Syllabus of Entrance Test for various courses:

Sr. no	Name of Department	Name of Course	Syllabus
1)	Agriculture	M.Sc. Sports Nutrition (2 years)	Click here
		Bachelor of Business Administration(Agri Storage and Supply Chain) (3 years)	Click here
		B.Sc. (Hons.) Agriculture (4 years)	Click here
		B.Sc. Dietetics and Nutrition (4 years)	Click here
2)	Apparel & Textile Technology	B.Tech (Textile Processing Technology) (4 years)	Click here
		M.Sc. (Fashion Designing) (2 years)	Click here
		M.Sc. Fashion Designing (FYIP)	Click here
3)	Biotechnology	M.Sc. (Biotechnology) (2 years)	Click here
4)	Botanical & Env. Sciences	M.Sc. (FYIP) Botany	Click here
		M. Sc (Botany) (2 years)	Click here
		M.Sc. (Environmental Sciences) (2 years)	Click here
5)	Chemistry	M.Sc. Chemistry (2 years)	Click here
		M.Sc. Applied Chemistry (2 years)	Click here
		M.Sc. (FYIP) Chemistry	Click here
6)	Computer Science	MCA (2 years)	Click here
		MCA(FYIP)	Click here
7)	Computer Engineering & Technology	M.Tech (Computer Science & Engineering) (2 years)	Click here
		B.Tech (Comp. Engg.) (4 years)	Click here
8)	Computational Statistics & Data Analytics	M.Sc. (Computational Statistics and Data Analytics) (FYIP)	Click here
		M.Sc (Computational Statistics and Data Analytics) (2 years)	Click here
9)	Education	M.Ed. (2 years) University Common Admission Test	Click here
		M.A. Education (Educational Management & Leadership) (2 years)	
		B.Ed. Special Education (MD) (2 years)	
		B.Sc. (Early Childhood Care and Education) (4 years)	
10)	English	M.A. English (2 years)	Click here
11)	Electronics Technology	M.Tech (Electronics & Communication Engineering) (2 years)	Click here
12)	Food Science & Technology	M.Sc. Food Technology (2 years)	Click here
		M.Sc. (FYIP) Food Technology	Click here
		B.Tech. (Food Tech.) (4 years)	Click here
13)	G. R. D. School of Planning	M. Tech. (Urban & Regional Planning) FYIP	Click here
		M. Tech. (Urban Planning/Infrastructure Planning/Transport Planning) (2 years)	Click here
14)	Guru Nanak Studies	M.A. Philosophy (2 years)	Click here
		M.A. (Religious Studies) (2 years)	Click here

15)	Hindi	M.A. Hindi (2 years)	Click here
16)	History	M.A. History (2 years)	Click here
17)	Human Genetics	M.Sc. (FYIP) Human Genetics	Click here
		M.Sc. Human Genetics (2 years)	Click here
18)	Laws	LL.M. (1 year)	Click here
19)	Mass Communication	M.A. Journalism & Mass Communication (2 years)	Click here
		M.A. Journalism & Mass Communication (FYIP)	Click here
20)	Mathematics	M.Sc. (FYIP) Mathematics	Click here
		M.Sc. (2 years) Mathematics	Click here
21)	Mechanical Engineeing	M.Tech (Artificial Intelligence and Robotics Engineering) (FYIP)	Click here
22)	Microbiology	M.Sc. (FYIP) Microbiology	Click here
		M.Sc. (Microbiology) (2 years)	Click here
23)	Molecular Biology & Biochemistry	B.Sc. Medical Lab (MLT) (4 years)	Click here
		M.Sc. (Molecular Biology and Biochemistry) (2 years)	Click here
		M.Sc. Biochemistry (Specialization in Sports Biochemistry) (2 years)	
24)	Music	M.P.A. Music Vocal (2 years)	Click here
		M.P.A. Music Instrumental (2 years)	Click here
25)	MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE	M.A. (Sports Psychology) (2 years)	Click here
		M.Sc. (Exercise & Sports Physiology) (2 years)	Click here
		M.Sc. (Sports Biomechanics) (2 years)	Click here
		Masters of Hospital Administration (2 years)	Click here
		MPT (Sports Physiotherapy) (2 years)	Click here
26)	Pharmaceutical	M.Pharmacy	Click here
		B.Pharmacy	Click here
27)	Physics	M.Sc. Physics (2 years)	Click here
28)	Physiotherapy	Bachelor of Physiotherapy	Click here
29)	Political Science	M.A. Political Science (2 years)	Click here
		M.A. Public Policy & Governance (2 years)	
30)	Physics	M.Sc. (FYIP) Physics	Click here
31)	Psychology	M.A. Psychology (2 years)	Click here
		Advanced Diploma In Guidance And Counselling (1 year)	Click here
32)	Punjab School of Economics	M.Sc. Economics (2 years)	Click here
		M.A. Business Economics (2 years)	Click here
		M.Sc. Economics (FYIP)	Click here
33)	Sanskrit	M.A. Sanskrit (2 years)	Click here
34)	School of Punjabi Studies	M.A. Punjabi (FYIP) Punjabi	Click here
		M.A. Punjabi (2 years)	Click here

35)	Social Science	B.A. Social Sciences (4 years)	Click here
		M.A. (International Relations) (2 years)	Click here
36)	Sociology	M.A. Sociology (2 years)	Click here
		Master of Social Work (2 years)	Click here
37)	Tourism and Hospitality	Master of Tourism & Travel Management (MTTM) (4 years)	Click here
		Master of Hotel Management and Catering Technology (MHMCT) (4 years)	Click here
38)	University School of Financial Studies	MBA (Finance) (FYIP)	Click here
		M.Com.(FYIP)	Click here
		M.Com (2 years)	Click here
		M.B.A. (Finance) (2 years)	Click here
39)	University Business School	MBA(FYIP)	Click here
		M.B.A. (2 years)	Click here
		M.B.A. (Financial Management) (2 years)	
		M.B.A. (Marketing Management) (2 years)	
		M.B.A (Human Resource Management) (2 years)	
40)	Urdu Persian	M A Persian (2 years)	Click here
41)	Zoology	M.Sc. (FYIP) Zoology	Click here
		M.Sc. (Zoology) (2 years)	Click here
42)	University Common Admission Test (UG) 2024	MBA (FYIP) (with dual specialization)/ MBA (Finance) (FYIP)/ MCA (FYIP)/ M.Com (FYIP)/ M.Sc. Economics (FYIP)/ Bachelor of Business Administration (Agri Storage and Supply Chain)/ Master of Tourism & Travel Management (MTTM)/ Master of Hotel Management and Catering Technology (MHMCT)/ M.Sc. Computational Statistics & Data Analytics (FYIP)/ B.A. Social Science/ M.A. Journalism and Mass Communication (FYIP)/ M.Sc. Fashion Designing (FYIP)	Click here
43)	Syllabus of Common Entrance test paper – 2024	M.A. (2 years) in History/International Relations/Philosophy/Political Science/ Public Policy & Governance/ Sociology/ Social Work/Religious Studies	Click here
44)	University Common Entrance Test (UG)-2024	M.Sc. (FYIP) Botany/Chemistry/Food Technology/Human Genetics/Mathematics /Microbiology/Physics/Zoology/B.Sc.(Hons) Agriculture/B.Sc. Dietetics and Nutrition/ B.Sc. Medical Lab (MLT)/ B.Pharmacy/ Bachelor of Physiotherapy/B.Tech (Comp. Engg.)./B.Tech. (Food Tech.)/B.Tech (Textile Processing Technology)/M.Tech	Click here

		(Artificial Intelligence and Robotics Engineering) FYIP/ Master of Technology (Urban & Regional Planning) (FYIP)	
45)	Syllabus for Common Entrance examination 2024-25	M.Sc. (2 years) : Botany, Microbiology, Zoology, Molecular Biology and Biochemistry, Biochemistry (Specialization in Sports Biochemistry) and Human Genetics	Click here

MULTIPLE CHOICE QUESTIONS
(M.Sc. Sports Nutrition)
Syllabus- Basic aspects of human biology and nutrition 50%

General aptitude- 40%
General knowledge- 10%

1. The percentage of total calories obtained from carbohydrates should be between-
   a) 15-20% b) 20-35%
   c) 50-60% d) 5-10%

2. All of the following vitamins act as antioxidant except-
   a) Vitamin D b) Vitamin A
   c) Vitamin E d) Vitamin C

3. Egg is reference protein
   a) Has high net protein utilization
   b) Has high biological value
   c) Has all essential amino acids
   d) Has high protein content

4. Human chorionic gonadotrophin responsible for maintenance of pregnancy in women originates from
   a) ovary b) pituitary
   c) uterus d) placental trophoblast

5. Daily dose of iron per day for adult man is
   a) 18 mg b) 24 mg
   c) 34 mg d) 40 mg

6. Girl : Beautiful:: Boy: ?
   a) Smart b) Heroic
   c) Courageous d) Handsome

7. Choose the odd one out-
   a) Apple b) Rose
   c) Marigold d) Lily

8. If SUMMER is coded as RUNNER, the code for WINTER will be-
   a) SUITER b) VIOUER
   c) WALKER d) SUFFER

9. Sphincter of Oddi is located in:
   a) Gastrium b) urinary bladder
   c) Biliary system d) Central nervous system

10. The upper house of the Indian Parliament is known as-

a) The Rajya Sabha b)The Lok Sabha

c) The Vidhan Sabha d) The Vidhan Parishad

Department of Biotechnology
(M.Sc. Biotechnology)

Syllabus for entrance exam (for University 12 seats)

Entrance test will be of 1 hour duration. It will consist of 60 multiple choice type questions of 10+2 level in the subjects of Physics, Chemistry and Mathematics. 40 questions will be from Biology (e.g. Botany, Zoology, Biochemistry, Microbiology, Genetics and Molecular Biology) of Bachelor's level. There will be no negative marking.

Department of Mass Communication

Guru Nanak Dev University

Syllabus for Entrance Test for Admission to M.A. Journalism & Mass Communication (Two Year Programme)

- General Awareness (Current Affairs, Awards & Winners, Science & Technology, Eminent Personalities)
- Media Aptitude (Basics of Mass Communication, Press & Media, Different Types of Mass Media, Advertising, Media Companies and Personalities)

Department of Computer Science

Syllabus for the MCA(Two Years) Entrance Test-2024

The MCA Entrance Test-2024 shall be based on the subjects of BCA/B.Sc.(IT) offered by GNDU and further as per the following details:

MCA Entrance Test 2024	
Exam Duration	One Hour
Mode of Examination	Offline
Question Type	Objective Type
Number of Questions	50
Total Marks	50
Marking Scheme	• 1 Marks for Each correct answer • Zero marks will be awarded for unattempted questions • No Negative marking

Syllabus for the 2 years M.Tech Entrance Test-2024 (Computer Science and Engineering/Electronics and Communication Engineering)

The syllabus for M.Tech 2024 Entrance Test shall be based on GATE-2024 syllabus as per the following particulars:

M.Tech Entrance Test-2024	
Exam Duration	One Hour Thirty Minutes
Modeofexamination	Offline Test
Questiontype	Objective type
Numberofquestions	60
Totalmarks	120
MarkingScheme	• 2 mark for each correct answer. • Zero marks will be awarded for un attempted questions • No negative marking

Department of Apparel & Textile Technology
Syllabus for M.Sc. (Fashion Designing) 2 years

Mode of Admission

The admission will be based on merit of the candidate in the Entrance Test to be conducted by the University in the subject of Fashion Designing. The Entrance test will contain 60 Objective type Questions with multiple choice answers.

Exam Duration: One Hour Thirty Minutes

Entrance test Syllabus for M.Sc. (Fashion Designing) two years programme

Fundamentals of Fashion Technology

1. **Introduction to sewing:** History of sewing machines. Sewing Machine: Different type of sewing machines, Maintenance of Sewing Machines, Common problems and their remedies, tools and equipment. Drafting & its importance. Study of Anthropometry: Methods of taking body measurements. Tools and equipment used in cutting, stitching and layout. Origin of clothing.

2. **Design Basics**: Introduction to art media and its application, different art media like Pencil, Pencil Color, Crayon, Poster Color, Eraser, Acrylic, Rendering and Shading Skills. Element of art and design- line, form, shape, size, textures and color. Principles of design- harmony, balance, rhythm, proportion, emphasis. Eight head theory of fashion figure.

3. **Fashion Conception:** Fashion Terminology: Fashion, Style, Change, Fashion Cycles, Fad, Classic, boutique, croquis, fashion trends, haute couture, designer, prêt-a-porter and silhouette. Fashion- Definition, importance, factors affecting fashion and difference of fashion and anti-fashion. Fashion-origin, evolution, cycles, length and breaks of fashion cycle. Fashion Leaders and Followers. Fashion Factors affecting apparel designing: Sex, Age, Occupation, Season, Occasion and Environment or Society.
   Fashion theories- trickle down, trickle across and bottom up theory.
   Fashion psychology- First impression, role of social and psychological aspect of clothing.
   Sociological choice of clothing as affected by nationality, tradition, class consciousness, occupation etc.
   National and international designer, brands, Fashion and anti-fashion
   Understanding the Trends: Market Survey- Developing a consumer Profile

Market Research: Definition and Objectives- Developing the research design, Data collection, analysis of data, presenting the findings

4. Fabric Construction Techniques

Fabric Construction: Introduction to different methods of fabric constructions (Weaving, knitting, Crocheting, Felting, Non-woven)

Loom- definition, basic motion of looms, parts of loom, types of looms and their operation.

Weaving- definition, principles, types of weaves (Basic and Novelty/Fancy Weaves) and their properties. Difference between weaving & knitting.

Knitting – Introduction to knitting, basic terms used in knitting, types of knitting (warp and weft) and their properties. Difference between warp and weft knitting.

5. Textile Fibres and Yarns

Fibers: Introduction to textile fibres and its importance in fashion design. Classification of textile fiber based on source: a) Natural- Cotton, Linen, Jute, Silk, Wool, etc b) Man-made- polyester, acrylic, Viscose Rayon, Nylon, Spandex, etc. Properties and applications of the fibres with respect to end uses.

Yarns: Introduction to yarn (different spinning process). Classification of yarns a) Simple yarns b) Novelty/Fancy yarns c) Bulk yarns. Yarn Properties: Linear density (count/tex/denier), Twist, Twist direction, Strength, elongation and uniformity.

Textile terminologies: Fibre, yarn, fabric, elasticity, absorbency, resiliency, abrasion resistance, etc.

6. Textile Wet Processing

Preparatory Processes: Introduction to the Grey Fabric, characteristics & classification of impurities. Singeing, Desizing, Scouring, Bleaching and Mercerization. Degumming and weighting of silk.

Dyeing: Introduction and objective of dyeing, Classification of various textile dyes. Pigment, Natural dyes, Synthetic dyes (direct, vat, sulphur, reactive, acid and disperse) and Mordant dyes. Methods of dyeing: a) Simple dyeing b) Resist dyeing Techniques: a) Tie and dye b) Batik.

Printing: Introduction and objectives of printing, Classification of textile printing: Direct printing, Discharge printing and Resist printing. Methods of Printing; Hand Printing: Block printing, Stencil printing, and Screen printing.

Finishing; Introduction and objectives of finishing, Classification of finishes, importance of various textiles finishes.

7. History of Costumes

Theories related to Origin of clothing, origin of Costumes and their development according to social factors. Ancient Indian Civilization Costumes: Indus Valley Period, Vedic Period, Kushan Period, Mauryan and Sunga Period, Satyavanaha Period, Gupta Period, Mughal Period (Pre-Post), British Period (Pre-Post). Traditional costumes of India: North Zone –

Punjab, Jammu and Kashmir. East Zone –Assam, West Bengal .West Zone –Maharashtra, Gujarat. South Zone –Kerala, Karnataka

8. **Fashion Marketing & Management**

Haute Couture, Pret-a-Porter, Mass Production. The Fashion Markets, Nature & Scope and the Market Environment. Consumer Market and behavior of consumers. Customer, Customer Identification, Planning and role of buyer.

Retail organizational store structure, store operations, store management, store merchandise. Store retailing & non store retailing.

Retail Fashion Promotion: Marketing channels. Planning and direction to promotion Advertising, Publicity, Special events, Visual Merchandising, Personal Selling, Relationship Marketing.

Fashion Forecasting & Analysis. Brand and labels. Purchase Term: Discount

9. **History of Indian Embroidery**

Bengal : Kanthas
Uttar Pradesh : Chikankari
Punjab : Phulkari
Gujarat : Sindhi and kutch Embroidery
Karnataka : Kasuti
Himachal Pardesh : ChambaRumal
Manipur : Manipuri
Kashmir : Kashida

Model Question paper for Entrance test for M.Sc. (Fashion Designing) Two Year Programme

1. Batik is ____ dyeing technique.

A. Resist
B. Tie & Dye
C. Egyptian
D. Stock

2. Any style that is accepted for a short period of time called _____.

A. Tradition
B. Classic
C. Fad
D. Old-fashioned

3. Ancient Egyptians used fiber for bandages for mummification was_____ .

A. Cotton
B. Linen
C. Jute

D. Silk

4. Road/route very important for exchange of luxury textiles between East and West was_____ .
A. G.T Road
B. Silk route
C. Persia Road
D. None of these

5. Asymmetrical balance occurs when the space within a garment is divided into _____ parts.
A. Equal
B. Unequal
C. Three
D. Four

6. Green and blues are _____colors.
A. Cool
B. Hot
C. Bright
D. Dull

7. Points create lines and lines create_____.
A. Shapes
B. Colors
C. Space
D. Emotions

8. Queen Marie Antoinette started a _____ revolution in France.
A. Freedom
B. Industrial
C. Fashion
D. Style

9. Comfort, Appearance, and Durability are the important factors for _____ of the garment.
A. Color
B. Wear
C. Good fitting
D. None of these

10. Which is an elastomeric fiber?

A. Acrylic

B. Mod Acrylic

C. Nylon

D. Spandex

Entrance Test Syllabus for M.Sc. Economics for Session 2024-25

Max. Marks: 150

Time Allowed: 1:30 hours

Micro Economics: 8 Questions

Theory of demand and consumer behavior: utility analysis and indifference curves analysis and their comparisons, Elasticity of demand and its measurement.

Theory of production and costs, concept of production function, laws of return to scale and law of variable or proportions. Cost concepts and cost curves in the short and in the long run.

Market forms and behaviour of average revenue and marginal revenue under perfect competition and imperfect competitions. Relationship between average revenue, marginal revenue and elasticity of demand. Price and output determination under perfect competition, monopoly and monopolistic competition Marginal Productivity theory of distribution.

Macro Economics: 8 Questions

Quantity theory of Toney (Fisher and Cambridge approaches); Say's Law of Market; Classical, loanable funds and liquidity preference theories of rate of interest determination; Classical and Keynesian views on labour market,

Keynesian consumption Function - its main features: average and marginal propensities to consume - their measurement and their inter-relationship; Multiplier – derivation, working and assumptions; MEC - meaning, prospective yield, supply price and role of expectations.

Derivation of super multiplier; Main features of the different phases of a trade cycle; Different kinds of business functions and their features; Upper ceiling (Full Employment) and lower ceiling; growth of income paths (Hick's model), distinction between Samuleson and Hicks models.

Inflation - meaning (emphasising its characteristics): Demand pull and cost push inflation, Control of inflation; Monetary and fiscal policies - their meaning, objectives and instruments.

Mathematics and Statistics: 5 Questions

Derivative of simple functions. Maxima and minima for single variable functions; concept of integration, matrices - properties and inverse.

Measurement of central tendency - mean, mode, median, geometric mean and harmonic mean. Measures of dispersion.

Simple correlation and regression (for grouped and ungrouped data).

Index numbers; weighted and unweighted index numbers, various formulas, Tests and index numbers.

Economic Development and Planning: 5 Questions

Economic Development: meaning and measurement, Economic and non-economic factors.

