

83/26

Question Booklet Alpha Code

A

Question Booklet Sl. No.

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.

1. Kepler's second law of planetary motion which is also called 'law of areas' is in accordance with which of the following law ?
 - A) Law of conservation of linear momentum
 - B) Law of conservation of angular momentum
 - C) Law of conservation of mass
 - D) Law of conservation of charge
2. Read the following statements and choose the correct option.
 At an instant, a particle in one dimensional motion
 - i. with zero speed can have non-zero acceleration.
 - ii. with zero speed can have non-zero velocity.
 - iii. with constant speed in same direction must have zero acceleration.
 - A) ii and iii are correct
 - B) i is correct but ii is wrong
 - C) i and ii are wrong
 - D) iii is correct but i is wrong
3. The largest unit to measure distance is

A) Light year	B) Parsec
C) Astronomical Unit	D) Km
4. Which statement about uniform circular motion is not correct ?
 - A) Centripetal acceleration is a constant
 - B) Angular velocity depends on linear velocity
 - C) Direction of centripetal acceleration is towards the center
 - D) Linear velocity is directed along the tangent
5. The power of a crane which can lift a car of mass 2000 kg upto a height of 30 m within one minute is

A) 588 KW	B) 39.2 KW	C) 9.8 KW	D) 58.8 KW
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6. When we shake the branches of a mango tree, ripe mangoes fall down. This is due to

A) inertia of motion	B) inertia of rest
C) inertia of direction	D) none of the above
7. From the following statements, which represents negative work ?
 - A) Work done by gravity on a ball falling down
 - B) Work done by the electrostatic force when a positive charge is brought near another negative charge
 - C) Work done by the gravitational force of earth on moon
 - D) Work done by a man who carefully places a glass sheet on the floor

8. Moment of inertia of a disc of mass M and radius R about an axis passing through the center and perpendicular to the disc is
A) $(MR^2)/2$ B) MR^2 C) $2(MR^2)/5$ D) $2(MR^2)/3$
9. The minimum distance between two points in a wave having the same phase is called
A) Frequency B) Wavelength
C) Phase Constant D) Amplitude
10. Identify the odd one.
A) Radio wave B) Micro wave C) Matter wave D) X-ray
11. Thermodynamic process in which temperature is constant is
A) Isobaric process B) Isochoric process
C) Isothermal process D) Adiabatic process
12. The temperature in Fahrenheit Scale equivalent to 100°C is
A) 98°F B) 273°F C) 212°F D) 100°F
13. The uniform velocity attained by raindrops when falling freely
A) Terminal velocity B) Critical velocity
C) Average velocity D) Instantaneous velocity
14. The principle behind dynamic lift of aircraft wing while moving through air
A) Pascal's Law B) Hooke's Law
C) Bernoulli's Principle D) Wheatstone's Principle
15. The magnetic field on the axis of a current carrying toroidal solenoid depends on
i. Permeability of its core
ii. Radius of the toroid
iii. Number of turns per unit length
iv. Current flowing through it
A) i and iv B) ii and iv C) i, iii and iv D) ii, iii and iv
16. When a galvanometer is converted into an Ammeter, its total resistance
A) increases
B) decreases
C) remain unchanged
D) will increase or decrease depending on the range of Ammeter

17. The speed of propagation of electromagnetic wave through a medium depends on
- permittivity of medium
 - permeability of medium
 - frequency of wave
 - temperature of medium
- A) i and ii B) i, ii and iv C) All of the above D) iii only
18. In a parallel plate capacitor, electric energy is stored in
- negative plate
 - positive plate
 - the electric field between the plates
 - both negative plate and positive plate
19. The magnitude of fundamental electric charge is
- 1 Coulomb
 - the charge on a proton
 - the charge on an electron
 - either the charge on a proton or the charge on an electron
20. Analog radio tuning circuit is
- an LR circuit with low impedance
 - an RC circuit with large capacitance
 - an LC circuit with high Q-factor
 - an LCR circuit with high Ohmic resistance
21. **Situation 1** : 'n' identical capacitors are connected in parallel.
Situation 2 : The above 'n' identical capacitors are connected in series.
 The ratio of equivalent capacity obtained in situation 1 to that of situation 2 is
- n^2
 - $2n$
 - $4n$
 - 1
22. Three band colour code combinations for some resistors are given below.
- Brown Brown Brown
 - Orange Orange Orange
 - Black Black Black
 - Red Red Red
- Among these, combination/combinations which are not usually find in resistors is
- i and iv
 - ii
 - iii
 - i and ii

