

242/23

Question Booklet Sl. No.

Question Booklet Alpha Code

A

A

Total Number of Questions : 100

Time : 90 Minutes

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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1. What are the four fundamental forces of nature from strongest to weakest ?
 - A) Weak nuclear force, Gravity, Electromagnetic force, Strong nuclear force
 - B) Strong nuclear force, Electromagnetic force, Weak nuclear force, Gravity
 - C) Weak nuclear force, Electromagnetic force, Gravity, Strong nuclear force
 - D) Electromagnetic force, Gravity, Strong nuclear force, Weak nuclear force

2. Identify the dimensionless quantity from the following.

A) Force	B) Relative density
C) Stress	D) Work

3. A particle moves along a circular path of radius, r . What is the distance and displacement of the particle after one complete revolution ?

A) $2\pi r, 0$	B) $0, 2\pi r$	C) $\pi r, 0$	D) $0, \pi r$
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4. Which among the following is a scalar quantity ?

A) Displacement	B) Acceleration
C) Pressure	D) None of the above

5. Which law is also known as law of inertia ?

A) Newton's I law	B) Newton's II law
C) Kepler's I law	D) None of the above

6. A moving body has kinetic energy 50 J. The work done to stop the body is given by

A) 25 J	B) 20 J	C) 50 J	D) 100 J
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7. Hooke's law is

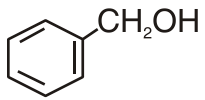
A) $\text{Stress} \propto \text{Strain}^3$	B) $\text{Stress} \propto \sqrt{\text{Strain}}$
C) $\text{Stress} \propto \text{Strain}$	D) $\text{Strain} \propto \frac{1}{\text{Stress}}$

8. Action of detergents
 - A) Decreases the surface tension of water
 - B) Increases the viscosity of water
 - C) Increases the surface tension of water
 - D) None of the above

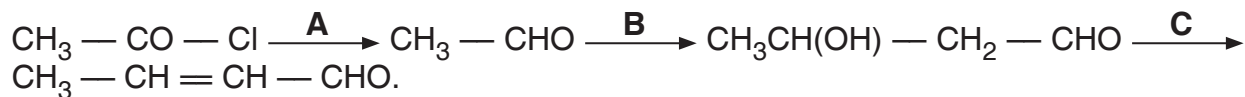
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9. Sea breeze is based on
- A) Radiation
B) Convection
C) Conduction
D) None of these
10. The relation connecting frequency (f) and time period (T) of a periodic motion is
- A) $f = 2\pi T$
B) $f = 2T$
C) $f = \frac{T}{2\pi}$
D) $f = \frac{1}{T}$
11. Quantization of charge is
- A) $Q = \pm ne$
B) $Q = n^2e$
C) $Q = \frac{n}{e}$
D) None of the above
12. Unit of electric potential is
- A) Joule/Coulomb
B) Newton/Coulomb
C) Volt/Metre
D) None of the above
13. Which among the following materials that obey Ohm's law ?
- A) Diodes
B) Conductors
C) Vacuum tubes
D) Thermistors
14. A ferromagnetic substance above curie temperature
- A) Becomes diamagnetic
B) Becomes paramagnetic
C) Remains ferromagnetic
D) None of the above
15. The principle behind transformer is
- A) Self induction
B) Mutual induction
C) Electromagnetic induction
D) None of the above
16. Tuning of radio is based on
- A) Electromagnetic induction
B) Self induction
C) Resonance
D) None of the above
17. Optical fibres works on the principle of
- A) Reflection
B) Diffraction
C) Scattering
D) Total internal reflection