Dualism - Social and Technological; Lewis model of unlimited supply of labour; Rostow's stages of growth; Classical, Marxian, Schumpeter and Harrod - Domar model of growth.

Balanced and unbalanced growth; Theory of Big Push; Leibenstein's critical minimum efforts thesis; export promotion and import substitution.

Investment criteria; choice of technique; role of planning in underdeveloped countries; need, objectives, strategy and problems of planning.

Indian Economic Problems: 4 Questions

Indian economy on the eve of independence. Agriculture - causes of low productivity, land reforms, new agricultural strategy.

Industry - problems of industrial development, public sector, private sector, role of small and large scale industries, industrial policy since 1948.

Principle features of Indian tax system, centre-state financial relations.

Foreign trade: direction and composition of exports and imports, balance of payment problem, foreign aid.

Major problems of Indian economy - unemployment, poverty, inflation, inequality and population growth, New Economic Policy and its impacts; Liberalisation, Privatisation and Globalisation.

M.Sc. (Hons. School) in Economics
Entrance Test : 2018

Time Allowed : 2 Hours **M. Marks : 150**

Note: ***Attempt all the questions. All questions carry equal marks. Every question must be attempted on relevant page.***

Q1. What are the two laws of utility ? Explain.

Q2. Explain how AR, MR and Price Elasticity of Demand are related to each other ?

Q3. State and explain the conditions of consumer equilibrium with the help of indifference curve analysis.

Q4. Distinguish between returns to a factor and returns to scale with the help of diagrams.

Q5. Show diagrammatically the shut down point under Perfect Competition.

Q6. What is the shape of supply curve under Monopoly ?

Q7. What is product differentiation under Monopolistic Competition ?

Q8. What are the various assumptions of Marginal Productivity theory of distribution ?

Q9. State and explain Say's Law of Market.

Q10. Explain the three motives of Liquidity Preference Theory of rate of interest determination.

Q11. Explain Keynesian consumption function.

Q12. What are the main features of the different phases of trade cycle ?

Q13. Write briefly about Super Multiplier.

Q14. What are different types of inflation ?

Q15. Explain the labour market from the view point of classicals ?

Q16. Explain the meaning and basic instruments of Fiscal Policy.

Q17. Distinguish between balanced and unbalanced strategy of growth.

Q18. What are the non-economic factors in development ?

Q19. Distinguish between social and technological dualism.

Q20. Explain important features of Schumpeter's Growth Model.

Q21. Discuss the rationale of planning in developing countries like India.

Q22. How do you consider over-population as an obstacle in economic development ?

Q23. What should be done to make Indian exports more competitive in the world market ?

Q24. What should be done to increase agricultural production in India ?

Q25. In what ways, privatization has promoted or retarded economic development of India ?

Q26. The average daily wage of all workers in a factory is Rs.444. If the average daily wages paid to male and female workers are Rs.480 and Rs.360 respectively, find the percentage of male and female workers employed by the factory.

Q27. Differentiate $\sqrt{\frac{1-x}{2+x}}$ with respect to x.

Q28. Find inverse of the matrix and verify $A.A^{-1} = I$

$$A = \begin{vmatrix} 1 & 3 & 4 \\ 4 & 1 & 2 \\ 3 & 2 & 2 \end{vmatrix}$$

Q29. From the following data find the value of mean and median:

Weight (in Kg)	93-97	98-102	103-107	108-112	113-117	118-122	123-127	128-132
No. of students	3	5	12	17	14	6	3	1

Q30. From the following data, calculate Karl Pearson's Coefficient of Correlation:

X	6	2	10	4	8
Y	9	11	?	8	7

Arithmetic means of X and Y series are 6 and 8 respectively.

Entrance Test Syllabus for M.A. Business Economics for Session 2024-25

Maximum Marks: 50

Time Allowed: 1:30 hours

Micro Economics:

Economic Problem and production possibility curve; Law of Demand; Elasticity of Demand; Consumer Equilibrium with Ordinal and Cardial Utility Analysis, Price, Income and Substitution Effects; Consumer Surplus; Production Function; Law of Variable Proportions and Returns to Scale; Economics of Scale; Cost and Revenue: Total, Average and Marginal; Perfect Competition, Monopoly.

Macro Economics:

National Income Aggregates; National Income Estimates, Circular flow of Income in Two, Three and Four Sector Economy, Say's law of Market; Classical and Keynesian Theory of Income and Employment; Principle of Effective Demand; Consumption Function; APC, MPC, APS and MPS.

Current Issues in Indian Economy:

Current Economic Problems in India: Poverty, Unemployment, Budget, Govt. Policies, Agriculture, Industrial & Services Sector performances, Foreign Trade & Trade Relations, national and international organizations and other current economic affairs.

Current Affairs and General Knowledge:

Developments in Indian & Global Corporate World, International Economic news & Events, Current development at national level, other General Knowledge & Current Affairs.

M.A. (Business Economics)
Entrance Test : 2016

Time Allowed : 1:30 hours

Max. Marks : 50

Roll No.

In figures : _____

In words : _____

_____

INSTRUCTIONS

1. Attempt all questions in Section-A (objective type) and tick (✓) the answer accordingly. Each question carries 1 mark.
2. Attempt any two questions from Section-B (subjective type) on the separate answer-sheet. Each question carries 15 marks.

****

Section - A

Note : Attempt all questions.

1. Who is the present Governor of RBI ?
   (a) Dr. D. Subbarao (b) Dr. Y.V. Reddy
   (c) Dr. Raghuram Rajan (d) Dr. C. Rangarajan

2. Who amongst the following were NOT being the Finance Minister of India.
   (a) Pranab Mukherjee (b) Manmohan Singh
   (c) P. Chidambaram (d) A.K. Antony

3. 'Christine Legarde' is associated with
   (a) International Monetary Fund (IMF)
   (b) International Bank for Reconstructions and Development (IBRD)
   (c) Asian Development Bank (ADB) (d) None of above

4. Amongst the following, India is NOT the part of
   (a) BRICS (b) SAARC
   (c) ASEAN (d) All of above

5. In the last one decade, which one among the following sectors has attracted the highest FDI inflows into India ?
   (a) Chemicals other than fertilizers (b) Service sector
   (c) Food Processing (d) Telecommunications

6. If the cash reserve ratio (CRR) is lowered by the RBI, its impact on credit creation will be to
   (a) Increase (b) Decrease
   (c) No impact (d) None of the above

7. Excise duty is a tax levied on the
   (a) Import of goods (b) Export of goods
   (c) Production of goods (d) Sale of goods

8. What was the growth rate of the Indian economy during 2015-16:
   (a) 6.7% (b) 7.6%
   (c) 5.6% (d) None of the above

9. Which of the following is not a direct tax:
   (a) Wealth tax (b) Income tax
   (c) Sales tax (d) Estate duty

10. India declared Plan Holiday in:
    (a) 1951-53 (b) 1966-69
    (c) 2001-04 (d) None of the above

Contd.....2

11. WTO was established on:
(a) January 2001 (b) January 1991
(c) January 1995 (d) None of the above

12. Who is Finance Minister of India ?
(a) Sushma Swaraj (b) Arun Jaitley
(c) Smriti Irani (d) None of the above

13. Who is the Chairman of 'NITI AYOG' ?
(a) Finance Minister of India (b) Governor, RBI
(c) Chief Economic Advisor of India (d) Prime Minister of India

14. The progress in increase of fish production is called:
(a) Green revolution (b) Blue revolution
(c) Black revolution (d) Golden revolution

15. Notes are issued by:
(a) RBI (b) State Bank of Patiala
(c) State Government (d) Central Government

16. First Five Year Plan was introduced in:
(a) 1951 (b) 1956
(c) 1961 (d) 1962

17. The difference between GDP and NDP is:
(a) Government Revenue (b) Consumption of fixed assets
(c) Capital formation (d) Subsidies

18. The working of SEBI includes:
(a) To regulate the dealing of share market
(b) To check the continuous decline in share market
(c) To control the inside trading of share
(d) All of the above

19. Name the state of India which is most populous.
(a) Andhra Pradesh (b) Uttar Pradesh
(c) Goa (d) Tamil Nadu

20. On which day, International Yoga Day is celebrated:
(a) Ist January (b) 13th March
(c) 2nd October (d) 21st June

Contd.....3

Section - B

Note: Attempt any two questions. Each question carry 15 marks.

1. Discuss role of social media in contemporary societies.
2. Why Indian farmers are committing suicides ? What are the causes of farmers distress ?
3. Write a comprehensive note on the status of poverty-unemployment in India.
4. Most people prefer shopping in supermarkets to small shops or local markets. Is this a positive or negative development ? Give your viewpoint in the context of Indian economy.

Education Department

Entrance test syllabus for various courses of the department

Entrance test syllabus for various courses of the department

S. No.	Class/Course	Syllabus	Marks	No. of Questions	Duration
1.	M.Ed.	**Logical Reasoning & Mental Ability:** • Verbal reasoning: Coding, Decoding, Analogy, Classification, Series, Direction sense test, relations, mathematical operations, time test, odd man out problems. • Non Verbal reasoning: Series, Analogy and Classification. Basic numerical skills, Percentage, Number system, LCM and HCF, Ratio and Proportion, Number series, Average, Problems based on Ages, Profit & Loss, Partnership and Mixture, Simple and Compound Interest, Work and Time, Time and Distance. Mensuration and Data Interpretation. • Current Affairs	25 25	25 25	01.30 hour
		• Content Based (B.Ed.)	25	25	

		• Teaching Aptitude • Current Affairs	25	25	
3.	B.Ed. Special Education (MD)	• Logical Reasoning & Mental Ability: **Verbal reasoning:** Coding, Decoding, Analogy, Classification, Series, Direction sense test, relations, mathematical operations, time test, odd man out problems. **Non Verbal reasoning:** Series, Analogy and Classification. Basic numerical skills, Percentage, Number system, LCM and HCF, Ratio and Proportion, Number series, Average, Problems based on Ages, Profit & Loss, Partnership and Mixture, Simple and Compound Interest, Work and Time, Time and Distance. Mensuration and Data Interpretation.	25 25	25 25	01.30 hour
4.	B.Sc. (Early Childhood Care and Education)	**Logical Reasoning & Mental Ability:** • Verbal reasoning: Coding, Decoding, Analogy, Classification, Series, Direction sense test, relations, mathematical operations, time test, odd man out problems. • Non Verbal reasoning: Series, Analogy and Classification. Basic numerical skills, Percentage, Number system, LCM and HCF, Ratio and Proportion, Number series, Average, Problems based on Ages, Profit & Loss, Partnership and Mixture, Simple and Compound Interest, Work and Time, Time and Distance. Mensuration and Data Interpretation.	25	25	01 hour
		• Current Affairs	25	25	

6.	a) B.A.B.Ed. (Integrated Teacher Education Programme - ITEP) (Secondary Stage) b) B.Sc.B.Ed. (Integrated Teacher Education Programme - ITEP) (Secondary Stage) c) B.Com.B.Ed. (Integrated Teacher Education Programme - ITEP) (Secondary Stage)	**Note: Admission will be on the basis of marks obtained in the National Common Entrance Test (NCET) conducted by NTA, syllabus of which will be uploaded on the website later. Keep visiting website timely.**

Note: All questions will be objective type.
There will be no negative marking.

English

PATTERN
M.A. ENGLISH ENTRANCE TEST – 2024

The pattern of question paper for the entrance test for admission to M.A. English Semester-I (2024-2025) is as follows:

Q1. Comprehension of a Prose Passage OR
Comprehension of a Short Poem 25 marks

Note: In the test, questions on comprehension of either a prose passage or a poem will be set to test (a) Comprehension of text (b) Knowledge of meanings of individual words/phrases/sentences.

Q2. Vocabulary: Meaning of given words and their usage in sentences.
(10x1.5=15 marks)

Q3. Rewriting the given sentences as instructed –
(10x2=20 marks)

Q4. Common literary terms: meaning and explanation –
(4x5=20 marks)

(Recommended book for reading: A Glossary of Literary Terms by M.H. Abrams)

Q5. A Paragraph on one of the 3 topics given in the test
20 marks (250 words approximately)

SAMPLE QUESTIONS

Q1. Read the following passage and answer the questions given at the end. Your answers should be brief and in your own words. Match your answers to the marks allotted for each questions. (25 marks)

In the town of Surat, in India, was a coffee-house where many travellers and foreigners from all parts of the world met and conversed.

One day a learned Persian theologian visited this coffee-house. He was a man who had spent his life studying the nature of the Deity and reading and writing books upon the subject. He had thought, read and written, so much about God that eventually he lost his wits, became quite confused and ceased even to believe in the existence of a God. The Shah, hearing of this, had banished him from Persia.

After having argued all his life about the First Cause, this unfortunate theologian had ended by quite perplexing himself, and instead of understanding that he had lost his own reason he began to think that there was no higher Reason controlling the universe.

The man had an African slave who followed him everywhere. When the theologian entered the coffee-house the slave remained outside, near the door, sitting on a stone in the glare of the sun and driving away the flies that buzzed around him. The Persian having settled down on divan in the coffee-house ordered himself a cup of opium. When he had drunk it and the opium had begun to quicken the working of his brain, he addressed his slave through the open door.

„Tell me, wretched slave," said he, „do you think there is a God, or not?"

„Of course there is," said the slave and immediately drew from under his girdle a small idol of wood.

„There," said he, „that is the God who has guarded me from the day of my birth. Every one in our country worships the fetish tree, from the wood of which this God was made."

Questions:

- What did the visitors do in the coffee-house? 2 marks
- study about God
- drink coffee
- take rest
- meet, talk and enjoy drink

- Where did the learned man came from? 2 marks
- India
- Persia
- Africa
- Unknown country

- Where was his slave when the learned man asked him the question? 2 marks
- in the coffee-house resting
- in the coffee-house keeping the flies off his master
- outside the coffee-house sitting
- outside the coffee-house talking to someone

- What does a theologian do? 2 marks

- How does the slave answer his master"s question? 4 marks

- Why did the Shah send the learned man away? 4 marks

- What did the learned man believe in, and why? 4 marks

Q1. Give a close reading to the following poem and answer the questions given at the end of the poem: (25 marks)

A NOISELESS PATIENT SPIDER
A noiseless patient spider
I marked where on a little promontory it stood isolated, Marked how
to explore the vacant vast surrounding,
It launched forth filament, filament, filament, out of itself, Ever
unreeling them, ever tirelessly speeding them.

And you O my soul where you stand,
Surrounded, detached, in measureless oceans of space,
Ceaselessly missing, venturing, throwing, seeking the spheres to connect them, Till the bridge
you will need be formed, till the ductile anchor hold,
Till the gossamer thread you fling catch somewhere, O my soul.

*Promontory – projection, jutting

- How does the first stanza (entirely about the spider) set up an elaborate parallel or comparison with the second (about the human soul)?

- What effect is achieved by repeating the words "filament" and "ever" in the first stanza?

- The spider‟s task is “to explore.” What does the soul do that is comparable?

- In what ways are the types of activities of the spider and the soul different? Which is more explanatory and tentative?

- Which two lines do you like and why?

QII. Write the meanings of the following words and use them in your own sentences: Brisk, Consequence, Metabolism, Symmetry, Symphony…

QIII. Rewrite the following sentences according to the instructions given in italics:

- I‟ve been working there for fifteen years.

- Suppose this sentence has been spoken by someone to you and you don‟t clearly understand if he has said *fifty* or *fifteen*. To know the missing information, ask a question beginning with **How…**

- The Managing Director prefers to leave finance affairs to the accountant.
- Change the form of the underlined word to make it suitable in the sentence.

- Their product is nothing like as attractive as ours, we feel.
- Rewrite the sentence without changing its meaning. Begin as **Our product is far…**

- From your voice, I‟d say you have a cold.
- Rewrite the sentence without changing its meaning. Begin the sentence with **You sound…**

- “I didn‟t steal the money”, said Joe.
- Rewrite the sentence as indirect speech using **denied** to make it a negative statement.

- It is possible that they didn‟t receive your letter.
- Rewrite the sentence using „**might’** to convey the sense of possibility.

- Rich people have a longer life expectancy than poor people.
- Rewrite the sentence using one of the following options so that it is grammatically as well as logically correct: (a) certain to (b) sure to (c) bound to (d) likely to

- Let us wait and see what she says.
- Choose one of the options to rewrite the sentences so that it has the same meaning. (a) understand (b) find out (c) consider (d) imagine.

- I admire so many things about her: her generousness, her intelligence, her looks and above all her self-confidence.
- Correct the form of some words in the sentence.

- He smokes all the time, I can‟t stand that about him.
- Rewrite the two sentences as one beginning your sentence with **What I…**

Q.IV Write about 50 words on each of the following literary terms:

- Elegy
- Metaphor
- Tragedy
- Symbolism
- Satire (4x5=20 marks)

QV. Write a well developed paragraph of about 250 words on any one of the following topics: (20 marks)

- If I were Grass!
- Are we happier than our forefathers?
- Indian weddings are extravagant.

M. A. HINDI (CBCEGS)

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,e-,- fgUnh

ikB~;Øe

fgUnh lkfgR; dk vkfndky % lkekU; ifjp;

fgUnh lkfgR; dk HkfDrdky % lkekU; ifjp;

fgUnh lkfgR; dk jhfrdky % lkekU; ifjp;

fgUnh lkfgR; dk vk/kqfudky % lkekU; ifjp;

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iz;kstuewyd fgUnh&izk:i.k] iYyou fVIi.k] la{ksi.k] i=dkfjrk ds izeq[k lanHkZ

M. A. HINDI (CBCEGS)

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fuEufyf[kr esa lgh fodYi ij ¼√½ lgh yxk,a %

1- rqylhnkl dk laca/k fdl jpuk ds lkFk gS\

¼d½ xksnku¼[k½ dkek;uh ¼x½ jkepfjrekul ¼?k½ jkepfUnzdk

2- lekl fdrus izdkj ds gS\

¼d½ rhu ¼[k½ pkj ¼x½ ik¡p ¼?k½ Ng

3- ^vk¡[k* dk i;kZ; gS %

¼d½ n`x ¼[k½ nqxZ ¼x½ u;urkjk ¼?k½ Jo.k

4- laKk ds LFkku ij iz;qDr gksus okys 'kCn dks ---------- dgrs gS %

¼d½ fo'ks"k.k ¼[k½ fØ;k ¼x½ loZuke ¼?k½ fØ;k&fo'ks"k.k

5- ^jh<+ dh gM~Mh* ,dkadh ds jpudkj gS %

¼d½ eksgu jkds'k ¼[k½ txnh'k pUnz ¼x½ jkedqekj oekZ ¼?k½ lqjsUnz oekZ

6- ^pkj.kdky* fdls dgk x;k gS\

¼d½ vkfndky ¼[k½ e/;dky ¼x½ vk/kqfud dky ¼?k½ jhfrdky

7- jhfrdky dks ^vyaÑrdky* fdlus dgk\

¼d½ jkepUnz 'kqDy ¼[k½ jek'kadj 'kqDy jlky

¼x½ feJca/kq ¼?k½ fxz;lZu

8- lwjnkl fdl dkO;/kkjk ds dfo gS\

¼d½ Ñ".k dkO;/kkjk ¼[k½ lwQh dkO;/kkjk

¼x½ jke dkO;/kkjk ¼?k½ izse dkO;/kkjk

9- dkSu lk miU;kl izsepan dk ugha gS\

¼d½ fueZyk ¼[k½ eSyk vkapy ¼x½ jaxHkwfe ¼?k½ lsoklnu

10- fu/kkZfjr fo"k; dk foLr`r foospu ---------- dgykrk gSA

¼d½ fVli.k ¼[k½ iYyou ¼x½ izk:i.k ¼?k½ la{ksi.k

fuEufyf[kr iz'uksa ds y?kq mÙkj nhft,%

1- dchj dk lkfgfR;d ifjp; nhft,A

2- lxq.k dkO;/kkjk dh izeq[k izo`fÙk;ksa ij izdk'k Mkfy,A

3- laKk dh ifjHkk"kk nsrs gq, blds izeq[k Hksnksa dh ppkZ dhft,
¼5×3=15½

fuEufyf[kr iz'uksa ds nh?kZ&mÙkj nhft,A

1- fgUnh ds orZeku Lo:i ij fucU/k fyf[k,A

2- vki fgUnh esa ,e- , D;ksa djuk pkgrs gSa\
¼7½×2=15½

Law Department

LL.M Entrance Test (2024-2025)

Examination: LL.M. Entrance Outline of Syllabus

Note: The LL.M Entrance Test will be of 1 hour duration carrying 50 marks. It will Consist of 50 objective type questions with multiple choice answers, There will be no negative marking.