23. A diverging lens of power 4 dioptre and a converging lens of power 8 dioptre are combined together, the focal length of combination.
 A) 25 cm B) 0.25 cm
 C) 8.5 cm D) 8.5 m
24. An object is placed in front of a convex mirror in a short distance then move the object towards the convex mirror, the image
 A) Moves towards the mirror B) Magnification increases
 C) Neither A) nor B) happens D) Both A) and B) happens
25. The refractive index of medium 2 with respect to medium 1 is "P" and refractive index of medium 2 with respect to medium 3 is "Q". Then what is the refractive index of medium 3 with respect to medium 1 ?
 A) $\frac{Q}{P}$ B) $\sqrt{\frac{P}{Q}}$
 C) $\frac{P}{Q}$ D) $\frac{P^2}{Q^2}$
26. An electron of mass "m" and a photon have same energy "E". The ratio of wavelength of photon to electron (Velocity of light = c).
 A) $c\left(\frac{E}{2m}\right)^{1/2}$ B) $c\left(\frac{2m}{E}\right)^{1/2}$ C) $\left(\frac{2m}{E}\right)^{1/2}$ D) $\frac{1}{c}(2mE)^{1/2}$
27. If a radioactive element having half life of 20 minutes is undergoing beta decay. The fraction of radioactive element remains undecayed after 80 minutes will be
 A) 1/6 B) 1/32 C) 1/16 D) 1/12
28. Which of the statement is true in the case of zener diode ?
 A) It works as a voltage regulator in forward bias as well as in reverse bias.
 B) It works as a voltage regulator only in forward bias.
 C) It works as a voltage regulator in forward bias and behaves like a simple P-N junction diode in reverse bias.
 D) It works as a voltage regulator in reverse bias and behaves like a simple P-N junction diode in forward bias.
29. **Statement 1** : When an electron jumps from higher orbit of energy E_2 to lower orbit of energy E_1 it emits radiation.
Statement 2 : The frequency of radiation $f = \frac{E_1 - E_2}{h}$
 A) Both 1 and 2 are correct B) 1 is correct 2 is incorrect
 C) Both 1 and 2 are incorrect D) 2 is correct 1 is incorrect

30. **Statement 1** : Resistivity of a semiconductor is greater than that of a conductor.
Statement 2 : Semiconductor has negative temperature coefficient of resistance.
A) Both 1 and 2 are correct
B) 1 is correct 2 is incorrect
C) 2 is correct 1 is incorrect
D) Both 1 and 2 are incorrect
31. Which of the following is commonly used as an emulsifying agent ?
A) Soap
B) Sugar
C) Sand
D) Salt
32. How many moles are present in 9 gm water ?
A) 1 mol
B) 2 mol
C) 0.5 mol
D) 3 mol
33. Which atom is best explained by Bohr model ?
A) Helium
B) Oxygen
C) Neon
D) Hydrogen
34. How many orbitals are present in a d subshell ?
A) 7
B) 3
C) 5
D) 1
35. Which of the following statement is/are correct ?
i. A solution of pH 8 is basic.
ii. Acidic solutions have pH greater than 7.
iii. As pH increases acidity decreases.
A) only ii
B) only i and iii
C) only ii and iii
D) only i
36. Milk is an example of
A) foam
B) sol
C) emulsion
D) gel
37. Molarity changes with temperature because
A) Mass of solute changes
B) Number of moles changes
C) Volume of solution changes
D) Density of solute changes
38. The cell commonly used in hearing aids is
A) Mercury cell
B) Fuel cell
C) Daniell cell
D) Nickel-Cadmium cell
39. How many periods and groups are there in the modern periodic table ?
A) 7 periods and 18 groups
B) 6 periods and 8 groups
C) 7 periods and 7 groups
D) 8 periods and 18 groups

- A**

51. Fractional distillation is used when the liquids to be separated have
- A) Boiling points differing by more than 50 K
 - B) Boiling points differing by less than 25 K
 - C) Equal boiling points
 - D) High melting points
52. Which purification method is suitable for separating a mixture of Iodine and Common salt ?
- A) Fractional distillation
 - B) Sublimation
 - C) Steam distillation
 - D) Crystallisation
53. Which reagent is commonly used to distinguish phenol and ethanol ?
- A) Neutral ferric chloride solution
 - B) Fehling's solution
 - C) Tollen's reagent
 - D) Benedicts solution
54. Which compound give Brisk effervescence with sodium metal ?
- A) Benzene only
 - B) Acetone only
 - C) Benzaldehyde only
 - D) Ethanol and Phenol
55. The Bromine water test for Phenol is indicated by
- A) White precipitate with decolourisation of Bromine water
 - B) Green colour formation
 - C) Silver mirror
 - D) Brick-red precipitate
56. Which artificial sweetener is not suitable for cooking, because it decompose on heating ?
- A) Saccharin
 - B) Sucralose
 - C) Aspartame
 - D) Alitame
57. Which of the following statements is correct ?
- A) Soaps work better than detergents in hard water
 - B) Detergents form scum in hard water
 - C) Detergents are effective in both hard and soft water
 - D) Soap molecules do not form micelles
58. A Nucleotide consists of
- A) Sugar and Phosphate only
 - B) Sugar, Nitrogenous base and Phosphate group
 - C) Nitrogenous base and amino acid
 - D) Sugar and amino acid

