

06/2019

Question Booklet
Alpha Code

A

Question Booklet
Serial Number

Total No. of Questions: 100

Maximum : 100 Marks

Time : 75 Minutes

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 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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Maximum : 100 Marks

Time : 1 hour and 15 minutes

1. Lorentz force law is :
(A) $F = q(\mathbf{V} \times \mathbf{B} + \mathbf{E})$ (B) $F = q\mathbf{E} + \mathbf{V} \times \mathbf{B}$
(C) $F = q(\mathbf{V} \times \mathbf{B}) + \mathbf{E}$ (D) $F = q(\mathbf{V} \times \mathbf{E} + \mathbf{B})$
2. Two simple harmonic motions, $y_1 = A \sin \omega t$ and $y_2 = A \cos \omega t$ are superimposed on a particle of mass m . The total mechanical energy of the particle is :
(A) $(1/2) m \omega^2 A^2$ (B) $m \omega^2 A^2$
(C) $(1/4) m \omega^2 A^2$ (D) Zero
3. If ρ is the density of the material of a wire and σ the breaking stress, the greatest length of the wire that can hang freely without breaking is :
(A) $2\sigma/\rho g$ (B) $\rho/\sigma g$
(C) $\rho g/2\sigma$ (D) $\sigma/\rho g$
4. How many times more intense is 90 dB sound than 40 dB sound ?
(A) 5 (B) 50
(C) 500 (D) 10^5
5. Current per unit area in a direction perpendicular to the flow is :
(A) Surface current density (B) Volume current density
(C) Electric current (D) Surface charge density
6. Two coherent monochromatic light beams of intensities I and $4I$ are superimposed. The maximum and minimum intensities in the resulting beam are :
(A) $5I$ and I (B) $5I$ and $3I$
(C) $9I$ and I (D) $9I$ and $3I$
7. Orbital motion of electrons accounts for the phenomenon of :
(A) Paramagnetism (B) Ferromagnetism
(C) Diamagnetism (D) All of the above
8. A rigid container with thermally insulated walls contains a coil of resistance 100 ohm carrying current 1 ampere. Change in internal energy after 5 minutes will be :
(A) Zero (B) 10 kilojoule
(C) 20 kilojoule (D) 30 kilojoule

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[P.T.O.]

9. A hollow metal sphere of radius 5 cm is charged such that the potential on its surface is 10 V. The potential at the centre is :
- (A) 2 V (B) 10 V
(C) Zero (D) None of the above
10. A magnetic needle is kept in a non-uniform magnetic field. It experiences :
- (A) A force and a torque (B) A force but not a torque
(C) A torque but not a force (D) Neither a force nor a torque
11. An inductor L is allowed to discharge through a capacitor C. The emf induced across the inductor, when the capacitor is fully charged is :
- (A) Maximum (B) Minimum
(C) Infinite (D) Zero
12. The angular momentum of an electron in an orbit is quantized because it is a necessary condition according to :
- (A) Wave nature of electron (B) Particle nature of electron
(C) Pauli's exclusion principle (D) None of the above
13. The state of an electron in an atom with principal quantum number $n = 3$ and orbital quantum number $l = 2$ is
- (A) 3s (B) 4d
(C) 3p (D) 3d
14. Atomic packing factor of the body centered cubic structure is :
- (A) 74% (B) 52%
(C) 68% (D) 34%
15. The radius of the innermost orbit of the hydrogen atom is :
- (A) $\frac{h^2 \epsilon_0}{\pi m e^2}$ (B) $\frac{h^2 \epsilon_0}{8 \pi m e^2}$
(C) $\frac{m e^4}{8 \epsilon_0^2 h^2}$ (D) $\frac{m e^4}{8 \pi \epsilon_0^2}$

16. Water conducting tissue in plants
- (A) Xylem (B) Chloroplast
(C) Nucleus (D) Parenchyma
17. Anemophylly is a type of pollination
- (A) Insect (B) Animal
(C) Wind (D) Bird
18. Expansion of TEM is
- (A) Transmit Electrical Microtome (B) Transverse Electron Microscope
(C) Transmissible Electron Microtome (D) Transmission Electron Microscope
19. Common name of *Psilotum* is
- (A) Horse tail (B) Whisk fern
(C) Club moss (D) Water fern
20. Blast of Paddy is caused by
- (A) *Pythium myriotylum* (B) *Albugo Candida*
(C) *Magnaporthe oryzae* (D) *Cercospora agerati*
21. Which one is a vital stain ?
- (A) Safranin (B) Janus green
(C) Phloroglucinol (D) Crystal violet
22. Diacytic stomata seen common in which plant family ?
- (A) Ranunculaceae (B) Cruciferae
(C) Rubiaceae (D) Acanthaceae