Jurisprudence:-Nature, Definition, Scope and Its Indian Perspective, Sources-Custom, Legislation, Precedent, Schools-Natural, Historical, Sociological, Analytical, Realist, Role of Artificial Intelligence and Robotics

Concepts-State, Sovereignty, Administration of Justice, Rights & Duties, Ownership, Possession

Constitution:-Evolvement & Salient Features of the Constitution, Basic Features, Preamble, Citizenship, State, Definition of Law, Operation of Legislations and Doctrine of Ultravires, Fundamental Rights and Duties, Rule of Law, Reservations &Protective Discrimination. Separation of Powers, Judicial Review, Directive Principles, Union & State Executive, Union & State Legislature, Coexistence of Central & State powers, Union & State Judiciary, Power of appointment and Transfer of Judges, Judicial accountability, Open & Transparent Government, Emergency Provisions, Amendment

International Law:- Sources of International Law, Treaties, League of Nations, United Nations and its organizations, Extradition, Law of Sea, Relation with Municipal Law, Recent Developments

Family Law:- Personal Law & its nature, Sources, Marriage, Divorce, Adoption, Guardianship, Maintenance, Succession, Uniform Civil Code, same sex marriages

Commercial Law:- Offer, Acceptance, Standard Form of Contracts, Consideration, Privity of Contract & Consideration, Contracts of Minor, Unsound Persons, Void & Voidable Contracts, Conditional Contracts, Performance & Breach, Damages, Nature & Scope of Partnership & Limited Partnership, Salient Features of Sale of Goods, Insurance, Banking, Company, Consumer & Competition Law, E-commerce

Criminal Law:- Theories/Forms of Punishment, Indian Penal Code,1860/ Bhartiya Nyaya Sanhita, 2023: Definitions, General Exceptions, Offences against the State, Offences affecting Human Body, Property, Offences against women and children

Environment Protection Law:- International & National Developments

Law of Torts and Consumer Protection:- Nature and scope, General Defences, Absolute Liability, Strict Liability, Defamation, Trespass, Consumer Protection Act: Definitions, Rights of the Consumer, Commissions: Composition and Jurisdiction.

Department of Mass Communication

Guru Nanak Dev University

Syllabus for Entrance Test for Admission to M.A. Journalism & Mass Communication (Two Year Programme)

- General Awareness (Current Affairs, Awards & Winners, Science & Technology, Eminent Personalities)
- Media Aptitude (Basics of Mass Communication, Press & Media, Different Types of Mass Media, Advertising, Media Companies and Personalities)

SYLLABUS OF THE ENTRANCE TEST FOR ADMISSION TO M.P.A. MUSIC VOCAL & M.P.A. MUSIC INSTRUMENTAL FOR SESSION 2024-25

Entrance test includes two components:
Theory Exam : 50 marks
Practical Exam: 50 marks
Total : 100 marks

SYLLABUS FOR THEORY EXAMINATION

Duration of Exam: 1.5 Hrs.

- Brief knowledge of following technical terminology of Music:-
  - Swara
  - Saptak
  - Raga
  - Nada
  - Laya
  - Tala
  - Vadi Swara
  - Samvadi Swara
  - Varjit Swara
- Brief introduction of following technical terms of Gurmat Sangeet:-
  - Ank
  - Mohalla
  - Jati, Ghar
  - Jodi
  - Rababi
  - Saath
  - Partaal
- Write down one Notation in Drut Khayala/Gata of any Raga of your choice.
- Description and Notation of the following Talas in Ekgun, Dugun and Chaugun Layakaries:-
  - Teentaal
  - Ektaal
  - Jhaptaal
  - Keharava
  - Dadra Taal
- Detailed knowledge of Folk music of Punjab.
- Salient features of Gurmat Sangeet.
- Opportunities and Challenges in Music in modern times.
- Biographical sketch and contribution of any Musician of your choice.

SYLLABUS FOR PRACTICAL EXAMINATION

- Practical demonstration of One Raga of your choice with proper classical style.
- One Light Composition/Dhun of your choice.
- Presentation of Teen Tala on Tabla and on Hands in Ekgun and Dugun Layakaris.

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MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE

GURU NANAK DEV UNIVERSITY, AMRITSAR

ENTRANCE EXAM PATTERN DETAILS:

ENTRANCE EXAM: MCQ OF 50 MARKS
SYLLABUS: 50% REASONING QUESTIONS AND 50% BASIC PSYCHOLOGY

SAMPLE QUESTIONS FOR THE ENTRANCE TEST OF M.A. (SPORTS PSYCHOLOGY)

1. Which of the following is a law of learning?
   (a) Law of readiness
   (b) Law of exercise
   (c) Law of effect
   (d) All the above.

2. Mental development includes
   (a) External and internal organs
   (b) reasoning and thinking
   (c) Ethical and moral
   (d) emotional maturity.

3. Play is to actor as concert is to

   (a) Symphony
   (b). Musician.
   (c). Piano.
   (d). Percussion

4. Statement: The principal instructed all the teachers to be careful in class because some students may disturb other students.
Assumption:
I the teacher may handle the situation properly and they may restrict the naughty students.
II the students will welcome the decision of the principal.
   (a) If only assumption I is implicit
   (b) If only assumption II is implicit
   (c) If either I or II is implicit
   (d) If neither I nor II is implicit

5. The therapy of psychoanalysis was developed by
   (a) Skinner
   (b) Sigmund Freud
   (c) Plato
   (d) Darwin.

6. Sports performance is the bi-product of

(a) Skill
(b) conditional ability
(c) Total personality
(d) tactical ability.

7. Which is the most effective method for encouraging self learning?

(a) Demonstration method
(b) Lecture method
(c) Observation method
(d) Task method.

8. Class A has a higher enrollment than class B.
Class C has a lower enrolment than class B.
Class A has a lower enrollemnt than class C.
If the first two statements are true, the third statement is :

(a) True
(b) False
(c) Uncertain
(d) None

9. All animals have

(a) Eyes
(b) Four legs
(c) Horns
(d) Instincts

10. Some green are blue. No blue are white.

(a)Some green are white.
(b)No white are green.
(c)No green are white.
(d) None of the above.

MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE

GURU NANAK DEV UNIVERSITY, AMRITSAR

ENTRANCE EXAM PATTERN DETAILS:

ENTRANCE EXAM: MCQ OF 50 MARKS

SYLLABUS: 80% from Basic Human Physiology 20% from Current Affairs of Sports.

SAMPLE QUESTIONS FOR THE ENTRANCE TEST OF M.Sc. (EXERCISE & SPORTS PHYSIOLOGY)

1. Following which one is an ergometer?
   a) Treadmill
   b) Hand-Grip measurement instrument
   c) Electromyography
   d) Functional Near Infra-Red Spectroscopy

2. How many ATP generated after one mole of glucose metabolism?
   a) 6
   b) 8
   c) 2
   d) 4

3. "Light weight shoes" is which type of ergogenic aids?
   a) Pharmacological
   b) Physiological
   c) Psychological
   d) Mechanical

4. Cardiac output value in resting condition is
   a) 5 L/min
   b) 10 L/min
   c) 20 L/min
   d) 15 L/min

5. Last hockey world champion title secured by which team?
   a) Australia
   b) Netherland

c) India
d) Belgium

6. Which one is slow oxidative fiber?
   a) Type I
   b) Type IIa
   c) Type IIb
   d) Type IIc

7. In 2019 who secured the first place in Khelo India?
   a) Delhi
   b) Haryana
   c) Maharashtra
   d) Punjab

8. Explosive strength is measured by
   a) Vertical jump test
   b) Counter Movement Jump Test
   c) Illionis test
   d) Step test

9. Tidal volume normal value is
   a) 100-150 ml
   b) 800-1000 ml
   c) 500-600 ml
   d) 1300-2000 ml

10. Isokinetic training involves
    a) Muscle activation with voluntary facilitation
    b) Angular muscle activation with resistance
    c) Concentric and eccentric muscle activation with load
    d) Muscle modulation via stretch and myotatic reflex

MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE

GURU NANAK DEV UNIVERSITY, AMRITSAR

ENTRANCE EXAM PATTERN DETAILS:

ENTRANCE EXAM: MCQ OF 50 MARKS

SYLLABUS: The entrance exam will be comprised of questions related to general awareness, English, Basic principles of Physics, Fundamentals of Biology and concepts of Mathematics.

SAMPLE QUESTIONS FOR THE ENTRANCE TEST OF M.Sc. (SPORTS BIOMECHANICS)

1. Lower body flexibility is measured by which test?
   a) Sit & Reach Test
   b) Harvard Step Test
   c) 600-metre run
   d) Push-up

2. Each gram of fat has how many calories?
   a) 3
   b) 4
   c) 9
   d) 11

3. What is Newton's second law of motion also known as?
   a) Law of acceleration
   b) Law of inertia
   c) Law of attraction
   d) Law of friction

4. How much force is needed to accelerate our 300 Newton object 2 m/s^2 ?
   a) 150 Newton
   b) 30.61 Newton
   c) 61.22 Newton
   d) 15.31 Newton

5. In which following city, the Commonwealth Games were held twice?
   a) Delhi
   b) Gold Coast
   c) Glasgow
   d) Edinburgh

6. Energy expenditure can be measured by indirect calorimetry, involves measuring.
   a) heat production by the body
   b) oxidative enzyme levels
   c) oxygen consumption
   d) carbon dioxide production
   e) respiratory exchange ratio

   choose the correct answer from the options given below:

   a) A, C, E only
   b) B, D, E only
   c) A, B, C only
   d) C, D, E only

7. Match list I with list II:

List I (Technological resources)	List II (Purpose)
A. pedometers	1. tracking of speed and direction
B. heart rate monitors	2. assessing body composition
C. GPS	3. records the number of steps taken.
D. bioimpedance devices	4. intensity levels of activity

   choose the correct answers from the options given below:
   a) A2, B3, C1, D4
   b) A2, B1, C3, D4
   c) A3, B4, C1, B2
   d) A4, B2, C3, B1

8. The force that provides the body an upward thrust in water borne condition is
   a) force of gravity
   b) resistive force
   c) propulsive force
   d) buoyant force

9. This type of movement takes place when the angle decreases between the two bones attached to a joint. It is……
   a) Adduction
   b) Abduction

c) Extension
d) Flexion

10. In a gait cycle of walking the ratio of stance phase to swing phase is approximately
    a) 50:50
    b) 60:40
    c) 70:30
    d) 40:60

MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE

GURU NANAK DEV UNIVERSITY, AMRITSAR

ENTRANCE EXAM PATTERN DETAILS:

ENTRANCE EXAM: MCQ OF 50 MARKS

SYLLABUS: The entrance exam will be comprised of questions related to general awareness, English proficiency, logical reasoning and basics of health and health sciences.

SAMPLE QUESTIONS FOR THE ENTRANCE TEST OF MASTERS IN HOSPITAL ADMINISTRATION

Aspirants can now practice MHA Sample question paper. This model paper is just for practice and acts as a window to know how the actual question paper will look like. It also helps to analyze your preparation level and can guide you towards possible remedial actions to work in your weak areas.

1. Write the letter which succeeds the letter which is midway between G and W:
   a) P
   b) Q
   c) O
   d) N

2. Scurvy is a deficiency disease caused by lack of :
   a) Vitamin A
   b) Vitamin C
   c) Vitamin B
   d) Vitamin D

3. If TOUR is coded as 1234, CLEAR as 56784, SPARE is coded as 90847, how would encode the word SCULPTURE:
   a) 953603147
   b) 953601347
   c) 953014376
   d) 956303147

4. World Health Day was observed on:
   a) April 7th
   b) May 7th

c) December 1st
d) March 8th

5. What is NABH?
a) National Association Board of Health and Hospital
b) National Accreditation Board for Hospitals and Healthcare Providers
c) National Accreditation Board for Health
d) National Association of Bureau of Hospitals

6. Which is a regenerative organ in human body?
a) Pancreas
b) Kidneys
c) Liver
d) Lungs

7. The ozone layer is found in _____.
a) Thermosphere
b) Exosphere
c) Stratosphere
d) Earth Crust

8. The "Atlas" bone in the human body is located in:
a) Chest
b) Stomach
c) Neck
d) Feet

9. India's health expenditure in terms of GDP% is about:
a) 1
b) 1.2
c) 2
d) 2.2

10. Pencillin is a/an:
a) Antiseptic
b) Antibiotic
c) Disinfectant
d) Antitoxin

MYAS-GNDU DEPARTMENT OF SPORTS SCIENCES AND MEDICINE

GURU NANAK DEV UNIVERSITY, AMRITSAR

ENTRANCE EXAM PATTERN DETAILS:

ENTRANCE EXAM: MCQ OF 100 MARKS

SYLLABUS: All four years of Bachelors of physiotherapy – 90%

Current affairs in sports – 10%

SAMPLE QUESTIONS FOR THE ENTRANCE TEST OF MPT (SPORTS PHYSIOTHERAPY)

1. Which of the following findings is not characteristic of a "burner" or "stinger" and should prompt an evaluation for more serious underlying cervical spine injury?
    a. Any lower extremity involvement
    b. Bilateral upper extremity involvement
    c. Neck pain or tenderness
    d. None of the above

2. Which of the following statements regardingbasic fracture care is *false*?
    a. Reduction of fractures should be attemptedin the field only when neurovascular compromiseis present.
    b. Fractures should be splinted in the positionin which they are found, unless somedegree of reduction is required because ofneurovascular compromise.
    c. When dealing with an open fracture in which bone or soft tissue is extruding fromthe wound, one should attempt to pushthe bone or soft tissue back into the woundprior to splinting the extremity in order toavoid further contamination.
    d. When dealing with an open fracture in which bone or soft tissue is extruding fromthe wound, one should simply place a moiststerile gauze

over the wound and splint theextremity with no attempts made to pushthe bone or soft tissue back into the wound.

3. The assessment of core body temperature is best performed by which means?
    a. Tympanic
    b. Oral
    c. Rectal
    d. Axillary

4. What is the difference between a “flexion contracture” and an “extension lag” when referring to motion of a joint?
    a. “Extension lag” refers to loss of active extension with normal passive extension.
    b. “Flexion contracture” means loss of both active and passive extension.
    c. A and B are correct.
    d. None of the above.

5. _____ adjust the length of muscle spindles so that sensitivity to stretch can be maintained over a wide range.
    a. Alpha motor neurons
    b. Gamma motor neurons
    c. Sarcomere motor units
    d. Myofilament motor units

6. Which of the following statements describe thereparative process of skeletal muscle injury?
    a. Macrophages initially invade the injurysite via cellular chemotaxis.
    b. The fibroblast is the only cell stimulatedby cellular mediators such as interleukin-1that results in the activation of inflammatorycells.
    c. Two distinct types of fibroblasts play specificroles in the healing process by modulatingthe reparative process and phagocytizingdamaged tissue.
    d. Satellite cells are myogenic mononuclearcells responsible for muscle fiber regeneration.

7. Osteoclasts
    a. are multinucleated bone resorbing cells
    b. function independently to resorb bone
    c. make no obvious change to the surface of bone
    d. dissolve only the organic portion of bone in maintaining bone homeostasis

8. Proprioceptive neuromuscular facilitation is a form of
    a. muscular strength training
    b. muscular endurance training
    c. flexibility training
    d. cardiorespiratory training

9. All of the following are true regarding osteoarthritis (OA) *except*
    a. Studies have shown that exercise improves the pain and disability of patients with osteoarthritis.
    b. Patients with arthritis have substantially worse health-related quality of life than those without arthritis.
    c. Available data support the theory that in the absence of joint abnormalities physical activity does not lead to OA.
    d. Joint specific exercises benefit patients with OA greater than whole body strength training.

10. Who won the IPLT20 in 2019?
    a. Chennai Super Kings
    b. Mumbai Indians
    c. Sunrisers Hyderabad
    d. Delhi Capitals

Department of Pharmaceutical Sciences

Syllabus for M Pharmacy Entrance Test

Natural Products: Pharmacognosy & Phytochemistry- Chemistry, tests, isolation, characterization and estimation of phytopharmaceuticals belonging to the group of Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavanoids, Purines, Guggulipids. Pharmacognosy of crude drugs that contain the above constituents. Standardization of raw materials and herbal products. WHO guidelines. Quantitative microscopy including modern techniques used for evaluation. Biotechnological principles and techniques for plant development, Tissueculture.

Pharmacology: General pharmacological principles including Toxicology. Drug interactions. Pharmacology of drugs acting on Central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system. Pharmacology of Autocoids, Hormones, Hormone antagonists, chemotherapeutic agents including anticancer drugs. Bioassays, Immuno Pharmacology. Drugs acting on the blood & blood forming organs. Drugs acting on the renal system.

Medicinal Chemistry: Structure, nomenclature, classification, synthesis and SAR of the following category of drugs, which are official in Indian Pharmacopoeia and British Pharmacopoeia. Introduction to drug design. Stereochemistry of drug molecules. Hypnotics and Sedatives, Analgesics, NSAIDS, Neuroleptics, Antidepressants, Anxiolytics, Anticonvulsants, Antihistaminics, Local Anaesthetics, Cardio Vascular drugs – Antianginal agents Vasodilators, Adrenergic & Cholinergic drugs, Cardiotonic agents, Diuretics, Antihypertensive drugs, Hypoglycemic agents, Antihyperlipedmic agents, Coagulants, Anticoagulants, Antiplatelet agents. Chemotherapeutic agents-Antibiotics, Antibacterials, Sulpha drugs. Antiproliozoal drugs, Antiviral, Antitubercular, Antimalarial, Anticancer, Antiamoebic drugs, Diagnostic agents. Preparation and storage and uses of official Radiopharmaceuticals, Vitamins and Hormones. Eicosonoids and their application.

Pharmaceutics: Formulation, preparation and evaluation of solid, liquid and semi-solid dosage forms. Manufacturing standards, Quality control limits, labeling as per the Pharmacopoeial requirements, Storage conditions of different dosage forms. Concept of microencapsulation and its applications. Introduction to Novel drug delivery systems such as Nanoparticles, Liposomes, Niosomes etc. Biopharmaceutics and Pharmacokinetics and their importance in drug product design. Formulation and preparation of cosmetics products, Sterilization techniques, Pharmaceutical calculations. Pharmaceutical Jurisprudence: Drugs and Cosmetics Act and rules with respect to manufacture, sales and storage. Pharmacy Act, pharmaceutical ethics.

Pharmaceutical Analysis: Principles, instrumentation and applications of the following: Absorption spectroscopy (UV, visible & IR). Fluorimetry, Flame photometry, Potentiometry. Conductometry and Polorography. Pharmacopoeial assays. Principles of NMR, ESR, Mass spectroscopy. X-ray diffraction analysis and different chromatographic methods.

Biochemistry: Biochemical role of hormones, Vitamins, Enzymes, Nucleic acids, Bioenergetics.General principles of immunology. Metabolism of carbohydrate, lipids, proteins. Methods to determine, kidney & liver function and lipid profiles.

Microbiology: Principles and methods of microbiological assays mentioned in the Pharmacopoeia. Methods of preparation of official sera and vaccines. Serological and diagnostics tests. Applications of microorganisms in Bio-conversions and in the Pharmaceuticalindustry.