59. The total rate of conversion of light energy into chemical energy of organic molecules within an ecosystem is called
 - A) Net Primary Productivity
 - B) Net Secondary Productivity
 - C) Gross Primary Productivity
 - D) Gross Secondary Productivity
60. Which chromosome has a terminal centromere ?
 - A) Acrocentric
 - B) Metacentric
 - C) Telocentric
 - D) Sub-metacentric
61. Restriction enzyme EcoRI cleaves DNA at which specific sequence ?
 - A) GTATAT
 - B) AAGCTT
 - C) AAGTTC
 - D) GAATTC
62. Exine of a pollen grain is formed of
 - A) Callose
 - B) Sporopollenin
 - C) Lignin
 - D) Pectose
63. Nepenthes belongs to a category of
 - A) Producer
 - B) Primary Consumer
 - C) Secondary Consumer
 - D) Both A) and C)
64. An abnormal gene is replaced by a normal gene. This process is known as
 - A) Cloning
 - B) Mutation
 - C) Gene therapy
 - D) None of the above
65. Tapetum is seen in which of the following parts ?
 - A) Ovary wall
 - B) Anther wall
 - C) Male gametophyte
 - D) Female gametophyte
66. Virus-free plants can be obtained by
 - A) Meristem culture
 - B) Embryo culture
 - C) Root culture
 - D) Antibiotic treatment
67. Enzymes required for the Polymerase Chain Reaction (PCR) are
 - A) RNA Polymerase
 - B) Taq Polymerase
 - C) Ribonuclease
 - D) Endonuclease
68. The number of chromosomes in the nucellus is 16. Then the number of chromosomes in the megaspore mother cell would be
 - A) 8
 - B) 32
 - C) 24
 - D) 16

69. Spirulina is an example of
- A) Edible fungus
B) Fortified rice
C) Biopesticide
D) Single cell protein
70. Hydrophily occurs in which plant ?
- A) Eicchornia
B) Nymphaea
C) Vallisneria
D) Nelumbo
71. In which organisms does mitotic cell division take place in haploid cells ?
- A) House fly
B) Male honey bee
C) Female honey bee
D) Fruit fly
72. Ti plasmid, which is used for introducing genes into plants, is obtained from
- A) Escherichia coli
B) Agrobacterium tumefaciens
C) Klebsiella aerogenes
D) Agrobacterium rhizogenes
73. The closure of which valves produces the first heart sound (lub) ?
- A) Semilunar valves
B) Tricuspid and bicuspid valves
C) Aortic and pulmonary valves
D) Aortic and bicuspid valves
74. Select the structures that are not parts of the female reproductive system.
- i. Ampulla ii. Vas deferens iii. Epididymis iv. Infundibulum
- A) i, ii
B) i, iv
C) ii, iii
D) iii, iv
75. Which of the following conditions favour the formation of oxyhaemoglobin in the alveoli ?
- i. low $p\text{CO}_2$ ii. lesser H^+ concentration
iii. lower temperature iv. high $p\text{O}_2$
- A) i, ii
B) i, iv
C) ii, iii
D) All of the above

76. Different types of joints and their locations in the human body are given below. Select the correctly matched pairs.

- i. Hinge joint – between humerus and pectoral girdle
- ii. Ball and socket joint – Knee joint
- iii. Pivot joint – between atlas and axis
- iv. Gliding joint – between the carpals

- A) iii, iv
- B) i, ii
- C) ii, iii
- D) i, iv

77. Match the glands with their respective hormones.

- | | |
|------------------|--------------------|
| 1. Adrenal gland | a. Melatonin |
| 2. Thymus gland | b. Glucagon |
| 3. Pineal gland | c. Glucocorticoids |
| 4. Pancreas | d. Thymosin |

- A) 1-c, 2-d, 3-a, 4-b
- B) 1-b, 2-d, 3-a, 4-c
- C) 1-a, 2-d, 3-b, 4-c
- D) 1-d, 2-a, 3-c, 4-b

78. Which of the following is not a copper releasing IUD ?

- A) CuT
- B) Multiload 375
- C) LNG-20
- D) Cu7

79. Identify the correct option regarding different chromosomal disorders.

- i. Turner's syndrome : Genetic disorder caused due to the presence of additional copy of the chromosome number 21.
- ii. Klinefelter's syndrome : Genetic disorder caused due to the presence of an additional copy of X-chromosome.
- iii. Down's syndrome : Genetic disorder caused due to the absence of one of the X-chromosomes.