18. In photoelectric effect, the number of photo electrons emitted per second depend on
- A) Intensity of incident light B) Frequency of incident light
C) Wavelength of incident light D) None of the above
19. The source of energy of the sun is
- A) Compton effect B) Nuclear fission
C) Nuclear fusion D) Photoelectric effect
20. The process of conversion of alternating current into direct current is known as
- A) Oscillation B) Amplification C) Rectification D) Modulation
21. Which experiment is responsible for finding out the charge of an electron ?
- A) Cathode ray discharge tube
B) Millikan's oil drop method
C) Rutherford α -ray scattering experiment
D) None of these
22. Acetylene molecule has carbon in
- A) sp hybridisation B) sp^2 hybridisation
C) sp^3d hybridisation D) sp^3 hybridisation
23. Enthalpies of all elements in their standard states are
- A) Unity B) Zero
C) < 0 D) Different for each element
24. Identify the Lewis acid among the following.
- A) OH^- B) H_2O C) BF_3 D) NH_3
25. Which of the following is a buffer ?
- A) $HCl + NaCl$ B) $NaOH + NaCl$
C) $HCl + KCl$ D) $NH_4OH + NH_4Cl$
26. In the Lassaigne's test for Nitrogen in an organic compound, the Prussian blue colour is obtained due to the formation of
- A) $K_4[Fe(CN)_6]$ B) $Fe_4[Fe(CN)_6]_3$ C) $Na_4[Fe(CN)_6]$ D) $Fe_2[Fe(CN)_6]$

27. Purification method used for separating Glycerol from Spent-lye in soap industry is
- Sublimation
 - Crystallisation
 - Distillation under reduced pressure
 - Chromatography
28. Number of moles of the solute per kilogram of the solvent is
- Mole fraction
 - Molality
 - Molarity
 - Mass %
29. Which of the following is an example for an ideal solution ?
- Ethanol + acetone
 - Phenol + aniline
 - Acetone + chloroform
 - Benzene + toluene
30. The conversion of molecules-A to B follows second order kinetics. If the concentration of A is increased to two times how will it affect the rate of formation of B ?
- Rate will increase two times
 - Rate will increase four times
 - Rate remains constant
 - Rate will increase six times
31. Choose the correct expression for Arrhenius equation.
- $k = Ae^{\frac{E_a}{RT}}$
 - $\ln k = \frac{E_a}{RT} + \ln A$
 - $\ln k = \frac{E_a}{RT} - \ln A$
 - $k = Ae^{-E_a/RT}$
32. The Carbon-Oxygen bond length in phenol is
- 142 pm
 - 141 pm
 - 136 pm
 - 130 pm
33. During fermentation which gas is released ?
- O₂
 - SO₂
 - CO₂
 - NO₂
34. Identify allylic alcohol from the following.
- CH₂ = CH — OH
 - 
 - CH₃ — CH₂ — CH₂ — OH
 - CH₂ = CH — CH₂ — OH

35. Fill in the reagents for the given conversions :



A	B	C
A) NaOH	hydrolysis	heat
B) Pd/BaSO ₄	dil. NaOH	heat
C) I ₂ /NaOH	LiAlH ₄	H ₃ O ⁺
D) (CH ₃) ₂ Cd	heat	dil. NaOH

36. Carboxylic acid can be prepared from Grignard reagent by the reaction with

- | | |
|-----------------|-------------------|
| A) Ammonia | B) Water |
| C) Chromic acid | D) Carbon dioxide |

37. General formula of Carboxydrate is

- | | | | |
|---|--|------------------------------------|---|
| A) C _x (H ₂ O) _y | B) C _x (H ₂ O) _{2y} | C) C _x H ₂ O | D) C _x H _(2y+1) O |
|---|--|------------------------------------|---|

38. In fibrous protein polypeptide chains are held together by

- | | |
|----------------------------------|--------------------------------------|
| A) Van der Waal's force | B) Electrostatic force of attraction |
| C) Hydrogen and disulphide bonds | D) None of these |

39. Enzyme which can catalyze hydrolysis of maltose to glucose is

- | | | | |
|-----------|------------|--------------|-------------|
| A) Zymase | B) Maltase | C) Invertase | D) Diastase |
|-----------|------------|--------------|-------------|