Clinical Pharmacy: Therapeutic Drug Monitoring, dosage regimen in pregnancy and lactation, pediatrics and geriatrics, renal and hepatic impairment. The drug-drug interactions and drug–food interactions, adverse drug reactions. teratogenicity, prescription writing, clinical trials (Overview), patientcounseling.

Note: The test will of two hours duration which consist of 100 multiple choice questions of onemark each. Candidates are required to shade the correct answer on the OMR sheet with Black Pen. There will be no negative marking. After the test is over, the candidate has to return the question booklet along with the OMR sheet to theinvigilator.

Sample Model Questionpaper

- Concerning drug receptor interactions, the constant Kd refersto:
  - ↘ Maximal physiologicaleffect
  - ↘ Maximal binding
  - ↘ Drug concentration that results in half-maximal physiologicalresponse
  - ↘ All of the above

- An example of an agent that exerts much of its effects through intracellular receptors that in complex form binds to DNA response elements:
  - ↘ Acetylcholine
  - ↘ Dopamine
  - ↘ Corticosteroids
  - ↘ Diltiazem

- A patient with an acute attack of glaucoma is treated with pilocarpine. The primary reason for its effectiveness in this condition isits:
  - ↘ Action to terminate acetylcholinesterase.
  - ↘ Selectivity for nicotinicreceptors.
  - ↘ Ability to inhibit secretions, such as tears, saliva, and sweat.
  - ↘ Ability to lower intraocularpressure.

- This catecholamine simultaneously can increase myocardial contractility, glomerular filtration rates, sodium excretion, urinary output, and renal bloodflow:
    - ↘ Phenylephrine
    - ↘ Isoproterenol
    - ↘ Dobutamine
    - ↘ Dopamine

- Most cardioselective beta1 adrenergic receptorantagonist
    - ↘ Esmolol
    - ↘ Metoprolol
    - ↘ Atenolol
    - ↘ Propranolol

- Primary therapeutic use for alpha2 selective adrenergicagonists:
    - ↘ Management of arrhythmias
    - ↘ Management of renalinsufficiency
    - ↘ Management of intraoperative hypotensivestates
    - ↘ Management ofhypertension

- Adverse effects associated with ACEinhibitors:
    - ↘ Angioedema
    - ↘ Drycough
    - ↘ Proteinuria
    - ↘ All ofabove

- Which of the following agent is a pure narcoticantagonist?
    a) Nalbuphine
    b) Fentanyl
    c) Pentazocine
    d) Naloxone

- The reason for enhancement of spinal anesthesia by the presence of epinephrine in local anestheticsis
    - ↘ Increased substance Prelease
    - ↘ Increased dorsal horn neuronalactivity
    - ↘ Decreased local neuronaluptake
    - ↘ None of the above

- Administration of an MAO inhibitor would most likely cause changes in the CNS concentration of:
    - ↘ Acetylcholine
    - ↘ Histamine
    - ↘ Norepine phrine
    - ↘ Adenosine

DEPARTMENT OF PHYSICS

Syllabus of Entrance Test for M.Sc. Physics (2 Year Programme) and Model Questions

Note: *- There will 50 multiple choice questions of two marks each. There will be no negative marking.*

Basic ideas of Vector Calculus, Gradient, Divergence, curl and their physical significance. Laplacian in rectangular, cylindrical and spherical coordinates. Coulomb's Law for point charges and continuous distribution of charges.Electric field due to dipole, line charge and sheet of charge. Electric flux, Gauss's Law and its applications. Gauss's divergence theorem and differential form of Gauss's Law.Green's theorem.Work and potential difference.Potential difference as line integral of field. Electric potential due to a point charge a group of point charges, dipole and quadrupole moments, long uniformly charged wire, charged disc. Stokes's theorem and its applications in Electrostatic field, curl E=0. Electric fields as gradient of scalar potential.Calculation of E due to a point charge and dipole from potential.Potential due to arbitrary charge distribution and multipole moments.Physical interpretation of Maxwell's equations, E.M. waves and wave equation in a medium having finite permeability and permittivity but with conductivity., Impedance of a dielectric to EM waves. EM waves in a conducting medium and Skin depth. EM wave velocity in a conductor and anomalous dispersion.Response of a conducting medium to EM waves.Reflection and transmission of EM waves at a boundary of two dielectric media for normal and oblique incidence.

Postulates of special theory of relatively.Lorentz transformations, observer and viewer in relativity.Relativity of simultaneity, Length, Time, velocities. Relativistic Dopplereffect. Variation of mass with velocity, mass-energy equivalence, rest mass in an inelastic collision, relativistic momentum & energy, their transformation, concepts of Minkowski space, four vector formulation.

Simple harmonic motion, energy of a SHO.Compound pendulum. Torsional pendulum Electrical Oscillations, damped harmonic oscillator, forced harmonic oscillator, coupled oscillator, wave motion (longitudinal and transverse waves) and speed of waves in gases, phase and group velocity, Transverse Vibrations of a mass on string, composition of two perpendicular SHM of same period and of period in ratio 1:2, Doppler's effect.

Fermat's principle and applications, aberrations, origin of refractive index, matrix method in paraxial optics, coherence, interference, Fraunhofer and Fresnel diffraction.

Brief introduction to need and development of quantum mechanics, photoelectric effect, Compton effect, Wave particle duality, de Broglie hypothesis, Uncertainty principle, Gaussian wave packet. Operator correspondence. Normalization and probability interpretation of wave function. Superposition principle.Expectation value, Probability current and conservation of

probability.Admissibility conditions or wave function.Ehrenfest theorem, Eigen function and Eigen value. Operator formalism, orthogonal system, expansion in Eigen functions, Hermitian operator, simultaneous Eigen function, equation of motion.Fundamental postulates of wave mechanics, Schrodinger equation for a free particle and equation of a particle subject to forces. Schrodinger equation, Application to stationary states for one dimension, Potential Barrier, rectangular potential well, degeneracy, Orthogonality, Linear harmonic oscillator. Schrodinger equation for spherically symmetric potential for hydrogen atom.Spherical harmonics and their solution.Physical significance of quantum number.Degeneracy.

Basic concepts about semiconductors,p-n junction, Biasing, V-I characteristics, different types of diodes, half wave, full wave rectifiers and bridge rectifiers, efficiency, ripple factor, qualitative ideas of filter circuits (LC and π filters), current and voltage sources.Photonic devices (solar cell, photodiode and LED).Junction transistor : Structure and working relation between different currents in transistors, Sign conventions, amplifying action, different configurations of a transistor and their comparison, CB and CE characteristics, structure and characteristics of JEFT, transistor biasing and stabilization of operating point, voltage divider biasing circuit.

Constituents of nucleus, non-existence of electrons in nucleus, Nuclear mass and binding energy, features of binding energy versus mass number curve, nuclear radius, angular momentum and parity, qualitative discussion of two-body nuclear forces, nuclear moments, magnetic dipole moment and electric quadruple moment.Modes of decay of radioactive nuclides and decay Laws, chart of nuclides and domain of instabilities, radioactive dating, constituents of Cosmic rays, Beta decays: β-, β+ and electron capture decays, allowed and forbidden transitions (selection rules), parity violation in β decay, Alpha decay: Stability of heavy nuclei against beak up, Geiger-Nuttal law, barrier penetration as applied to alpha decay, reduced widths, deducing nuclear energy levels, Gamma transitions : Excited levels, isomeric levels, Gamma transitions.Energy loss of electrons and positrons, Positrons annihilation in condensed media, Stopping power and range of heavier charged, derivation of Bethe-Bloch formula, interaction of gamma rays with matter.

Historical introduction, fermions and bosons, particles and antiparticles, Classification of particles, types of interactions, electromagnetic, weak, strong interactions, gravitational interactions, Quantum numbers and conservation laws, isospin, charge conjugation, Yukawa theory, Introduction to quarks and qualitative discussion of the model, high energy physics units.

Crystal structure, Symmetry operations for a two dimensional crystal, Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure.Crystal diffraction : Bragg's law, Experimental methods for crystal structure studies, Laue equations, Reciprocal lattices of SC, BCC and FCC, Brag's law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, Structure factor and atomic form factor. Free electron theory, Conductivity and its variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Band theory, Kronig-Penney model, Metals and insulators, Qualitative discussion of band gap in semiconductors, Superconductivity, Magnetic field effect in superconductors, BCS theory and Thermal properties of superconductors.

Phase space and its division into elementary cells.Three kinds of statistics.The basic approach in the three statistics. Maxwell Boltzmann (MB) statistics applied to an ideal gas in

equilibrium. Experimental verification of Maxwell Boltzmann law of distribution of molecular speeds. Need for quantum statistics-Bose-Einstein (B.E.) statistics. Derivation of Planck's law of radiation. Deduction of Wien displacement law and Stefan's law from Planck's law, Fermi-Dirac (F.D.) statistics, Comparison of M.B., B.E. and F.D. statistics.

Statistical definition of entropy, Change of entropy of a system, Additive nature of entropy, Law of increase of entropy.Reversible and irreversible process and their examples.Work done in a reversible process, Examples of increase of entropy in natural processes, Entropy and disorder.Brief review of terms and laws of thermodynamics. Carnot's cycle, Entropy changes in Carnot cycle. Applications of thermodynamics to thermoelectric effect. Change of entropy along a reversible path in a P.V. diagram. Entropy of a perfect gas.Equation of state of an ideal gas from simple statistical consideration, Heat death of the universe.

Model Questions

Q1.A Zener diode, when used in voltage stabilization circuits, is biased in

a) Reverse breakdown region below the breakdown voltage
b) Reverse breakdown region
c) Forward bias region
d) Forward bias constant current mode

Q2. For non-dispersive medium,

a) Phase velocity > group velocity
b) Phase velocity < group velocity
c) Phase velocity = group velocity
d) None of the above

Q3. A particle moves in two dimensions on the ellipse $x^2+4y^2=8$. At a particular instant, it is at the point (x,y) =(2,1) and x-component of its velocity is 6 (in suitable units). Then the y-component of its velocity i

a) -3
b) -2
c) 1
d) 4

Q4. The acceleration due to gravity (g) on the surface of the Earth is approximately 2.6 times that on the surface of Mars. Given that the radius of Mars is about one half the radius of Earth, the ratio of the escape velocity on Earth to that on Mars is approximately

a) 1.1
b) 1.3
c) 2.3
d) 5.2

Guru Ramdas School of Planning

Syllabus for M. Tech. (Urban Planning/Infrastructure Planning/Transport Planning) Entrance Test

- General Awareness
- Mental Ability / Quantitative Aptitude
- Basics of Planning, Architecture, Civil Engg., Sociology, Economics & Geography

No. of questions: 100 (Multiple Choice Questions having one mark each).

Duration of Examination: Two hours

Model Questionnaire for M. Tech. (Urban Planning/Infrastructure Planning/Transport Planning) Entrance Test

1. Which among the following is an informal method of social control?
   A. Customs B. Coercion
   C. Law D. Education

2. Which of the following is the Garden City of India?
   A. Pune B. Surat
   C. Bangalore D. Allahabad

3. Blue Revolution is associated with –
   A. Agriculture B. Fishery
   C. Poultry D. None of the above

4. VAT is imposed
   A) Directly on Consumer B) On Final Stage of Production
   C) On First Stage of Production D) On all Stages between Production and Final Sale

5. Lines drawn parallel to the equator are called-
   A. Latitude B. Longitudes
   C. Meridian D. None of the above

6. If 2=0, 3=3, 4=6, 5=9, then 7=?
   A) 18 B) 15
   C) 12 D) 16

7. Varun and Arun start from a fixed point. Varun moves 3km North and turns right and then

covers 4km. Arun moves 5km West and turns right and walks 3km. The distance between Varun and Arun is:

A) 10 km C) 9 km
B) 12 km D) 6 km

8. The group which is more influential than family among the adolescents is _____

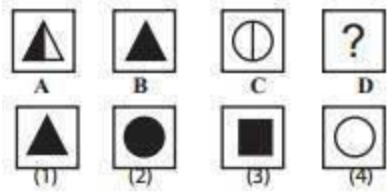
A. Occupational group B. Peer group
C. Out-group D. Religion

9. The ratio of daily wages of two workers is 4:3 and one gets daily Rs 9 more than the other, what

are their daily wages?

A. Rs 80 and Rs 60 B. Rs 60 and Rs 45
C. Rs 36 and Rs 27 D. Rs 32 and Rs 24

10. Which figure will replace the question mark



A.1 B. 2
C. 3 D.4

School of Punjabi Studies

Guru Nanak Dev University, Amritsar

Syllabus/Sources for Preparing the ENTRANCE TEST for

M.A. Punjabi (FYIP) Punjabi and M.A. Punjabi (2 Years PG Programme)

for the SESSION (2024-25)

- **Seek Admission for M.A. Punjabi (FYIP) in Semester - I :**

  - ✓ Full Syllabus of the subjects **Punjabi Compulsory & Punjabi (Elective)** for classes **10+1 and 10+2** as per Punjab School Education Board.
  - ✓ **Punjabi Grammar and Gurmukhi Script**
  - ✓ General Awareness, Current Affairs and Current Events in respect of Punjabi Language, Literature, Culture and Folklore.
  - ✓ Exam carries **50** Objective type **(MCQ)** questions.
  - ✓ Total duration for the exam will be **1 Hour**.

- **Seek Admission for M.A. Punjabi (2 Years PG Programme) in Semester-I :**

  - ✓ Full Syllabus of the subjects **Punjabi Compulsory, Punjabi (Elective) and Functional Punjabi** for Class **B.A. (Semester I to VI)** as per the syallbus of Guru Nanak Dev University **(G.N.D.U.)**, Amritsar.
  - ✓ General Awareness, Current Affairs and Current Events in respect of Punjabi Language, Literature, Culture and Folklore.
  - ✓ Exam carries **50** Objective type **(MCQ)** questions.
  - ✓ Total duration for the exam will be **1Hour**.

SYLLABUS & SAMPLE PAPER
UNIVERSITY COMMON ADMISSION TEST
(UCAT 2024-25)

MBA (FYIP) (with dual specialization)/ MBA (Finance) (FYIP)/ MCA (FYIP)/ M.Com (FYIP)/ M.Sc. Economics (FYIP)/ Bachelor of Business Administration (Agri Storage and Supply Chain)/ Master of Tourism & Travel Management (MTTM)/ Master of Hotel Management and Catering Technology (MHMCT)/ M.Sc. Computational Statistics & Data Analytics (FYIP)/ B.A. Social Science/ M.A. Journalism and Mass Communication (FYIP)/ M.Sc. Fashion Designing (FYIP)

The admission to above mentioned courses will be done on the basis of the merit in the written test and the detail about the test is as follows:

- Total number of Multiple Choice Questions: 150
- Each question carries equal marks.
- Duration of the Test: 2 hours
- Use of any kind of calculator or electronic gadget is not allowed.

SYLLABUS OF THE TEST

It will consist of the following three parts:

Part A: General Knowledge (50 Multiple Choice Questions covering components such as Indian Economy, Polity, History, Geography, Business, Sports, Religion, Literature, Music, Dance and General Science etc.)

Part B: General English (50 Multiple Choice Questions covering components such as vocabulary, tenses, prepositions, grammar, punctuation, comprehension etc.)

Part C: Quantitative Aptitude (50 Multiple Choice Questions covering components such as Numbers, HCF & LCM, Decimal Fractions, Simplification, Square Roots & Cube Roots, Averages, Problems on Numbers, Problems on Ages, Percentage, Profit & Loss, Ratio and Proportion, Simple and Compound Interest, Clocks, Odd Man Out & Series etc.)

Note: Total marks of the paper will be 150. There will be *No Negative Marking*. Un-attempted questions will not carry any marks.

- Format of the test will be as follows:

SAMPLE PAPER

Part A: General Knowledge

1. Who was the first Indian woman in Space?

A. Kalpana Chawla
B. Sunita Williams
C. Koneru Humpy
D. None of these

2. The capital of Brazil is:

A. São Paulo
B. Rio de Janeiro
C. Brasília
D. De Caprio

Part B: General English

3. Tick the option that is close in meaning to 'CONCEDE'

A. Admit
B. Link
C. Challenge
D. Extend

4. Read the passage and answer the questions that follow by choosing the right option:

The first official one-day cricket international was played on Jan.5, 1971 between England and Australia in Melbourne. It was watched by a packed house. But the first one-day international happened by chance rather than by design. The match was played on the 5th day of an Ashes Test after the first four days were washed out. The success of that match led to a three-match one-day series during Australia's return tour in1972. These rise was a roaring success.

The three match one-day series in 1972 was held in?

A. Australia
B. England
C. Both Australia and England

D. Neither a) nor b)

Part C: Quantitative Aptitude

5. 8597 -?=7429 – 4358

   A. 5426

   B. 5706

   C. 5526

   D. 5476

6. If the price of a mobile phone is first decreased by 25% and then increased by 20%, the net change in the price will be?

   A. No Change

   B. 5% Increase

   C. 5% Decrease

   D. 10% Decrease

Department of Urdu & Persian

Syllabus for M A Persian (Entrance Test) 2024-25

(This Paper consists of five Units having twenty marks each)

UNIT: A

I: Basic Persian Grammar.

II: Isem (Noun), Feal (Verb), Faael (Subject) and Mefool (Object).

III: Mazi (Past), Hall (Present) and Mustaqbal (Future)

UNIT: B

I: Contribution of RoodqiSamarqandi to Persian Literature.

II: Firdousi Tusi and his Shah Namah.

III: Name the Ten Cities of Iran.

UNIT: C

I: Name of the Fruits in Persian.

II: Name of the Days and monthes in Persian.

III: Name of the Birds and Animals in Persian.

UNIT: D

I: Translation of easy Persian words into English.

II: Translation of easy English words into Persian.

iii: Counting in Persian from One to Thousand.

UNIT: E

Life and Contribution of

I: Saadi Sherazi

II: Movlana Jalal Din Rumi

III: Alama Iqbal Lahore

IV: Guru Gobind Singh Ji

V: Mirza Asadullah Khan Ghalib.

University School of Financial Studies

Syllabus For M.Com Entrance Test (2024-25)

For B.Com degree holder students

Instructions for the candidates:

- There will be 80 Multiple Choice Questions, 20 from each of the belowmentioned 4 sections
- Each question will carry 1 mark
- Time Allowed: 90 mins.
- No Negative marking for wrong answers.
- Admission will be purely on the basis of merit in entrance test.
- Basic Questions to assess the general understanding will be asked based on thefollowing subject areas:-

SECTION-1. FUNDAMENTALS OF COMMERCE

- Company Law.
- Business Economics.
- Financial Accounting
- Basics of Banking & Insurance.

Sample Questions

When did RBI commence its operations?

(A) April 1 , 1935 (B) April 1, 1949

(C) January 1, 1939 (D) January 01, 1950

Nifty 50 index is composed of_____shares:(A) 40 (B) 30

(C)50 (D) 60

SECTION-2. DIRECT TAX LAWS

- Incidence of Tax.
- Exempted Income.
- Income from salary.
- Capital Gains.
- Income from other sources
- Deduction of tax at Source.

Sample Question

Education Cess of 3% per cent is payable on

(A) Income tax (B) Income tax plus surcharge

(C) Surcharge (D) None of these

SECTION-3. BUSINESS FINANCE

- Sources of Company Finance-Long Term and Short Term.
- Capital Budgeting Decisions.
- Tools of Financial Analysis.
- Cost of Capital.
- Working Capital Management.

Sample Question

The rate of return that an investor earns if he buys a bond at a specific price and holds it untilmaturity is called__.

(A) Yield to maturity (B) Coupon Rate

(C) Premium (D) Discount

SECTION-4. BUSINESS APTITUDE

This Section will consist of questions on current issues related to Business and Finance.For instance:

- Mergers and Acquisitions.
- CEO's of Corporate and Banking sector.
- Leading Brands of India.
- Flagship Companies of India.
- Advertisements
- Terminology related to Business and Finance.

Sample Question

When did the last demonetization happen in India?