- A) i, iii
- B) ii
- C) ii, iii
- D) iii

80. Which type of sex determination is found in human beings ?

- A) ZZ-ZW
- B) XX-XO
- C) XX-XY
- D) None of the above

81. Which of the following forms the "beads-on-string" appearance of chromatin ?

- A) Ribosome
- B) Centrosome
- C) Chromosome
- D) Nucleosome

82. Identify the post-transcriptional modification that involves the addition of methyl guanosine triphosphate to the 5' end of hn RNA.
 A) Splicing B) Capping C) Tailing D) Translation
83. Select all the secondary lymphoid organs from the following :
 i. Spleen ii. Bone marrow
 iii. Thymus iv. Tonsils
 A) i, iv B) i, ii C) iii, iv D) i, iii
84. Which of the following is the widely used diagnostic test for AIDS ?
 A) Widal test B) ELISA C) Mantoux test D) MAT test
85. Identify the phylum that exhibits Metagenesis.
 A) Arthropoda B) Porifera C) Echinodermata D) Coelenterata
86. Which of the following animals belongs to the phylum platyhelminthes ?
 i. Tape worm ii. Round worm
 iii. Hook worm iv. Filaria worm
 A) i, iii B) ii, iii
 C) i D) ii, iv
87. The value of $\tan\left(19\frac{\pi}{3}\right)$ is
 A) $1/\sqrt{3}$ B) 1 C) $\sqrt{3}$ D) 0
88. The number of different teams of 7 players that can be chosen from 10 players is
 A) 110 B) 120 C) 130 D) 115
89. How many chords can be drawn through 19 points on a circle ?
 A) 210 B) 211 C) 171 D) 181
90. $1^2 + 2^2 + 3^2 + 4^2 + 5^2$ equals
 A) 35 B) 45 C) 55 D) 65
91. A man starts repaying a loan as first instalments of ₹ 100. If he increases the instalment by ₹ 5 every month, what will be the 30th instalment ?
 A) 215 B) 225 C) 245 D) 255
92. Find the equation of a line through the origin, that makes an angle of 45° with the positive direction of x axis.
 A) $y = \frac{x}{2}$ B) $y = x$ C) $y = \frac{-x}{2}$ D) $y = \frac{x}{3}$

93. If $A = \{1, 2\}$ $B = \{3, 4\}$, number of relations from A to B is
 A) 2 B) 2^2 C) 2^3 D) 2^4
94. Write the solution set of the equation $x^2 - 4x + 3 = 0$.
 A) $\{1, 3\}$ B) $\{-1, 2\}$ C) $\{2, -3\}$ D) $\{-1, -3\}$
95. Two sets A and B are disjoint if
 A) $A \cup B = \phi$ B) $A \cap B \neq \phi$ C) $A \cap B = \phi$ D) $A - B = A$
96. Range of signum function is
 A) $\{-1, 0, 1\}$ B) $\{-1, 0, -1\}$ C) $\{1, 0, 1\}$ D) $\{0, 1, 0\}$
97. Which one of the following function is invertible ?
 A) One – one into function
 B) Many – one onto function
 C) Many – one into function
 D) One – one onto function
98. Find the radius of the circle in which a central angle of 60° intercepts an arc length 37.4 cm $\left(\text{use } \pi = \frac{22}{7}\right)$.
 A) 37.5 cm B) 36.7 cm
 C) 35.5 cm D) 35.7 cm
99. Find the equation of the circle with center $(-3, 2)$ and radius 4.
 A) $(x + 3)^2 + (y - 2)^2 = 16$
 B) $(x - 3)^2 + (y - 2)^2 = 16$
 C) $(x + 3)^2 - (y + 2)^2 = 16$
 D) $(x + 3)^2 - (y - 2)^2 = 16$
100. Write the length of latus rectum of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$.
 A) $\frac{8}{3}$ B) $\frac{9}{2}$
 C) $\frac{9}{4}$ D) $\frac{8}{5}$
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Space for Rough Work