40. Which choice contains all the three molecular units found in nucleotides ?

- A) Amino acid, sugar, nitrogen containing base
 B) Phosphate, sugar, amino acid
 C) Phosphate, nitrogen containing base, sugar
 D) Nitrogen containing base, peptide linkage, sugar

41. Geitonogamy is the transfer of pollen grains from

- A) Anther to stigma of the same flower
 B) Anther to stigma of the different plant of two species
 C) Anther to stigma between different plants of same species
 D) Anther to stigma between two flowers of the same plant

42. From the list of fruits below select true fruit.
 A) Apple
 B) Cashew
 C) Mango
 D) Strawberry
43. Choose the selectable marker gene of cloning vector pBR 322.
 A) Bam Ifl
 B) ampR
 C) ClaI
 D) PvuI
44. Rosie is a transgenic animal. It belongs to
 A) Monkey
 B) Pig
 C) Cow
 D) Rat
45. The population interaction between Barnacles and Whale is
 A) Commensalism
 B) Amensalism
 C) Mutualism
 D) Parasitism
46. From the following list of pteridophytes choose a heterosporous pteridophyte.
 A) Psilotum
 B) Selaginella
 C) Equisetum
 D) Pteris
47. Parietal placentation is found in
 A) Dianthus
 B) Primrose
 C) Argemone
 D) Marigold
48. Name the stage at which synapsis of homologous chromosomes appears during prophase I of meiosis.
 A) Zygotene
 B) Leptotene
 C) Diplotene
 D) Diakinesis
49. Name the first stable product of Carbon dioxide fixation in C_4 plants.
 A) Phosphoenolpyruvate
 B) Oxaloacetic Acid
 C) Phosphoglyceric Acid
 D) Phosphoglucolate
50. Respiratory Quotient (RQ) is
 A) $RQ = \frac{\text{Volume of } O_2 \text{ evolved}}{\text{Volume of } CO_2 \text{ consumed}}$
 B) $RQ = \frac{\text{Volume of } CO_2 \text{ consumed}}{\text{Volume of } O_2 \text{ evolved}}$
 C) $RQ = \frac{\text{Volume of } CO_2 \text{ evolved}}{\text{Volume of } O_2 \text{ consumed}}$
 D) $RQ = \frac{\text{Volume of } O_2 \text{ consumed}}{\text{Volume of } CO_2 \text{ evolved}}$

51. Which statement is not correct about Osteoporosis ?
- A) It is an age related disorder
 - B) Increased levels of estrogen is a common cause of it
 - C) In this chance of fractures increased
 - D) In this bone mass is decreased
52. Enzymes which catalyse transfer of a group other than hydrogen, belong to the class
- A) Dehydrogenase
 - B) Lyase
 - C) Isomerase
 - D) Transferase
53. Which of the following are sensory organs in Phylum Arthropoda ?
1. Simple or compound eye.
 2. Statocyst or balancing organ.
 3. Malpighian tubules.
 4. Antennae.
- A) All except 4
 - B) All except 1
 - C) All except 2
 - D) All except 3
54. Which of the following is not a goal of Human Genome Project ?
- A) Identify all the approximately 20,000-25,000 genes in human DNA
 - B) Store this information in databases
 - C) Restrict the related technologies, so that the other sectors do not benefitted with it
 - D) Address the ethical, legal and social issues
55. Sacred groves are one of the important means of biodiversity conservation. In respect of this, find out the odd one.
- A) Aravalli Hills – Rajasthan
 - B) Khasi and Jaintia Hills – Meghalaya
 - C) Sarguja, Chanda and Bastar – Tamil Nadu
 - D) Western Ghat – Karnataka and Maharashtra

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56. Match the following :

- | | |
|-------------------|--------------------------------------|
| 1. Pectinases | i. Blood cholesterol lowering agents |
| 2. Streptokinases | ii. Immuno suppressive agents |
| 3. Cyclosporin A | iii. Clot busters |
| 4. Statin | iv. Clarifying agents |