(A) 2017 (B) 2018

(C) 2019 (D) 2016

SYLLABUS for M.COM ENTRANCE TEST (2023-24)

For B.B.A. degree holder students

Instructions for the candidates:

- There will be 80 Multiple Choice Questions, 20 from each of the below mentioned 4sections
- Each question will carry 1 mark
- Time Allowed: 90 mins.
- No Negative marking for wrong answers.

- ❖ Admission will be purely on the basis of merit in entrance test.
- ❖ Basic Questions to assess the general understanding will be asked based on the followingsubject areas:-

SECTION-1. BUSINESS LAWS

- The Indian Contract Act, 1872.
- The Negotiable Instruments Act, 1881.
- The Sale of Goods Act, 1930.
- The Indian Partnership Act, 1932.

Sample Question

A public limited company is requested to obtain_____before commencing business.

(A) Memorandum of Association. (B) Article of Association

(C) Certificate of Commencement (D) Certificate of Incorporation

SECTION-2. MANAGEMENT AND COST ACCOUNTING

- Accounting Concepts and Conventions.
- Distinction between Capital and Revenue items.
- Ratio analysis- liquidity, activity, profitability & solvency ratios.
- Budget and Budgetary control-concept, types of budgets.
- Standard Costing &Variance Analysis.

Sample Question

The firm has fixed standard selling price as Rs.12 per unit and standard quantity as 1000 units. If actual selling price is Rs.10 per unit, then what should be the actual quantity sold so that thesales variance is neither favorable nor unfavorable?

(A) 1000 (B) 1200

(C) 900 (D) 833

SECTION-3. FINANCIAL MANAGEMENT

- Financial Planning.
- Working Capital Management.
- Capital Budgeting Decisions.
- Cost of capital.
- Capital Structure Planning.

Sample Question

In_____approach, the Capital structure decision is not relevant to the valuation ofthe firm.

(A) Net income (B) Net operating income

(C) Traditional (D) Miller and Modigliani

SECTION-4. BUSINESS APTITUDE

This paper will consist of questions on current issues related to Business and Finance.For instance:

- Mergers and acquisitions.
- CEO's of Corporate and Banking Sector.
- Leading brands of India.
- Flagship Companies of India.
- Advertisement issues
- Terminology related to Business and Finance.

Sample Question

Who is the current finance minister of Punjab?

(A) Navjot Singh (B) Manpreet Singh

(C) Sukhjinder Singh (D) None of these

Department of Psychology

Master Of Arts In Psychology (Two Years P.G. Programme)

(Credit Based Evaluation and Grading System)

SYLLABUS FOR ENTRANCE TEST (2024-2025)

Max. Marks: 100 **Time: 2 Hours.**

PART-A: GENERAL PSYCHOLOGY (COMPULSORY)

Note: Questions paper will consist of 6 questions and all questions are compulsory. Each question will carry 10 marks.

Experimental Method (Advantages and disadvantages)
Psychological Tests: Nature, Characteristics and Types
Learning: Nature of Learning, Characteristics of learning process, Trial and Error learning, Insight learning, Social/observational learning, Classical and Instrumental Conditioning
Intelligence: Nature and factors affecting Intelligence, Theories of intelligence (Spearman, Thurstone, Gardner, Sternberg) **Personality**: Nature and factors affecting personality, Theories of Personality (Freud, Eysenck, Cattell and Allport) **Memory**: Nature, types and factors affecting memory
Sensation and Perception:- Structure and functions of eye and ear.

Measures of central Tendency: Mean, Median, Mode (Nature, merits and demerits)
Measure of Variability: Range, Average Deviation, Quartile Deviation, Standard Deviation - Nature, advantages and limitations
Hypothesis, One Tailed and Two Tailed Tests, Type-I and Type-II Errors, Level of Significance, Degrees of Freedom

Part-B will have two options and the candidate will be required to attempt any one option. Part-B will also carry 40 marks.

PART-B: ABNORMAL PSYCHOLOGY (OPTION-I)

Note: Questions paper will consist of 4 questions and all questions are compulsory. Each question will carry 10 marks.

Definition, Myths and Misconceptions of Abnormal Psychology
General Causes of Abnormal Behaviour(Biological, Psychological and Socio-cultural)
Neuroses: Nature, General causes, Symptoms & Treatment of Generalized Anxiety disorder, Phobias, Obsessive compulsive disorder
Schizophrenia: Nature, Causes, Types, Symptoms & Treatment
Personality Disorders: Causes, Symptoms & Treatment.
Mood disorders - Causes, Symptoms, & Treatment.
Alcoholism & Drug abuse (opium): Causes, Effects, Symptoms& Treatment.

OR

PHYSIOLOGICAL PSYCHOLOGY (OPTION-II)

Note: Questions paper will consist of 4 questions and all questions are compulsory. Each question will carry 10 marks.

Neuron: Structure & Functions, Difference between Axon & Dendrite, Transmission of Nerve impulse along nerve fiber, Resting and Action Potentials

Synapse: Nature & Types

Nervous System: Nature, Structure & Functions of Cerebrum, Hypothalamus, Cerebellum, Pons, Medulla Oblongata **Limbic System** - Structure & Functions

Endocrine glands: (Thyroid & Parathyroid, Adrenal cortex & Adrenal Medulla, Pancreas, Pituitary, Testes &Ovaries)

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(SAMPLE QUESTIONS)

PART-A

GENERAL PSYCHOLOGY (COMPULSORY)

. Q. 1 What do you understand by Trial & Error learning?

PART-B:

ABNORMAL PSYCHOLOGY (OPTION-I)

Q. 1 Differentiate between psychosis and neurosis.

PHYSIOLOGICAL PSYCHOLOGY (OPTION-II)

Q. 1 What do you mean by action and resting potentials?

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Department of Psychology

Advanced Diploma In Guidance And Counselling

(Credit Based Evaluation and Grading System)

SYLLABUS FOR ENTRANCE TEST (2024-25)

Max. Marks: 100 **Time: 2 Hours**

Note: Questions paper will consist of 20 questions and all questions are compulsory. Each question will carry 5 marks.

SOCIAL PSYCHOLOGY: Interpersonal Attraction, Altruism &Prosocial behavior, aggression, attitudes-nature, formation, theories and measurement

GROUP DYNAMICS: Concept of Group, Formation of Groups and Their Development, Theoretical Approaches to the Study of Groups, Social Facilitation and Social loafing in groups Coordination in Groups, Fairness in Groups, Decision making Processes in Groups

APPROACHES TO PERSONALITY: Freud, Jung, Adler, Horney, Erikson, Maslow, Rogers, Rollo May, Kelly, Miller and Dollard, Bandura, Rotter, Eysenck, Cattell and Allport

CHILD AND ADOLESCENT PSYCHOLOGY: Nature and Principles of Development, :rocess of Heredity, Pre-natal Development: Stages and Hazards
Theoretical Perspectives: Freud, Erickson, Bronfenbrenner, Piaget &Vygotsky
Socio-emotional Development: Attachment, Temperament, Gender-Role Socialization, Moral Development.
Adolescence: Introduction; Significance of Studying adolescents' development, contexts of development
Theoretical Perspectives: Havighurst, Freud, Sullivan, Erikson, Kohlberg, Kelly

PSYCHOMETRICS: Item writing, Item Analysis -Item difficulty and Item Discrimination, Reliability and validity (Nature, Types and Factors, Relationship between validity and reliability), Norms **(**Nature and Types of Norms, Norm - referencing Vs criterion – referencing, Profiles **(**Nature and Construction of Profiles)

COUNSELLING PSYCHOLOGY: Concept, Historical Antecedents, Goals and Current Trends of Counselling, Ethical Issues in Counselling, Theoretical approaches – Psychoanalytic, behavioristic, Client-centered, Cognitive, Gestalt

ABNORMAL AND CLINICAL PSYCHOLOGY: Classification of Mental disorders (DSM and ICD), General Etiology of Mental disorders, Clinical Picture, Causes & treatment of Neurotic disorders-Anxiety, Phobia, OCD and Mood Disorders and Psychotic Disorders-Schizophrenia, Paranoia, Substance abuse Picture of Causes & treatment, Psycho-diagnosis (Concept, Objectives of Psycho-diagnosis, Relationship of diagnosis and therapy), Therapies (Physical Therapies, Chemical Therapies, Psychotherapies, Client Centered Therapy and Gestal Therapy Behaviour therapies, Cognitive Therapies, Humanistic Therapy Existential Therapy, Transactional Analysis. Social & Group Therapies)

RESEARCH METHODOLOGY: Scientific Research (Meaning, Stages in Research and Types of Research), Experimental Methods, Descriptive Methods, Longitudinal, Cross Sectional and Cross sequential Research (Nature, Uses, Advantages and limitation), Sampling **(**Concept and Types, Problems of Sampling), Cross Cultural Research **(**Types, Problems of Sampling and Measurement, Emic & Etic Strategies), Qualitative Research (Nature, Principles, and limitations), Comparison of Qualitative and Non Qualitative Research, Participant observation, Sociometry, Interviews, Ethical Issues.

HEALTH PSYCHOLOGY: Models of Health (Bio-psychosocial, Lazarus and Folkman's Transactional Model, Eastern/ Oriental Approaches, Health Belief Models), Stress & Coping (Nature, Types, Factors,

Causes & Consequences), Stress Management Techniques **(**Meditation, Yoga, Diaphragmatic Breathing, Progressive Muscular Relaxation, Biofeedback, Music Therapy, Nutrition & Stress, Physical Exercise & Stress)

PSYCHOLOGICAL ASSESSMENT: Psychometric Tests of Personality **(**MMPI, CPI, EPI Cattell's 16PF, NEO Five factor Inventory) and Intelligence **(**Stanford-Binet Scales, Wechsler Scales, Bhatia's Battery of Intelligence, Cattell's Culture Fair Intelligence Test, Ravens Progressive Matrices Test) Projective Tests (Rorschach Inkblot technique, TAT, Word Association Test, Sentence Completion Test), Interest (Strong Interest Inventories, Kuder Occupational Interest Survey), Aptitude and Creativity Testing **(**Aptitudes-Differential Aptitude Test Battery, General Aptitude Tests Battery, Torrance Test of Creative Thinking)

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ADVANCED DIPLOMA IN GUIDANCE AND COUNSELLING

(SAMPLE QUESTIONS)

Q. 1. Describe the concept of stress according to Lazasrus and Folkman's Model of stress.
Q. 2. How will you improve reliability and validity of a psychometric test.?

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M.A. Sanskit

M.A. Sanskrit Entrance Test Syllabus

Duration :- 1.30 Hour ***Marks : 50***

स्नातकोत्तर संस्कृत प्रवेश परीक्षा का पाठ्यक्रम प्रायः निम्नलिखित अनुसार होगा –

1. नीतिशतकम्, पूर्णसार्धशतकम्, गीता, स्वप्नवासवदत्तम्, पंचतन्त्रम्।
2. वेदों का साधारण परिचय।
3. प्रमुख संस्कृत कवि।
4. धातु रूप।
5. शब्द रूप।
6. सन्धि।
7. कृदन्त।
8. विभक्ति प्रयोग।
9. व्यावहारिक शब्द।
10. अनुवाद।
11. लघुसंस्कृत निबन्ध

.....**इत्यादि।**

प्रवेश परीक्षा में बहुविकल्पीय प्रश्न होंगे जिन के संभावित उत्तरों में से एक पर टिक लगानी होगी। विषय की आवश्यकतानुसार कुछ लघु उत्तर वाले प्रश्न भी पूछे जा सकते हैं।

Department of Computational Statistics & Data Analytics

Syllabus for the 2 Years M.Sc (CSDA) Entrance Test-2024

The M.Sc (CSDA) 2024 Entrance Test shall comprise of the following format:

Two Years M.Sc (CSDA) Entrance Test-2024	
Exam Duration	One Hour Thirty Minutes
Mode of examination	Offline Test
Question type	Objective type
Number of questions	60
Total marks	60
Marking Scheme	➢ 1 mark for each correct answer. ➢ Zeromarkswillbeawarded for unattempted questions ➢ No negative marking

SectionA: Mathematics (20 questions - objective type)

- **Algebra:** Fundamental operations in Algebra, expansion, factorization, quadratic equations, indices, logarithms, arithmetic, geometric and harmonic progressions, binomial theorem, permutations and combinations, surds.
- **Set Theory:** Sets and subsets, operations on sets, sequences, properties of integers, relations and functions.
- **Matrix Algebra**: Elementary transformations, inverse of a matrix, rank, solution of simultaneous linear equations, Eigen values and Eigen vectors, quadratic forms.
- **Calculus:** Limit of functions, continuous functions, differentiation of function(s), tangents and normal, simple examples of maxima and minima, integration of function by parts, by substitution and by partial fraction, definite integral application to volumes and surfaces of frustums of a sphere, cone, cylinder, Taylor Series.
- **Probability and Statistics:** Basic concepts of probability theory, averages, dependent and independent events, frequency distributions, and measures of dispersions, skewness and kurtosis, random variable and distribution functions, mathematical expectations, binomial, Poisson, normal distributions, curve fitting, and principle of least squares, correlation and regression.

SectionB: Analytical Ability and Logical Reasoning:(20 questions– objective type)

Questions in this section will test logical reasoning, quantitative reasoning, and visio-spatial reasoning

Section C: Computer Awareness: (20 questions - objective type)

- **Computer Basics**: Organization of a Computer, Central Processing Unit (CPU), ALU and Control Unit of CPU, input / output devices, computer memory, memory hierarchy, fundamentals of network, fundamentals of operating system.
- **Data Structures**: Arrays, stacks, queues, linked lists, trees, graphs, searching and sorting techniques.
- **Programming Concepts**: Assembly language and high-level language, Basics of programming concepts, basic of python programming, data types, operators, control and conditional statements , function, recursion .

SYLLABUS & SAMPLE PAPER
GNDU MANAGEMENT ENTRANCE TEST (GMET 2024-25)

MBA (Two Years)/ MBA (Marketing Management)/ MBA (Human Resource Management)/ MBA (Financial Management)/ MBA (Finance)

Syllabus for Entrance Test (GMET) 2024-25

Paper	Title of the paper	No. of Questions	Marks
Part-A	General Knowledge	50	50
Part-B	General English	50	50
Part-C	Mental and Numerical Ability	50	50
Part-D	Business Aptitude	50	50

Note: Total marks of the paper will be 200. There will be *No Negative Marking*. Un-attempted questions will not carry any marks. Duration of the Test will be 2 hours 30 Min. Use of any kind of calculator or any other electronic gadgets is not allowed. Each question carries equal marks.

SAMPLE PAPER (GMET 2024-25)

Part A: General Knowledge

1. When a person enters a dark room from the bright light:
    a) The iris contracts
    b) The iris expands
    c) Distance between retina and lens increases
    d) Length of lens increases

2. Light year is a unit of:
    a) Time
    b) Light intensity
    c) distance
    d) None of these

3. The number of spinal nerves in man is:
    a) 31 pairs
    b) 35 pairs
    c) 12 pairs
    d) 102 pairs

4. The Prime Minister of India, at the time of his/her appointment:
    a) Need not necessarily be the member of parliament but must become a member of the either House within 6 months
    b) Need not necessarily be the member of parliament but must become a member of the Lok Sabha within 6 months

c) Must be the member of parliament
d) None of these

Part B: General English

5. Select the word that does not belong to the group:
   a) Mess
   b) Dilemma
   c) Disorder
   d) Chaos

6. Select the word that does not belong to the group:
   a) Hybrid
   b) Fusion
   c) Blend
   d) Pure

7. Select the correct Sentence:
   a) To be intelligent is more essential than being hard working.
   b) Being intelligent is more important than to be hard working.
   c) For one to be intelligent is more important that being hard working.
   d) Being intelligent is more important than being hard working.

8. Select the correct Sentence:
   a) It is high time he started earning.
   b) The villagers were enjoying winter evening around fire.
   c) I am an optimist and therefore I differ from you.
   d) Neena can do it alone and nobody else can do it.

9. The .....arguments put forth for not disclosing the facts did not impress anybody.
   a) intemperate
   b) spurious
   c) specious
   d) convincing

Part C: Mental and Numerical Ability

10. If 5 men or 9 women can do a piece of work in 19 days, then 3 men and 6 women will do the same work in

   a) 16 days
   b) 12 days
   c) 13 days
   d) 15 days

11. An automobile financier claims to be lending money at a simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest becomes
   a) 10%

b) 10.25%
c) 10.5%
d) None of these

12. Three tickets from city A to B and two tickets from city A to C cost ₹ 173. Two railway tickets from city A to B and three tickets from city A to C cost ₹ 177. The fare for city B from city A will be ₹

a) 25
b) 27
c) 30
d) 33

13. What percentage of numbers from 1 to 70 have squares that end in the digit 1?

a) 2
b) 5
c) 10
d) 20

14. How many days are there in n weeks and days?

a) $7n^2$
b) 8n
c) 7n
d) 14n

Part D: Business Aptitude

15. NIFTY 50 is related to
a) National Stock Exchange benchmark stock market index
b) National Institute of Financial Technology
c) National Institute Fashion Technology started in 1950
d) National Institute Fitness, Training and Yoga

16. TANISHQ is a brand owned by
a) Amrapali Industries
b) PC Jewelers
c) Josco Jewelers
d) Titan Industries Ltd.

17. Who is the CEO of Apple Inc.?
a) Tim Cook
b) Steve Wozniak
c) Steve Jobs
d) Paul Allen

18. Sergy Brin and Larry Page co-founded which of the following companies:

a) Facebook
b) Twitter
c) LinkedIn
d) Google

Department of Food Science and Technology

Syllabus for M.Sc. (Food technology) 2 years

Mode of Admission

The admission will be based on **merit of the candidate in the Entrance Test** to be conducted by the University in the subject of **Food Technology or Chemistry**. Students can appear in **any one of these subjects**. The Entrance test will contain 60 Objective type Questions with multiple choice answers.

Entrance Test Syllabus for the subject of Food Technology

- Food nutrients requirements and deficiency diseases, food groups and concepts of balanced diet.
- Food adulteration, food laws and food safety.
- General principles of food processing and preservation by additives, high and low temperature, drying, irradiation, sugar, salt, etc.
- Preparation of jams, jellies, marmalades, juices, squashes, ketchup, pickles and chutneys.
- Liquid milk processing, filled and fermented milks. Preparation of milk products- cheese condensed and evaporated milk, whole and skim milk powder and ice cream.
- Structure of cereals and their proximate composition, flour and its use in bakery products-bread, biscuits, cakes, doughnut and buns. Additives for bakery industry. Milling of different cereals, parboiling of rice. Pulses: composition, antinutritional factors and utilization.
- Structure, composition, nutritive value and functional properties of eggs. Slaughter and dressing of poultry and other pet animals. Meat tenderization. Principles of meat preservation.
- Dimensions and Units. Material and energy balance. Unit operations in food processing.
- Cell bioconstituents, structure, function and biochemistry and human nutrition. Nutritional significance of carbohydrates, lipids, proteins and nucleic acids.
- Biochemistry of enzymes, vitamins, mineral elements and their role in nutrition. Composition and functions of blood and lymph, digestion and absorption of carbohydrates, lipids and proteins.
- Biochemistry of food constituents such as water, lipids, proteins, carbohydrates, minerals, vitamins, enzymes, tannins, coloring and flavoring components.
- Effects of processing on food constituents.

- Food spoilage-sources and preservation by physical and chemical means. Microbiology of foods-cereals based products, meat, poultry, eggs, fruits, vegetables, milk, milk products, salts, sugars, etc.

- Role of microorganisms in fermented foods-bread, malt beverages, wine, vinegar, butter and cheese, etc.

- Food poisoning and their causative organisms, food borne infections.

- Principles of food packaging, packaging materials, packaging methods and machinery. Packaging requirements for different food products.

Entrance Test Syllabus for the subject of <u>Chemistry</u>

1. Chemical bonding: Covalent Bond-Valence bond theory, hybridization and shapes of inorganic molecules and ions. VSEPR theory, MO theory-homonuclear (elements and ions of 1st and 2nd row) and heteronuclear (BO, CN^{-}, CO, NO^{+}, CO^{+}, CN), diatomic molecules, multicenter bonding in electron deficient molecule (Boranes). Ionic Solids: Concept of close packing, ionic structures (NaCI type, Zinc blende, Wurtzite, CaF_2 and antifluorite), radius ratio rule, lattice defects, semiconductors, lattice energy and Born–Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond– free electron, valence bond and band theories.Weak Interactions **(**H-bonding, Vander Waals forces).

2. Acids and bases: Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and bases.

3. s and p-block elements: Comparative studies, diagonal relationship, salient features of hydrides, salvation and complexation tendencies of s-block elements. Comparative study (including diagonal relationship) of groups 13–17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13–16, hydrides of boron–diborane and higher boranes, borazine, borohydrides, fullerenes. Carbides, fluorocarbons, silicates (structural principle), tetrasulphurtetranitride, basic properties of halogens, interhalogens and polyhalide.Inorganic polymers- silicones and phosphazenes.

4. d-block elements: General characteristic properties of *d*–block elements. Comparative properties of 1^{st}, 2^{nd} and 3^{rd} row transition elements with respect to ionic radii and oxidation states, magnetic Properties (types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for characterization of 3d-2metal complexes). Metal-ligand bonding in Transition Metal Complexes: crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

5. f-block elements: Electronic structure, oxidation states, ionic radii, lanthanides and actinides contraction. Electronic absorption and magnetic properties.

6. Coordination Compounds: Werner's coordination theory, effective atomic number concept, chelates, nomenclature and isomerism.

7. Organometallic and bioinorganic chemistry: Classification of organometallic compounds. 18e's rule, preparation, properties and applications of alkyls aryls of lithium and aluminium, bonding in metal-olefin complexes, Mechanism of homogeneous hydrogenation reactions. Essential and trace elements in biological processes, metalloporphyrins and special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to $Ca^{2+.}$

8. Mechanism of organic reactions

Homolytic and heterolytic bond breaking. Reactive intermediates: carbocations, carbanions, free radicals, carbenes, arenes and nitrenes (structure, synthesis and reactions).

9. Alkanes and cycloalkanes

Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity.

10. Alkenes and alkynes

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes, mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation, oxymercuration reduction.

11. Arenes and aromaticity

Aromaticity: the Huckel's rule. Aromatic electrophilic substitution reactions: role of σ and π complexes. Mechanisms of nitration, halogenation, sulphonation, desulphonationmercuration and Friedel Crafts reaction.

12. Alkyl and aryl halides

Nomenclature and classes of alkyl halides, chemical reactions. Mechanisms of nucleophilic substitution reaction of alkyl halides, SN2 and SN1 reaction mechanisms with energy profile diagrams. Nuclear and side chain reactions of aryl halides.

13. Phenols

Reactions of phenols: electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Reimer Tiemann reaction.

14. Aldehydes and ketones

Synthesis of aldehydes and ketones using 1,3-dithianes. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. Meerwein-Pondorff-Verley reduction, Clemmensen reduction, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions. Halogenation of enolizable ketones.

15. Carboxylic acids and derivatives

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Preparation of carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and hydrolysis (acidic and basic).

16. Organic compounds of nitrogen

Reactivity, structure and nomenclature of amines, Methods of preparation of amines by reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hofmann bromamide reaction. Physical properties of amines. Structural features effecting basicity of amines.

17. Stereochemistry of organic compounds

Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature. Geometric isomerism–determination of configuration of geometric isomers. E & Z system of nomenclature. Conformational isomerism–conformational analysis of ethane and n–butane; conformation of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configuration and conformation.

18. Organometallic compounds

Preparation, structure and reactions of Grignard and organolithium reagents.

19. Heterocyclic compounds

Molecular orbital picture and aromaticity of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Comparison of basicity of pyridine, piperidine and pyrrole.

20. Amino acids, peptides, proteins and nucleic acids

Classification, structure and stereochemistry of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation and reactions of α-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination. Nucleic acids: Introduction. Constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.

21. Absorption spectroscopy

Ultraviolet-visible (UV-Vis) absorption spectroscopy: electromagnetic spectrum, Beer-Lambert law, molar absorptivity, types of electronic transitions, effect of conjugation. Concept of chromophores and auxochromes, Bathochromic, hypsochromic, hyperchromic, hypochromic shifts, UV-Vis spectra of conjugated compounds,

Infrared (IR) absorption spectroscopy: introduction, Hooke's law, selection rules, intensity of IR bands, measurement of IR spectrum, concept of FTIR, characterization of IR absorption frequencies of functional groups of simple organic compounds and relevant comparisons.

22. Nuclear Magnetic Resonance (NMR) spectroscopy.

Proton Magnetic Resonance (^{1}H NMR) spectroscopy, Nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin coupling and coupling constants. Concept of deuterium exchange.

23. Colloidal State

Definition of colloids, classification of colloids. Solids in liquids (Sol): kinetic, optical and electrical properties, stability of colloids, protective action, Hardy Schulze law, gold number. Liquids in liquids (emulsions): Types of emulsions, preparation. Emulsifiers. general applications of colloids.

24. Solutions, Dilute Solutions and Colligative Properties

Ideal and non–ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, colligative properties, Raoult's law, relative lowering of

vapour pressure. Osmosis, Law of osmotic pressure. Elevation of boiling point and depression of freezing point, Molecular weight determination, Abnormal molar mass, degree of dissociation and association of solutes.

25. Thermodynamics-I

Definition of thermodynamic terms: System, surroundings, etc. Types of systems, intensive and

extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity. Joule's law-Joule-Thomson coefficient and inversion temperature, Calculation of w,q,dU&dH for the expansion of ideal gases.

Thermochemistry: Standard state, standard enthalpy of formation-Hess's Law of heat summation

and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy. Kirchhoff's equation.

26. Thermodynamics-II & III

Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

Concept of Entropy : Entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics: Nernst heat theorem, statement and evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions, criteria for thermodynamic equilibrium and spontaneity, their advantages over entropy change.

27. Introduction to Phase Equilibrium

Statement and meaning of the terms-phase, component and degree of freedom, derivation of

Gibbs phase rule, phase equilibria of one component system-water, CO2 and S systems. Phase

equilibria of two component systems-solid-liquid equilibria. Solid solutions-compound formation with

congruent melting point (Mg-Zn), $FeCl_3$-H_2O) and incongruent melting point, (NaCl-H_2O). $CuSO_4$-H_2O) system. Partially miscible liquids Phenol-water, triethylamine-water, Nicotine-water System. Lower and upper consulate temperature, Effect of impurity on consolute temperature, immiscible liquids, steam distillation. Nernst distribution law-thermodynamic derivation and applications.

28. Electrochemistry-I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance. Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation, weak and strong electrolytes, Ostwald's dilution law. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number. Applications of conductivity measurements: conductometric titrations.

29. Electrochemistry – II

Types of reversible electrodes-gas metal ion, metal ion, metal insolblue salt-anion and redox electrodes. Electrode reactions. Nernst equation, derivation of cell E.M.F. and Single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, electrochemical series. Electrolytic and Galvanic cells, reversible and irreverisible cells. EMF of a cell and its measurements. Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH and K), polarization, over potential and hydrogen overvoltage. Concentration cells with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations. Definition of pH and pKa, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods. Buffers-mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

30. Quantum Mechanics-I

Black-body radiation, Planck's radiation law, Photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom and its defects, Compton effect. de Broglie hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box, quantization of energy levels, extension to two and three dimensional boxes, degeneracy.

Sample Question Paper (Food Technology)

Q 1. Which of the following is not a chemical sporicide?

a. Formaldehyde
b. Steam
c. Hydrogen Peroxide
d. Glutaraldehyde

Q 2. Bread mold is

a. Penicillium notatum
b. Aspergillus niger
c. Rhizopus stolonifer
d. Monilla sitophilla

Q 3. The force involved in Crushers is

a. Impact force
b. Compression
c. Attrition
d. Pseudo force

Q 4. Align is

a. A polysachharide
b. A lipid
c. A protein
d. A provitamin

Q 5. Crème filling test is important for

a. Snack Cake
b. Angle Cake
c. Pastry
d. Bread

Q 6. Chocolate liquor is another name for

a. Marshmallow
b. Cocoa mass
c. Cocoa butter
d. Chocolate drink

Q 7. The pigment in the muscle which acts as a carrier of oxygen in the blood

a. Hemoglobin
b. Myoglobin
c. Metmyoglobin
d. Met hemoglobin

Q 8. Pugency factor present in chilli is

a. Capsorubin
b. Capsaicin

c. Capsanthin
d. Capsine

Q 9. First law of thermodynamics deals with the conservation of

a. Temperature
b. Energy
c. Force
d. None of the above

Q 10. Colostrum is rich in which of the following as compared to normal milk

a. Protein b. Fat c. Vitamin K d. Iron

Sample Question Paper (Chemistry)

1. A tripeptide has ---------peptide bonds.

   (A) Three

   (B) Two

   (C) Four

   (D) One

2. What is the correct order of reactivity of pyrrole, furan and thiophene towards electrophiles?

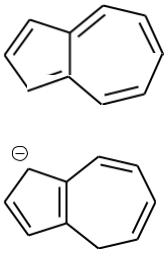
   (A) Furan>Pyrrole>Thiophene

   (B) Pyrrole> Furan>Thiophene

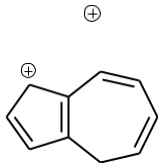
   (C) Furan>Thiophene>Pyrrole

   (D) Thiophene>Pyrrole> Furan

3. Which of the following structures is aromatic?

   (A) 

(B)



(C)

(D) All of above

Syllabus of Common Entrance test paper – 2024

M.A. (2 years) in History/International Relations/Philosophy/Political Science/Public Policy & Governance/Sociology/Social Work/Religious Studies

The Common Entrance test paper – 2024 will consist of total 100 Objective type questions of 1 mark each. The duration of the test will be of 02 marks. Suggested topics for the Common Entrance are as under:

1. General Knowledge / Current Affairs.
2. New Education Policy 2020.
3. Indian Society
4. Indian Polity
5. Indian History
6. Indian Economy
7. Punjab History and Culture
8. Science and Technology
9. Foreign Relations of India
10. Rural Development and Governance

The medium of question paper will be English / Punjabi only. The topics mentioned above will be of Graduation level courses.

Model Questionnaire

Entrance Test for M.Sc. Chemistry and M.Sc. Applied Chemistry (Pharmaceuticals)

Duration of Entrance Test : 01.30 hrs **Max. Marks : 60**

1. A tripeptide has ---------peptide bonds.

   (A) Three

   (B) Two

   (C) Four

   (D) One

2. What is the correct order of reactivity of pyrrole, furan and thiophene towards electrophiles?

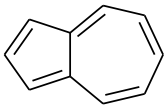
   (A) Furan>Pyrrole>Thiophene

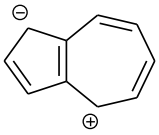
   (B) Pyrrole> Furan>Thiophene

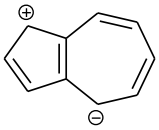
   (C) Furan>Thiophene>Pyrrole

   (D) Thiophene>Pyrrole> Furan

3. Which of the following structures is aromatic?

   (A) 

   (B) 

   (C) 

   (D) All of above

Syllabus for Entrance Test for M.Sc. Chemistry and M.Sc. Applied Chemistry (Pharmaceuticals):

1. Chemical bonding: Covalent Bond-Valence bond theory, hybridization and shapes of inorganic molecules and ions. VSEPR theory, MO theory-homonuclear (elements and ions of 1st and 2nd row) and heteronuclear (BO, CN^-, CO, NO^+, CO^+, CN), diatomic molecules, multicenter bonding in electron deficient molecule (Boranes). Ionic Solids: Concept of close packing, ionic structures (NaCI type, Zinc blende, Wurtzite, CaF_2 and antifluorite), radius ratio rule, lattice defects, semiconductors, lattice energy and Born–Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond– free electron, valence bond and band theories.Weak Interactions **(**H-bonding, Vander Waals forces).

2. Acids and bases: Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and bases.

3. s and p-block elements: Comparative studies, diagonal relationship, salient features of hydrides, salvation and complexation tendencies of s-block elements. Comparative study (including diagonal relationship) of groups 13–17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13–16, hydrides of boron–diborane and higher boranes, borazine, borohydrides, fullerenes. Carbides, fluorocarbons, silicates (structural principle), tetrasulphurtetranitride, basic properties of halogens, interhalogens and polyhalide.Inorganic polymers- silicones and phosphazenes.

4. d-block elements: General characteristic properties of *d*–block elements. Comparative properties of 1^{st}, 2^{nd} and 3^{rd} row transition elements with respect to ionic radii and oxidation states, magnetic Properties (types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for characterization of 3d-2metal complexes). Metal-ligand bonding in Transition Metal Complexes: crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

5. f-block elements: Electronic structure, oxidation states, ionic radii, lanthanides and actinides contraction. Electronic absorption and magnetic properties.

6. Coordination Compounds: Werner's coordination theory, effective atomic number concept, chelates, nomenclature and isomerism.

7. Organometallic and bioinorganic chemistry: Classification of organometallic compounds. 18e's rule, preparation, properties and applications of alkyls aryls of lithium and aluminium, bonding in metal-olefin complexes, Mechanism of homogeneous hydrogenation reactions. Essential and trace elements in biological processes, metalloporphyrins and special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to $Ca^{2+.}$

8. Mechanism of organic reactions

Homolytic and heterolytic bond breaking. Reactive intermediates: carbocations, carbanions, free radicals, carbenes, arenes and nitrenes (structure, synthesis and reactions).

9. Alkanes and cycloalkanes

Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity.

10. Alkenes and alkynes

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes, mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation, oxymercuration reduction.

11. Arenes and aromaticity

Aromaticity: the Huckel's rule. Aromatic electrophilic substitution reactions: role of σ and π complexes. Mechanisms of nitration, halogenation, sulphonation, desulphonationmercuration and Friedel Crafts reaction.

12. Alkyl and aryl halides

Nomenclature and classes of alkyl halides, chemical reactions. Mechanisms of nucleophilic substitution reaction of alkyl halides, SN2 and SN1 reaction mechanisms with energy profile diagrams. Nuclear and side chain reactions of aryl halides.

13. Phenols

Reactions of phenols: electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Reimer Tiemann reaction.

14. Aldehydes and ketones

Synthesis of aldehydes and ketones using 1,3-dithianes. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. Meerwein-Pondorff-Verley reduction, Clemmensen reduction, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions. Halogenation of enolizable ketones.

15. Carboxylic acids and derivatives

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of

substituents on acid strength. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Preparation of carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and hydrolysis (acidic and basic).

16. Organic compounds of nitrogen

Reactivity, structure and nomenclature of amines, Methods of preparation of amines by reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hofmann bromamide reaction. Physical properties of amines. Structural features effecting basicity of amines.

17. Stereochemistry of organic compounds

Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.

Geometric isomerism–determination of configuration of geometric isomers. E & Z system of nomenclature. Conformational isomerism–conformational analysis of ethane and n–butane; conformation of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge

formulae. Difference between configuration and conformation.

18. Organometallic compounds

Preparation, structure and reactions of Grignard and organolithium reagents.

19. Heterocyclic compounds

Molecular orbital picture and aromaticity of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Comparison of basicity of pyridine, piperidine and pyrrole.

20. Amino acids, peptides, proteins and nucleic acids

Classification, structure and stereochemistry of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation and reactions of α-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination. Nucleic acids: Introduction. Constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.

21. Absorption spectroscopy

Ultraviolet-visible (UV-Vis) absorption spectroscopy: electromagnetic spectrum, Beer-Lambert law, molar absorptivity, types of electronic transitions, effect of conjugation. Concept of chromophores and auxochromes, Bathochromic, hypsochromic, hyperchromic, hypochromic shifts, UV-Vis spectra of conjugated compounds,

Infrared (IR) absorption spectroscopy: introduction, Hooke's law, selection rules, intensity of IR bands, measurement of IR spectrum, concept of FTIR, characterization of IR absorption frequencies of functional groups of simple organic compounds and relevant comparisons.

22. Nuclear Magnetic Resonance (NMR) spectroscopy.

Proton Magnetic Resonance (^{1}H NMR) spectroscopy, Nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin coupling and coupling constants. Concept of deuterium exchange.

23. Colloidal State

Definition of colloids, classification of colloids. Solids in liquids (Sol): kinetic, optical and

electrical properties, stability of colloids, protective action, Hardy Schulze law, gold number.

Liquids in liquids (emulsions): Types of emulsions, preparation. Emulsifiers. general

applications of colloids.

24. Solutions, Dilute Solutions and Colligative Properties

Ideal and non–ideal solutions, methods of expressing concentrations of solutions, activity and

activity coefficient. Dilute solution, colligative properties, Raoult's law, relative lowering of

vapour pressure. Osmosis, Law of osmotic pressure. Elevation of boiling point and depression of freezing point, Molecular weight determination, Abnormal molar mass, degree of dissociation and association of solutes.

25. Thermodynamics-I

Definition of thermodynamic terms: System, surroundings, etc. Types of systems, intensive and

extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity. Joule's law-Joule-Thomson coefficient and inversion temperature, Calculation of w,q,dU&dH for the expansion of ideal gases.

Thermochemistry: Standard state, standard enthalpy of formation-Hess's Law of heat summation

and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy. Kirchhoff's equation.

26. Thermodynamics-II & III

Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle

and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

Concept of Entropy : Entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics: Nernst heat theorem, statement and evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions, criteria for thermodynamic equilibrium and spontaneity, their advantages over entropy change.

27. Introduction to Phase Equilibrium

Statement and meaning of the terms-phase, component and degree of freedom, derivation of

Gibbs phase rule, phase equilibria of one component system-water, CO2 and S systems. Phase

equilibria of two component systems-solid-liquid equilibria. Solid solutions-compound formation with congruent melting point (Mg-Zn), $FeCl_3$-H_2O) and incongruent melting point, (NaCl-H_2O). $CuSO_4$-H_2O) system. Partially miscible liquids Phenol-water, triethylamine-water, Nicotine-water System. Lower and upper consulate temperature, Effect of impurity on consolute temperature, immiscible liquids, steam distillation. Nernst distribution law-thermodynamic derivation and applications.

28. Electrochemistry-I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and

equivalent conductance. Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation, weak and strong electrolytes, Ostwald's dilution law. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number. Applications of conductivity measurements: conductometric titrations.

29. Electrochemistry – II

Types of reversible electrodes-gas metal ion, metal ion, metal insolblue salt-anion and redox

electrodes. Electrode reactions. Nernst equation, derivation of cell E.M.F. and Single electrode

potential, standard hydrogen electrode, reference electrodes, standard electrode potential, electrochemical series. Electrolytic and Galvanic cells, reversible and irreverisible cells. EMF of a cell and its measurements. Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH and K), polarization, over potential and hydrogen overvoltage.

Concentration cells with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations. Definition of pH and pKa, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods. Buffers-mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

30. Quantum Mechanics-I

Black-body radiation, Planck's radiation law, Photoelectric effect, heat capacity of solids, Bohr's

model of hydrogen atom and its defects, Compton effect. de Broglie hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box, quantization of energy levels, extension to two and three dimensional boxes, degeneracy.