- | | | | | |
|----|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 |
| A) | iv | iii | ii | i |
| B) | iv | iii | i | ii |
| C) | iii | iv | ii | i |
| D) | i | ii | iii | iv |

57. Find the incorrect matching.

- A) Hypertension – High blood pressure
- B) CAD – Athero sclerosis
- C) Heart failure – Heart attack
- D) Stroke volume – Beat volume

58. The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography is called

- A) Convergent evolution
- B) Adaptive radiation
- C) Parallel evolution
- D) Continental drift

59. Match the source gland with its respective hormone and function and select correct option.

Gland	Hormone	Function
A) Pineal gland	Melatonin	Regulation of 24 hours (diurnal) rhythm in man
B) Posterior pituitary	Oxytocin	Stimulate the reabsorption of water in the distal tubules (in the nephron) of kidney of man
C) Corpus luteum	Testosterone	Formation of spermatozoa in man
D) Thymus gland	Thyroxin	Regulate the blood calcium level of human beings

60. **Assertion** : Sex of human body is determined by father, not by mother.
Reason : XY chromosome is present in human male.
 Read the above assertion and reason carefully to select the correct option out of the options given below :
- A) If both the assertion and reason are true and the reason is a correct explanation of the assertion
 B) If both the assertion and reason are true, but the reason is not a correct explanation of the assertion
 C) If the assertion is true, but the reason is false
 D) If both the assertion and reason are false
61. Let A and B are two sets such that $n(A) = 3$, $n(B) = 4$, then $n(A \times B)$ equals
 A) 7 B) 12 C) 27 D) 16
62. What is the derivative of $\log 3$?
 A) 3 B) $\frac{1}{3}$ C) $\sqrt{3}$ D) 0
63. $\lim_{x \rightarrow \frac{\pi}{4}} (\sin x + \cos x)$ equals
 A) 2 B) $\sqrt{2}$ C) 0 D) None of these
64. In the expansion of $(a+b)^{2n}$, which is the middle term ?
 A) t_n B) t_{n+1} C) t_{n-1} D) t_{2n}
65. How many chords can be drawn through 8 points on a circle ?
 A) 20 B) 28 C) 56 D) 16
66. $3! - 2!$ equals
 A) 1 B) 2 C) 3 D) 4
67. Find the number of permutations using all the letters of the word ALLAHABAD.
 A) 7650 B) 7560 C) 6570 D) 6750
68. Three coins are tossed once. What is the probability of getting atmost 2 heads ?
 A) $\frac{7}{8}$ B) $\frac{3}{8}$ C) $\frac{1}{8}$ D) $\frac{1}{2}$

69. How many terms of a geometric progression $1, 2, 2^2, \dots$ are needed to give the sum 63 ?
 A) 5 B) 4 C) 6 D) 3
70. The interval in which the function f given by $f(x) = x^2 - 4x + 6$ is strictly increasing is
 A) $(-\infty, 2)$ B) $[2, \infty)$ C) $(-\infty, 2]$ D) $(2, \infty)$
71. Which of the following relations on $A = \{1, 2, 3\}$ is an equivalence relation ?
 A) $\{(1, 1), (2, 2), (3, 3)\}$ B) $\{(1, 1), (2, 2), (3, 3), (1, 2)\}$
 C) $\{(1, 1), (3, 3), (1, 3), (3, 1)\}$ D) $\{(2, 2), (1, 2), (2, 1)\}$
72. The function given $f : \mathbb{N} \rightarrow \mathbb{N}$ by $f(x) = 2x$ is
 A) One-one and onto B) One-one but not onto
 C) Not one-one and not onto D) Onto but not one-one
73. $\sin^{-1}(\sin x) = x$ is defined on
 A) $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ B) $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
 C) $x \in [0, \pi]$ D) $x \in (0, \pi)$
74. The slope of the tangent to the curve $y = x^3 - x$ at $x = 2$ is
 A) 6 B) 11 C) 12 D) 10
75. If $f(x) = 8x^3$ and $g(x) = x^{1/3}$, the $(g \circ f)(x)$ is
 A) $8x$ B) $2x^3$ C) $2x$ D) x^3
76. The number of all possible 2×2 matrices with entries 0 or 1 is
 A) 16 B) 9 C) 8 D) 25
77. The value of $\begin{vmatrix} x & x-1 \\ x+1 & x \end{vmatrix}$ is
 A) -1 B) x C) x^2 D) 1
78. If A and B are square matrices of the same order, then $(A+B)(A-B)$ equal to
 A) $A^2 - B^2$ B) $A^2 - BA - AB - B^2$
 C) $A^2 - B^2 + BA - AB$ D) $A^2 - BA + B^2 + AB$