Guru Nanak Dev University, Amritsar
University Common Entrance Test (UG)-2024
UCET (UG) 2024

Courses Offered:

S. No.	Name of the Course	Name of Department
1.	M.Sc. (FYIP) Botany	Botany
2.	M.Sc. (FYIP) Chemistry	Chemistry
3.	M.Sc. (FYIP) Food Technology	Food Science & Technology
4.	M.Sc. (FYIP) Human Genetics	Human Genetics
5.	M.Sc. (FYIP) Mathematics	Mathematics
6.	M.Tech (Artificial Intelligence and Robotics Engineering) (FYIP)	Mechanical Engineering
7.	Master of Technology (Urban & Regional Planning) (FYIP)	Guru Ramdas School Of Planning
8.	M.Sc. (FYIP) Microbiology	Microbiology
9.	M.Sc. (FYIP) Physics	Physics
10.	M.Sc. (FYIP) Zoology	Zoology
11.	Bachelor of Physiotherapy (BPT)	Physiotherapy
12.	B.Sc. (Honours) Agriculture	Agriculture
13.	B.Sc. Dietetics and Nutrition	Agriculture
14.	B.Sc. Medical Lab Technology	Molecular Biology and Biochemistry
15.	B. Pharmacy	Pharmaceutical Sciences
16.	B. Tech. Computer Engineering	Computer Engineering & Technology
17.	B. Tech Food Technology	Food Science & Technology
18.	B. Tech Textile Processing Technology	Apparel and Textile Technology

- The common entrance test will be conducted in the subjects of Physics, Chemistry, Biology and Mathematics as per the syllabus attached in the **Annexure**. There will be 50 multiple choice questions (MCQ) of One mark each for each subject (i.e. Physics, Chemistry, Biology and Mathematics). The candidates can opt for Physics, Chemistry and Biology (PCB) combination (150 MCQ) or Physics, Chemistry and Mathematics (PCM) combination (150 MCQ) or Physics, Chemistry, Mathematics and Biology combination (PCMB) (200 MCQ).
- The candidate desirous of appearing in both **Mathematics and Biology will have to clearly fill this option in the application form.**

- The admission to courses **(S. No. 1 - 4, 6 - 18)** will be on the basis of merit in Common Entrance Test.
- The Admission to **M.Sc. (FYIP) Mathematics (S. No. 5)** course offered by the Department of Mathematics is based on merit of **"Separate Entrance Test" (different than UCET scheduled to be held on 28.06.2024 (Friday)** in second half from 2.30 pm to 4.00 pm**)** which consists of 60 MCQs in the subject of Mathematics only as per the syllabus attached in the Annexure.

- The Admission to Master of Technology (Urban & Regional Planning) (FYIP) **(S. No. 7)** course is based on merit of Common Entrance Test **(Physics, Chemistry and Mathematics (PCM) combination) 28.06.2024 (Friday) 10.00 am to 12.15 pm)** or **"Separate Entrance Test" (different than UCET scheduled to be held on 28.06.2024 (Friday)** in second half from 2.30 pm to 4.00 pm**)** which consists of 60 MCQs in the subject of Mathematics only as per the syllabus attached in the Annexure.
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No. of questions and duration of test is detailed as:

Date of Examination	**Subjects**	**No. of Questions**	**Duration of Test**	**Time**
28.06.2024 (Friday)	PCM/PCB	150	2 hours 15 minutes	10.00 am to 12.15 pm
	PCMB	200	3 hours	10.00 am to 1.00 pm
	Mathematics	60	90 minutes	2.30 pm to 4.00 pm

Venue of Test: Maharaja Ranjit Singh Bhawan

Instructions Related to Test

1. The test shall have MCQs where each question has four choices labeled as A, B, C and D. Candidates have to shade the correct answer on the OMR sheet with **Black Pen** only. The shading of the bubble should be complete and dark enough so that letter/number inside it is not visible.
2. OMR Sheet having bubbles shaded with lead pencil will be out rightly cancelled.
3. No rough work should be done on the OMR sheet
4. There will be no negative marking

Counseling Schedule:

The counseling for admission to all the courses will be done at Guru Nanak Bhawan from **03.07.2024 to 06.07.2024**. The schedule of counseling will uploaded on the GNDU website after declaration of the result of the Common Entrance Test.

Note: All queries related to UCET UG Test 2024 should be sent only on email id ucet24@gndu.ac.in

Annexure

Syllabus for University Common Entrance Test (UG)-2024

PHYSICS

Laws of Motion

Intuitive concept of force. Inertia. Newton's first law of motion; momentum and Newton's second law of motion; impulse: Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction. rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on level circular road. vehicle on banked road).

Work, Energy and Power

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces: conservation of mechanical energy (kinetic and potential energies); non-Conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

Motion of System of Particles and Rigid Body

Centre of mass of a two-particle system, momentum conversation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod.Moment of a force, torque, angular momentum, conservation of angular momentum with some examples. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; moment of inertia, radius of gyration. Values of moments of inertia for simple geometrical objects (no derivation).Statement of parallel and perpendicular axes theorems and their applications.

Electrostatics

Electric Charges; charging by induction, basic properties of electric charge (addition of charges, quantisation of charges and their Conservation) Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electrical field, electric field due to a point charge, electric field due to system of charge, physical significance of electric field, electric-field lines; electric dipole, electric field due to a dipole;(on its axis, on equatorial plane)physical significance of dipoles; torque on a dipole in uniform electric

field. Electric field due to continuous charge distribution. Electric flux, statement of Gauss's theorem proof of Gauss's theorem for a charge enclosed in sphere, and its applications to find electric field due to infinitely long straight wire, uniformly charged infinite thin plane sheet and uniformly charged thin spherical shell (Field inside and outside).

Electric potential, potential difference, electric potential due to a point charge, potential due to an electric dipole with special cases for axis and equatorial plane and system of charges; equipotential surfaces, its properties, relation between field and potential electrical potential energy of a system of two point charges potential energy in external field and of electric dipole in an electrostatic field.

Conductors and insulators, electrostatics of conductors, free charges and bound charges inside a conductor. Electrostatic shielding its uses, Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor, Van de Graaf generator.

Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, drift of electron mobility and their relation with electric current:

Ohm's law, electrical resistance. V-I characteristics (linear and non linear), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance and resistivity. Internal resistance of a cell, potential difference and emf of cell, combination of cells in series and in parallel. Kirchhoff's laws and simple applications of Wheatstone bridge, meter bridge. Potentiometer-principle and its applications to measure potential difference and for comparing emf of two cells, measurement of internal resistance of a cell.

Magnetic Effects of Current and Magnetism

Concept of magnetic field. Oersted's experiment; Biot-Savart law and its application to find magnetic field on the axis of a current carrying circular loop, Ampere's circuital law (no proof) and its applications to infinitely long straight wire, straight and toroidal solenoids.

Force on a moving charge in uniform magnetic and electric fields. Motion in a magnetic field, motion in combined electric and magnetic field (velocity selector) Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field Force between two parallel current-carrying conductors, definition of ampere. Torque experienced by a current loop in

uniform magnetic field; moving coil galvanometers- its current sensitivity and conversion to ammeter and voltmeter. Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (Bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; magnetism and Gauss's law; Earth's magnetic field and magnetic elements, magnetisation and magnetic intensity, magnetic properties of materials, Para-, dia-and ferro-magnetic substances with examples, Electromagnets and factors affecting their strengths. Permanent magnets.

Electromagnetic Induction and Alternating Currents

Electromagnetic induction, Faraday's and Henry experiments, magnetic flux, Faraday laws, induced emf and current, Lenz's Law and conservation of energy, motional emf, Eddy currents: Self and mutual inductance. Alternating current, peak and rms value of alternating current/voltage; reactance and impedance; phasors, ac applied across resistance, ac applied across inductor, as applied across capacitor, ac applied across LCR, LC oscillations, across inductor, ac applied across capacitor, LCR series circuit resonance; power in AC circuit, AC generator and transformer.

Electromagnetic Waves

Need for displacement current, Electromagnetic waves and their characteristics. Transverse nature of electromagnetic waves.

Electromagnetic spectrum (Radio waves, Radio-microwaves, infra-red, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Optics

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibers, refraction at spherical surfaces, refraction by lens, lenses, thin lens formula/equation, lens-maker's formula. Magnification, power of a lens, combination of thin lenses in contact, combination of lens and mirror. Refraction and dispersion of light through a prism. Some natural phenomenon due to sunlight, Scattering of light-blue colour of the sky and reddish appearance of the sun at sunrise and sunset.

Waves optics

Wave front and Huygens' Principle, reflection and refraction of plane wave at a plane surface using Huygens' Principle, wave fronts. Proof of laws of reflection and refraction using Huygens

‘Principle. Interference Young's double hole experiment and expression for fringe width, coherent sources and incoherent addition of waves and sustained interference of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarization, polarization by scattering and reflection, plane polarised light, Brewster's law, uses of plane polarised light and Polaroids.

Dual nature of Matter and Radiations

Electron emission, Photoelectric effect, Hertz and Lenard's observations'; experimental study of photoelectric effect, and wave theory of light, Einstein's photoelectric equation, particle nature of light, the photon, Matter waves-wave nature of particles, de Broglie relation. Davission-Germer experiment (experimental details should be omitted; only conclusion should be explained).

Atoms & Nuclei

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, expression for radius, velocity and energy of electron in orbit, energy levels, line spectrum of hydrogen atom, atomic spectra, de Broglie’s explanation of Bohr’ s second postulate of quantization. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity- alpha, beta and gamma particles/rays and their properties; radioactive decay law, alpha, beta and gamma decay. Mass-energy relation, mass-defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear force, nuclear reactor, Nuclear energy.

Electronic Devices

Classification of metal insulator and semiconductor, Energy bands in Solids, conductor, insulators and Semiconductors; intrinsic and extrinsic semiconductors, p-n junction, semiconductor Diode-I-V characteristics in forward and reverse bias, diode as a rectifier, I-V characteristics of LED, photodiode, solar cell and Zener diode, Zener diode as a voltage regulator. Junction transistor, transistor action; characteristics of a common emitter transistor: transistor as an amplifier (common emitter configuration) and oscillator, digital electronics and Logic gates (OR, AND, NOT, NAND and NOR). Transistor as a switch, integrated circuits.

CHEMISTRY

Solid State

Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three

dimensional lattices, calculation of density of unit cell, packing in solids packing efficiency, voids, number of atoms per unit cell in a cubic unit cell, points defects, electrical and magnetic properties. Band theory of metals, conductors, semiconductors and insulators and n and p type semiconductors.

Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties - relative lowering of vapour pressure, Raoult's Law, elevation of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass. Vant Hoff factor.

Electrochemistry

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea) dry cell-electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, fuel cells; corrosion. Relation between Gibbs Energy change and EMF of cell.

Chemical Kinetics

Rate of a reaction (average and instantaneous), factors affecting rates of reaction; concentration, temperature, catalyst; order and molecularity of a reaction: rate law and specific rate constant, integrated rate equations and half life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment). Activation Energy, Arrhenius equation.

Surface Chemistry

Absorption physiorption and chemisorption; factors affecting adsorption of gases on solids; catalysis; homogenous and heterogeneous, activity and selectivity; enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophillic, lyophobic, multi molecular and macromolecular/colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsion-types of emulsions.

General Principles and Processes of Isolation of Elements

Principles and methods of extraction – concentration, oxidation, reduction electrolytic method and refining; occurrence and principles of extraction of aluminum, copper, zinc and Iron.

p-Block Element

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen - preparation, properties and uses; compounds of nitrogen- preparation and properties of ammonia and nitric acids, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous preparation and properties of phosphine, halides (PCl3, PCl5) and oxoacids (elementary idea only).

Group16 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen; preparation, properties and uses; classification of oxides; Ozone. Sulphur - allotropic forms; compounds of sulphur preparation, properties and uses of sulphur dioxide, sulphuric acid, industrial process of manufacture, properties and uses, oxoacids of sulphur (structures only).

Group 17 elements: (General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens; preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only).

Group 18 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals-metallic character, ionization, enthalpy, oxidation states, ionic radii, colour, catalytic properties, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanoids -electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and consequences.

Actenoids - Electronic configuration, oxidation states.

Coordination Compounds

Coordination compounds - introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding; Werner's theory VBT, CFT, Isomerism (structure and stereo) importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

Haloalkanes and Haloarenes

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions, optical rotation. Haloarenes: Nature of C-X bond, substitution reactions (directive influence of halogen for mono substituted compounds only) Uses and environmental effects of - dichloromethane, trichlromethane, tetrachloromethane, iodoform, freons, DDT.

Alcohols, Phenols and Ethers

Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols; mechanism of dehydration, uses, with special reference to - methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

Aldehydes, Ketones and Carboxylic Acids

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, and mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; uses.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Organic compounds containing Nitrogen (Amines, cyanides and isocyanides):

Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Cyanides and Isocyanides, Diazonium Salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

Biomolecules; Carbohydrates, Proteins, Vitamins, Hormones and Nucleic Acids

Classification (aldoses and ketoses), monosaccaharides (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance Proteins - Elementary idea of amino acids, peptide bond, polypeptides proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins; enzymes.

Vitamins: Classification and functions.

Hormones: Elementary idea (excluding structure)

Nucleic Acids: DNA & RNA.

Polymers

Classification - natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers; natural and synthetic like polythene, nylon, polyesters, bakelite, rubber. Biodegradable and Non- Biodegradable Polymers.

Chemistry in everyday life:

1. Chemicals in medicines analgesic, tranquilizers, antiseptics, disinfectants, antimicrobials, anti-fertility drugs, antibiotics, antacids, antihistamines.
2. Chemicals in food-preservatives, artificial sweetening agents. Elementary idea of antioxidants.
3. Cleansing agents- soaps and detergents, cleansing action.

BIOLOGY

Reproduction

Reproduction in organisms: Reproduction, a characteristic feature of all organism for continuation of species; Modes of reproduction-Asexual and sexual reproduction; Modes –Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants. Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination-types, agencies and examples; Out breedings devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events-Development of endosperm and embryo, Development of seed and formation of fruit; Special modes-apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.

Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis-spermatogenesis and oogenesis; Menstrual cycle; Fertilization, embryo development up to blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).

Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control – Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies-IVF, ZIFT, GIFT (Elementary ideas for general awareness).

Genetics and Evolution

Heredity and variation: Mendelian Inheritance; Deviations from Mendelism-Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and

genes; Sex determination in humans, birds, honey bee; Linkage and crossing over; Sex linked inheritance – Haemophilia, Colour blindness; Mendelian disorders in humans- Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Molecular Basis of Inheritance: Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation- Lac Operon; Genome and human genome project; DNA finger printing. Evolution: Origin of life; Biological evolution and evidences for biological evolution (Paleontological, Comparative anatomy, embryology and molecular evidence); Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution- Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic drift; Hardy-Weinberg's principle; Adaptive Radiation; Human evolution.

Biology and Human Welfare

Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology-vaccines; Cancer, HIV and AIDS; Adolescence, drug and alcochol abuse. Improvement in food production: plant breeding, tissues culture, single cell protein, Bifortification, Apiculture and animal husbandary. Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

Biotechnology and its applications

Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology). Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues- Biopiracy and patents.

Ecology and environment

Organisms and environment: Habitat and niche; Population and ecological adaptations; Population interactions-mutualism, competition, predation, parasitism; Population attributes- growth, birth rate and death rate, age distribution.

Ecosystems: Patterns, components; productivity and decompositions;

Energy flow; Pyramids of number, biomass, energy; Nutrients cycling (carbon and phosphorous); Ecological succession; Ecological Services-Carbon fixation, pollination, oxygen release.

Biodiversity and its conversation: Concepts of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, Biosphere reserves, National parks and sanctuaries.

Environmental issues: Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation; Case studies as success stories addressing environmental issues.

MATHEMATICS

Sets and Functions

Sets

Sets and their representations. Empty set, Finite & Infinite sets, Equal sets. Subsets, Subsets of the set of real numbers especially intervals (with notations). Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set, Properties of complement sets.

Relations & Functions

Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto R × R x R).

Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

Trigonometric Functions

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing sin(x±y) and cos(x±y) in terms of sinx, siny, cosx&cosy. Deducing the identities like following:

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}, \cot(x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x}$$

$$\sin\alpha \pm \sin\beta = 2\sin \frac{1}{2}(\alpha \pm \beta)\cos \frac{1}{2}(\alpha \mp \beta)$$

$$\cos\alpha + \cos\beta = 2\cos \frac{1}{2}(\alpha + \beta)\cos \frac{1}{2}(\alpha - \beta)1$$

$$\cos\alpha - \cos\beta = -2\sin \frac{1}{2}(\alpha + \beta)\sin \frac{1}{2}(\alpha - \beta)$$

Identities related to sin2*x*, cos2*x*, tan2 *x*, sin3*x*, cos3*x* and tan3*x*

Algebra

Complex Numbers and Quadratic Equations

Need for complex numbers, especially √-1, to be motivated by inability to solve every quadratic equation. Algebraic properties of complex numbers. Argand plane.

Linear Inequalities

Linear inequalities, Algebraic solutions of linear inequalities in one variable and their representation on the number line.

Permutations & Combinations

Fundamental principle of counting, Factorial n(n!) Permutations and combinations, Formulae for ${}^{n}P_{r}$ and ${}^{n}C_{r}$ and their connections, simple applications.

Binomial Theorem

Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, simple applications.

Sequence and Series

Sequence and Series. Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of *n* terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

Coordinate Geometry

Straight Lines

Brief recall of two dimensional geometry from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form, Distance of a point from a line.

Conic Sections

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

Introduction to Three-dimensional Geometry

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points.

Calculus

Limits and Derivatives

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions

Statistics and Probability

Statistics

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

Probability

Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

Relations and Functions

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and ontofunctions.

Inverse Trigonometric Functions:

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

Matrices

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. Non- commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

Determinants

Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

Continuity and Differentiability

Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, l $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functionsexpressed in parametric forms. Second order derivatives.

Applications of Derivatives

Applications of derivatives: rate of change of quantities, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

Integrals

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2+a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2-x^2}}, \int \frac{dx}{ax^2+bx+c}, \int \frac{dx}{\sqrt{ax^2+bx+c}},$$

$$\int \frac{px+q}{ax^2+bx+c}\, dx, \int \frac{px+q}{\sqrt{ax^2+bx+c}}\, dx, \int \sqrt{a^2 \pm x^2}\, dx, \sqrt{x^2-a^2}\, dx$$

$$\int \sqrt{ax^2+bx+c}\, dx,$$

Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

Applications of the Integrals

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

$$\frac{dy}{dx} + py = q, where\ p\ and\ q\ are\ functions\ of\ x\ or\ constants.$$

$$\frac{dx}{dy} + px = q, where\ p\ and\ q\ are\ functions\ of\ y\ or\ constants.$$

Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

Three-dimensional Geometry

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equationof a line, skew lines, shortest distance between two lines. Angle between two lines

Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Probability

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable

Sample Questions

Physics

1. Which of the following series of hydrogen spectrum lies in visible region?
    A. Lyman series
    B. Balmer series
    C. Paschen series
    D. Brackett series
2. If a car of mass 1000 kg starting from rest reaches a velocity of $18ms^{-1}$ after 6s then force acting on it is:
    A. 300 N
    B. 3000 N
    C. 6000 N
    D. 8000 N
3. The coefficient of restitution e for a perfectly inelastic collision is
    A. 1
    B. 0
    C. ∞
    D. -1

Chemistry

1. Which of the following ores of iron contain Sulphur?
    A. Haematite
    B. Iron pyrites
    C. Siderite
    D. Magnetite
2. Which of the following halides shows nucleophilic substitution reactions exclusively by S_N1 mechanism?
    A. Isopropyl chloride
    B. *n*-Propyl iodide
    C. Bromobenzene
    D. Benzyl chloride
3. Which of the following properties of solutions is temperature dependent?
    A. Molarity
    B. Molality
    C. Mole fraction
    D. Molar mass

Biology

1. A plant with both male and female flowers is -
    A. Unisexual
    B. Bisexual
    C. Monoecious
    D. Dioecious

2. Trisomy of chromosome 21 is found in-
   A. Turner Syndrome
   B. Klinefelter syndrome
   C. Down Syndrome
   D. Edward syndrome
3. Which was the first ever human hormone produced by recombinant DNA technology -
   A. Progesterone
   B. Insulin
   C. Estrogen
   D. Growth hormone

Mathematics

1. The number of diagonals that can be drawn by joining the vertices of an octagon is
   A. 20
   B. 28
   C. 8
   D. 16
2. The eccentricity of $\frac{\sqrt{1001}}{5}\left(x^2 - y^2\right)$ = 1 is
   A. 1/2
   B. $2\sqrt{2}$
   C. $\sqrt{2}$
   D. 3
3. The point of local maxima for the function $f(x) = 3x^4 + 4x^3 - 12x^2 + 12$ is given by
   A. 12
   B. 6
   C.
   D. 2

Syllabus of Common Entrance examination 2024-25
(Post Graduate courses: Life Sciences)
M. Sc 2 years [Botany, Microbiology, Zoology, Molecular Biology and Biochemistry, Biochemistry (Specialization in Sports Biochemistry) and Human Genetics]

Cell Biology:-Principles of microscopy, Structure and functions of cell organelles, Plasma membrane, Endoplasmic reticulum, Mitochondria, Golgi complex, Ribosomes, Lysosomes, Centrosome and Nucleus cell cycle, mitosis and meiosis.