79. If A is a 3×3 matrix with $|A| = 5$, then $|\text{adj } A|$ is
- A) $\frac{1}{5}$ B) $\frac{1}{25}$ C) 5 D) 25
80. Let $A = \begin{bmatrix} 1 & 3 \\ -2 & 4 \end{bmatrix}$ then $\text{adj } A$ is
- A) $\begin{bmatrix} 4 & -3 \\ 2 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ C) $\begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ D) $\begin{bmatrix} -1 & 3 \\ -2 & -4 \end{bmatrix}$
81. Which of the following statement is correct regarding zebu cattle ?
1. They are well adapted to tropical climate.
 2. They have low nutritional requirements.
 3. They have low disease resistance.
 4. They have high potential for milk production.
- A) 1 only B) 1 and 2 only C) 1, 2 and 3 only D) 1, 2, 3 and 4
82. The first phase of operation flood was financed by the sale of skim milk powder and butter oil gifted by
- A) United Nations B) World Bank
C) European Economic Community D) USA
83. Which of the following statement is/are correct regarding Operation Flood (OF) program ?
1. OF phase 1 started in 1962.
 2. OF phase 2 started in 1979.
 3. OF phase 2 concluded in 1981.
- A) 1 only B) 2 only C) 1 and 2 only D) All of the above
84. Which of the following are the objectives of "National Project for Cattle and Buffalo Breeding" (NPCBB) ?
1. Arrange delivery of vastly improved artificial insemination service at the farmers door-step.
 2. Bring all breedable females among cattle and buffalo under organized breeding through artificial insemination or natural service.
 3. Undertake breed improvement programme for indigenous cattle and buffaloes.
- A) 1 only B) 2 only C) 1 and 2 only D) All of the above

94. Which of the following microorganisms is not responsible for the fermentation of milk into curd/dahi ?
- A) Lactobacillus casei B) Lactobacillus bulgaricus
C) Streptococcus thermophilus D) Escherichia coli
95. Which dairy product results from the coagulation of milk proteins by acidification/ enzyme action ?
- A) Cheese B) Butter C) Whey protein D) Milk powder
96. What is the primary function of a hydrometer in dairy quality control ?
- A) Measuring pH
B) Determining microbial load
C) Assessing milk solids-not-fat (SNF) content
D) Testing for antibiotics
97. What is the reason for conducting a sensory evaluation of dairy products ?
- A) To determine the microbial count
B) To assess consumer preferences and product attributes
C) To measure the product shelf life
D) To calculate the viscosity of the product
98. When conducting quality control for dairy product packaging, what is the primary objective of evaluating seals and closures on containers ?
- A) To check for proper labeling
B) To ensure that the milk is properly pasteurized
C) To confirm the product's pH
D) To maintain product freshness and prevent contamination
99. Which of the following milk products does not contain sucrose ?
- A) Sweetened condensed milk B) Dairy whitener
C) Skim milk powder D) Srikhand
100. Which of the following fat rich dairy products does not contain protein ?
- A) Ghee B) Cream C) Butter D) Malai

Space for Rough Work