Ecology: Flora and Fauna, microflora and Environment; Atmosphere (gaseous compositions), water, light, temperature, soil.Biogeochemical cycles (C, N, P), Community Ecology; Population Ecology; Ecosystems; Biogeographical Regions of India; Landscape Ecology; ecological succession. Ecosystem, Ecological factors, concept of limiting factors. Ecological adaptations, Characteristics and regulation of population, Inter and Intra specific interactions, Ecological succession, Niche, Environmental pollution. Microbial interactions: Commensalism, Amensalism, Symbiosis, Parasitism and Predation. Plant pathology, classification of plant pathogens, control measures.

Genetics:-DNA the Genetic Material: DNA structure; replication; DNA–protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA. Multiple alleles and factors, Linkage, Crossing over and recombination, Gene, Genetic code, Replicatin, Transcription, Translation, Regulation of gene expression, Extranuclear inheritance, Evolution of genes, Population genetics, Genetic recombination and its applications, Mendelism; laws of segregation and independent assortment; linkage analysis; Incomplete dominance and co-dominance, epistasis, pleiotropy, penetrance and expressivity, polygenic inheritance, Mutations, spontaneous & induced, chemical nature of genetic material, replication of DNA, Genetic code, Bacterial recombination, transformation, conjugation and transduction. Cloning vectors (Plasmid, M13 and λ bacteriophages, phasmids, cosmids, bacterial and yeast artificial chromosomes) Restriction enzyme , modifying enzymes, cDNA cloning, PCR, Nucleic Acid, Labelling.

Biochemistry:- Carbohydrates, Proteins, Enzymes (classification, Enzyme energetics (Km),Vmax and Enzyme Inhibition) , Lipids and Nucleic acids, Metabolic pathways (Glycolysis, TCA, HMP and electron transport chain).Microbial nutrition: Growth medium (selective, differential, enrichment, complete, synthetic and minimal medium) factors affecting the growth of microorganisms

Biodiversity: spontaneous generation theory, Koch's postulates, Pasteur's contributions to microbiology. Sources of microorganisms, pure culture techniques. and preservation, bright field microscopy, Gram's staining, Structure of Bacteria and chemical composition, bacterial cell wall, cell membrane, capsule, pili and spore, Classification of viruses, basic structure of a bacteriophage, Life cycle of bacteriophage (lytic and lysogenic), Fungi: Important features and life history, Algae: General characters and important features, classification and economic importance and life cycles; General account of Lichens; diversity of cryptogams: Bryophyta: Structure, reproduction, classification; Pteridophyta: important characteristics, classification, Salient features of Animal phyla (Protozoa, Porifera, Cnidaria, Platyhelminthes, Annelida, Arthropoda, Mollusca, Echinodermata and Chordata).

Structure, development and reproduction in flowering plants: Diversity in plant form in annuals, biennials and perennials; trees-largest and longest-lived; Branching patterns; Monopodial and Sympodial growth; Canopy architecture; Vegetative reproduction; Double fertilization; leaf size shape arrangement; internal structure in relation to photosynthesis and water loss; adaptations to water stress; senescence and abscission. **diversity of seed plants and their systematics:** Characteristics of seed plants General features of gymnosperms and their classification;, taxonomy and classification of Angiosperms; nomenclature of plants,- Geological time scale and fossilization. **plant physiology:** Plant-Water Relation:, physical properties of water, Mineral Nutrition; Photosynthesis, photosynthetic pigments, absorption spectra and

enhancement effects, concept of two photosystems, photophosphorylation, Calvin cycle, C4 pathway, CAM plants, photorespiration. Plant hormones - auxins, gibberellins, cytokinins, abscissic acid and ethylene. photomophogensis, phytochromes and cryptochromes, their physiological role and mechanism of action.

Techniques: Biochemical and Biophysical Techniques, Centrifugation, Chromatography, Electrophoresis, Spectroscopy, Radioisotopes. Plant cell transformation, Fundamentals of Animal tissue culture

Economical aspects of life forms: Food Plants; Spices; Medicinal Plants; Beverages: Role of microorganisms in industries such as bakery, alcoholic beverages, penicillin, biofertilizers, biopesticides, Mushroom cultivation: methods and future perspectives.

Disease and immunology: Important pathogenic bacteria, viruses, protozoans, helminths and arthropods. Immune response: antigens, antibodies, cell mediated immunity, immune system T and B lymphocytes, generation of antibody diversity, monoclonal antibodies.

Model Test paper for CET 2023 for admission to M Sc (2 years)

[Botany, Microbiology, Zoology, Molecular Biology and Biochemistry, Biochemistry (Specialization in Sports Biochemistry) and Human Genetics]
The test will be based on 100 MCQ's set across the prescribed syllabus for CET, as per following pattern

1. Monocytes differentiate into which kind of phagocytic cells?
    a) Neutrophil
    b) B cell
    c) Macrophage
    d) T cell

2. Who discovered the first virus?
    a) The microscopist Antonie van Leeuwenhoek
    b) The bacteriologist Charles Chamberland
    c) The botanist Dmitri Iwanowsky
    d) The virologist Jonas Salk

3. Brown algae possess pigments like chlorophyll a, c, carotenoids and _____
    a) Phycobilins
    b) Xanthophylls
    c) Fucoxanthin
    d) Sorbitol

4. Scopolamine is obtained from:
    a) *Terminolia arjuna*
    b) Papaver
    c) *Atropa belladonna*
    d) Ashwagandha

5. In leguminous plants, leghaemoglobin protects the activity of which enzyme?
    a) Nitrogenase

b) Lipase
c) Nitrate reductase
d) Both A and C

6. A mutation that causes a lysine to be replaced with an arginine is called a ____ mutation.
   a) Nonsense
   b) Missense
   c) Synonymous
   d) Transversion

7. Sickle-cell disease occurs due to which kind of mutation?
   a) Point
   b) Frameshift
   c) Nonsense
   d) Insertion

8. The ability of a microscope to distinguish two adjacent points as distinct & separate is known as

   a) Magnification power
   b) Resolving power
   c) Brightening power
   d) None of the above

9. Immersion oil is used with 100X objective because its

   a) Refractive index is same as that of air
   b) Refractive index is same as that of water
   c) Refractive index is same as that of glass slide
   d) None of the above

10. Acoelomate triploblastic body with bilateral symmetry is characteristics of:
   a) Flatworms
   b) Roundworms
   c) Segmented Worms
   d) Molluscs

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–I) (Session 2020-23)(Faculty of Sciences*

PAPER–I: ALGEBRA

SECTION–A

Linear independence of row and column vectors. Row rank, Column rank of a matrix, Equivalence of column and row ranks, Nullity of matrix, Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations. Theorems on consistency of a system of linear equations.

SECTION–B

Eigen values, Eigen vectors, minimal and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix. Quadratic Forms, quadratic form as a product of matrices. The set of quadratic forms over a field.

SECTION–C

Congruence of quadratic forms and matrices. Congruent transformations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Matrix Congruence of skew-symmetric matrices. Reduction in the real field. Classification of real quadratic forms in variables. Definite, semi-definite and indefinite real quadratic forms. Characteristic properties of definite, semi-definite and indefinite forms.

SECTION–D

Relations between the roots and coefficients of general polynomial equation in one variable. Transformation of equations and symmetric function of roots, Descarte's rule of signs, Newton's Method of divisors, Solution of cubic equations by Cardon method, Solution of biquadratic equations by Descarte's and Ferrari's Methods.

Books Recommended:-

1. K.B. Dutta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi (2002).
2. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications, 1994.
3. Chandrika Parsad: Text book on Algebra and Theory of Equations, Pothishala Pvt. Ltd.,Allahabad.
4. S.L. Loney: Plane Trigonometry Part–II, Macmillan and Company, London.
5. Shanti Narayan and P.K. Mittal: Text Book of Matrices.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–I) (Session 2020-23)(Faculty of Sciences)*

PAPER–II: CALCULUS AND TRIGONOMETRY

SECTION–A

Real number system and its properties, lub, glb of sets of real numbers, limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Uniform continuities.

SECTION–B

Differentiation of hyperbolic functions, Successive differentiation, Leibnitz theorem, Taylor's andMaclaurin's theorem with various forms of remainders, Indeterminate forms.

SECTION–C

De–Moivre's Theorem and its applications, circular and hyperbolic functions and their inverses.

SECTION–D

Exponential and Logarithmic function of a complex numbers, Expansion of trigonometricfunctions, Gregory's series, Summation of series.

Books Recommended:-

1. N. Piskunov: Differential and Integral Calculus, Peace Publishers, Moscow.
2. Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
3. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–II) (Session 2020-23)(Faculty of Sciences*

PAPER–I: CALCULUS AND DIFFERENTIAL EQUATIONS

SECTION–A

Asymptotes, Tests for concavity and convexity, Points of inflexion, Multiple Points, Curvature, Tracing of Curves (Cartesian and Parametric coordinates only).

SECTION–B

Integration of hyperbolic functions. Reduction formulae. Definite integrals. Fundamental theorem of integral calculus. Quadrature, rectification.

SECTION–C

Exact differential equations. First order and higher degree equations solvable for x,y,p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories.

SECTION–D

Linear differential equations with constant and variable coefficients. Variation of Parameters method, reduction method, series solutions of differential equations. Power series method, Besseland Legendre equations (only series solution).

Books Recommended:-

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longman (India), 1967.
2. G.F. Simmons: Differential Equations, Tata McGraw Hill, 1972.
3. E.A. Codington: An Introduction to Ordinary Differential Equations, Prentice Hall of India,1961.
4. Gorakh Prasad: Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
5. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999. 52

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–II) (Session 2020-23)(Faculty of Sciences*

PAPER–II: CALCULUS

SECTION–A

Limit and Continuity of functions of two variables, Partial differentiation, Change of variables, Partial derivatives and differentiability of real-valued functions of two variables, Schwartz's and Young's Theorem, Statements of Inverse and implicit function theorems and applications.

SECTION–B

Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians, Envelopes. Evolutes, Maxima, Minima and saddle points of functions of two variables.

SECTION–C

Lagrange's undetermined multiplier method, Double and Triple Integrals, Change of variables., Applications to evaluation of areas, Volumes, Surfaces of solid of revolution, Change of order ofintegration in double integrals.

SECTION–D

Application to evaluation of area, volume, surface of solids of revolutions.

Books Recommended:-

1. Narayan, S. and P.K. Mittal: Integral Calculus. Sultan Chand & Sons.
2. Kreyszig, E.: Advanced Engineering Mathematics.
3. Narayan S. and P.K. Mittal: Differential Calculus, Sultan Chand & Sons.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–III) (Session 2020-23)(Faculty of Sciences*

PAPER–I: ANALYSIS

SECTION–A

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

SECTION–B

Series of non-negative terms. Comparison tests. Cauchy's integral test. Ratio test. Cauchy's root test. Raabe's test, logarithmic test. De Morgan's and Bertrand's test. Kummer's test, Cauchy condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence.

SECTION–C

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

SECTION–D

Improper integrals and statements of their conditions of existence. Test of the convergence ofimproper integral, Beta and Gamma functions.

Books Recommended:

1. Malik, S.C. and Savita Arora: Mathematical Analysis, Wiley Eastern Ltd. (1991).
2. Apostal, T.M.: Mathematical Analysis, Addison Wesley Series in Mathematics (1974).
3. Narayan, S. and P.K. Mittal: Integral Calculus, Sultan Chand & Sons.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–III) (Session 2020-23)(Faculty of Sciences*

PAPER–II: ANALYTICAL GEOMETRY

SECTION–A

Transformation of axes, shifting of origin, Rotation of axes in two dimension and three dimension, The invariants, Joint equation of pair of straight lines, equations of bisectors

SECTION–B

Parabola and its properties. Tangents and normal, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of mid point and diameter of conic.

SECTION–C

Ellipse and hyperbola with their properties. Tangents and normal, Pole and polar. pair of tangents at a point, Chord of contact, Identifications of curves represented by second degree equation (including pair of lines).

SECTION–D

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism, Sphere: Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point w.r.t. a shpere, radical planes.

Books Recommended

1. Gorakh Prasad and H.C. Gupta: Text Book on Coordinate Geometry.
2. S.L. Loney: The Elements of Coordinate Geometry, Macmillan and Company, London.
3. Narayan, S.: Analytical Solid Geometry, Sultan Chand & Sons (2005).
4. Kreyszig, E.: Advanced Engineering Mathematics.
5. Thomos, G.B. and Finney, R.L.: Calculus and Analytic Geometry.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–IV) (Session 2020-23)(Faculty of Sciences*

PAPER–I: STATICS AND VECTOR CALCULUS

Section–A

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem, (ג-μ) theorem). Resultant of a number of coplanar forces, parallel forces.

Moments, Varignon's theorem of moments, Couples, Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple. Equilibrium of coplanar forces.

SECTION–B

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centreof gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

SECTION–C

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity,Vector integration.

SECTION–D

Theorems of Gauss, Green, Stokes and problems based on these.

Books Recommended:

1. S.L. Loney: Statics, Macmillan and Company, London.
2. R.S. Verma: A Text Book on Statics, Optical Pvt. Ltd., Allahabad.
3. Spiegal, M.R.: Introduction to Vector Calculus and Tensor.
4. Spiegal, M.R.: Vector Analysis.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–IV) (Session 2020-23)(Faculty of Sciences*

PAPER–II: SOLID GEOMETRY

SECTION–A

Cylinder as surface generated by a line moving parallel to a fixed line and through fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standard forms

SECTION–B

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in *x*, *y*, *z*. Cone as a surface generated by a line passing through a fixed curve and fixed point outside theplane of the curve, right circular and elliptic cones.

SECTION–C

Equation of surface of revolution obtained by rotating the curve $f(x, y) = 0$ about the z-axis in the form of $f(x^2 + y^2, z) = 0$ Equation of ellipsoid, hyperboloid and paraboloid in standard forms.

SECTION–D

Surfaces represented by general equation of 2nd degree S = 0. Tangent lines, tangent planes andNormal plane.

Books Recommended:

1. Narayan, S.: Analytical Solid Geometry, Sultan Chand & Sons (2005).
2. Kreyszig, E.: Advanced Engineering Mathematics.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–V) (Session 2020-23)(Faculty of Sciences*

PAPER–I: DYNAMICS

Section–A

Rectilinear motion in a starlight line with uniform acceleration, Newton's laws of motion. Motion of two particles connected by a string. Motion along a smooth inclined plane. Variable acceleration.Simple Harmonic Motion.

Section–B

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles. Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum. Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work doneagainst gravity.

Books Recommended:

1. S.R.Gupta: A text book of Dynamics
2. F. Chorlton: Dynamics.
3. S.L. Loney: An Elementary Treatise on the Dynamics of a Practice and of Rigid Bodies,Cambridge University Press, 1956.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–V) (Session 2020-23)(Faculty of Sciences)*

PAPER–II: NUMBER THEORY

Section–A

The division algorithm, The greatest common divisor, least common multiple, The Euclidean alogrithm, The Diophantine equation $ax + by = c$ Prime numbers and their distribution, The fundamental theorem of arithmetic, Basic properties of congruences, Linear congruences, Specialdivisibility tests.

Section–B

Chinese remainder theorem, The Fermat's theorem, Wilson's theorem, τ and σ functions, Mobius Inversion formula, Greatest integer function, Euler's Phi function, Euler's theorem, some propertiesof the Phi Function.

Books Recommended:

1. D. Burton: Elementary Number Theory, Sixth Edition, McGraw-Hill.(Scope in Chapters 2-5, 7-12)., 2005
2. Niven and Zuckerman: An Introduction to Number Theory, Wiley 1972.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–VI) (Session 2020-23)(Faculty of Sciences)*

PAPER–I: LINEAR ALGEBRA

Section–A

Definition of groups, rings and fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces. Linear span, Linear dependence, Linear independence of vectors. Linear combination of vectors, Basis of a vector space, Finitely generated vector spaces. Existence theorem for basis. Invariance of the number of elements of the basis set. Dimension of sum of two subspaces. Quotient space and its dimension.

Section–B

Linear transformation. Algebra of linear transformation. Rank- Nullity theorem, Isomorphism andIsomorphic spaces, Matrix of a linear transformation. Changes of basis, Linear operator.

Books Recommended:

1. K.Hoffman & R. Kunze: Linear Algebra, 2nd Edition, Prentice Hall, New Jersey, 1971.
2. V. Krishnamurthy, V. P. Mainra and J.L. Arora: An Introduction to Linear Algebra, East West Press, 1976.
3. Shanti Narayan & P.K. Mittal: A Text Book of Matrices, 10th Edition (2002), S.Chand & Co.
4. Surjit Singh: Linear Algebra, 1997.

B.A./B.Sc. (Semester System) *(12+3 System of Education) (Semester–VI) (Session 2020-23) (Faculty of Sciences)*

PAPER–II: NUMERICAL ANALYSIS

Section–A

Error generation, propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Iteration method, Newton's Method, Generalized Newton's Method, Method of false position, Muller's method, Rate of convergence of these methods.

Solution of linear system of equation; Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative Method, Jacobi's Method, Gauss Seidel Method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator.

Section–B

Interpolation with divided difference, Newton's formula, Lagrangian Method, Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation Extrapolation. Numerical differentiation, Method based on interpolation. Numerical Integration, Trapezoidal rule, Simpson's rule, Weddle rule, Romberg Integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration.

Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's Method, Runge-Kutta Method. Predictor- Corrector'sMethod.

Books Recommended:

1. S.S. Sastry: Introductory Methods of Numerical Analysis, 2003 (3rd Edition), Prentice Hall ofIndia.
2. A. Maritava Gupta and Subash Ch. Bose: Introduction to Numerical Analysis.

Department of Botanical and Environmental Sciences
Guru Nanak Dev University, Amritsar

Admission to **M.Sc. Environmental Sciences - 2024**

Syllabus for Entrance Test

Entrance test will be based on multiple choice questions (MCQ) consisting of 100 marks for one-hour duration and there will be no negative marking. The questions will be mainly based on general awareness, scientific aptitude and basic mathematics/physics/chemistry/biology at the under-graduate level.

Sample Questions

1	World Water Day is celebrated on			
	A	2 February	C	22 April
	B	22 March	D	5 June
2.	$PM_{2.5}$ and PM_{10} are associated with			
	A	Water Pollution	C	Hazardous Waste
	B	Air Pollution	D	Nuclear Waste
3.	Find the minimum value of function $f(x) = x^2-x + 2$			
	A	0.5	C	1.75
	B	0.75	D	0.25
4.	Geometric mean of 3, 3, 4, 9 and 24 is			
	A	3	C	6
	B	4	D	8
5.	Sustainable Development Goals (SDGs) were set up in 2015 by United Nation General Assembly are a collection of ……. interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all"			
	A	11 Goals	C	16 Goals
	B	13 Goals	D	17 Goals
6	Stoichiometric calculations are based on			
	A	Atomic number	C	Number of shared electrons
	B	Atomic weight	D	Moles