23. In *Asafoetida* morphology of useful part is
 (A) Latex from rhizome (B) Latex from leaf
 (C) Latex from stem (D) Latex from flower
24. MS medium is
 (A) Murashige and Schimid (B) Murashif and Skoog
 (C) Moral and Schimid (D) Murashige and Skoog
25. Water Bloom is caused by
 (A) Bryophytes (B) Algae
 (C) Pteridophytes (D) Bacteria
26. Name a fossil gymnosperm
 (A) Rhynia (B) Lepidocarpon
 (C) Naiadita (D) Williamsonia
27. Example for simple lipid is
 (A) Fats (B) Lecithin
 (C) Cephalin (D) Sphingomelins
28. Ratio of complementary gene action is
 (A) 9 : 3 : 4 (B) 9 : 3 : 3 : 1
 (C) 9 : 7 (D) 12 : 3 : 1
29. Carmine is obtained from
 (A) Gymnosperm (B) Insect
 (C) Algae (D) Fungi
30. Anthrax diseased by
 (A) Virus (B) Bacteria
 (C) Insects (D) Birds

31. Larval form of sponges
- (A) Trochophore (B) Glochidium
(C) Nauplius (D) Parenchymula
32. Watson and Crick demonstrated
- (A) Wobble hypothesis
(B) One gene one enzyme hypothesis
(C) Semi conservative mode of DNA replication
(D) One gene one polypeptide hypothesis
33. Example of pseudocoelomate
- (A) Ascaris (B) Taenia
(C) Fasciola (D) Schistosoma
34. Disease due to monosomic condition
- (A) Patau's syndrome (B) Turner's syndrome
(C) Down's syndrome (D) Klinefelter's syndrome
35. Central Nervous system is formed from
- (A) Endoderm (B) Mesoderm
(C) Ectoderm (D) All of the above
36. Tropical Asian countries are included in which of the following region ?
- (A) Ethiopian region (B) Oriental region
(C) Nearctic region (D) Palaeartic region
37. Movement of individual cells into the embryo or out towards its surface
- (A) Delamination (B) Ingression
(C) Intercalation (D) Dispersal

38. A group of potentially interbreeding individuals of a local population
- (A) Cline (B) Sympatric species
(C) Semi species (D) Deme
39. Which is the broadest DNA ?
- (A) A (B) B
(C) C (D) Z
40. Microcytic anemia is caused due to
- (A) Folic acid (B) Riboflavin
(C) Vitamin-C (D) Iron
41. Succus-entericus is secreted by
- (A) Goblet cells (B) Crypts of Lieberkuhn
(C) Aciner cells (D) Oxyntic cells
42. Which is the function of DNA polymerase ?
- (A) Transcription (B) Splicing
(C) Capping (D) Replication
43. Sea Horse belongs to the group
- (A) Amphibia (B) Reptilia
(C) Pisces (D) Mammalia
44. Which is a Protein sequence database ?
- (A) EMBL (B) DDBJ
(C) GenBank (D) Swiss-Prot
45. Most abundant immunoglobulin
- (A) IgA (B) IgM
(C) IgG (D) IgD

46. How many groups of order 4 are there upto isomorphism ?
 (A) 4 (B) 3
 (C) 2 (D) 1
47. The function $f(x) = \begin{cases} x \sin \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$ is
 (A) both differentiable and continuous at $x = 0$
 (B) continuous but not differentiable at $x = 0$
 (C) differentiable but not continuous at $x = 0$
 (D) neither differentiable nor continuous at $x = 0$
48. How many positive integers are there less than or equal to 150 which are relatively prime to 150 ?
 (A) 40 (B) 42
 (C) 38 (D) 44
49. The Fourier series of $f(x) = \begin{cases} -\pi & -\pi < x < 0 \\ x & 0 < x < \pi \end{cases}$ converges at $x = 0$ to
 (A) 0 (B) $-\pi$
 (C) π (D) $\frac{-\pi}{2}$
50. The inverse Laplace transform of $\frac{a^2}{s(s^2 + a^2)}$ is
 (A) $1 - \sin at$ (B) $1 - \cos at$
 (C) $\sin at + \cos at$ (D) $\cos at - \sin at$
51. The general solution of second order equation $x^2y'' + 3xy' + y = 0$ is
 (A) $y = (c_1 + c_2x) e^{-x}$ (B) $y = c_1e^x + c_2e^{-x}$
 (C) $y = c_1x + c_2x^{-1}$ (D) $y = (c_1 + c_2 \ln x) x^{-1}$
52. The value of $\lim_{x \rightarrow 0} \frac{1}{x} \int_0^x e^{t^2} dt$ is
 (A) 0 (B) 2
 (C) 1 (D) -1
53. The value of integral of complex function $f(z) = \frac{e^z}{z^2 - 1}$ over the counter clockwise oriented circle $|z| = 2$ is
 (A) $2\pi i \sin h1$ (B) $2\pi i \cos h1$
 (C) $2\pi i e^2$ (D) $2\pi i e^{-2}$

54. The general solution of partial differential equation $u_{xy} - u = 0$ is

- (A) $u(x, y) = c e^{kx + \frac{y}{k}}$ (B) $u(x, y) = c e^{k(x+y)}$
(C) $u(x, y) = c e^{kx - \frac{y}{k}}$ (D) $u(x, y) = c e^{k(x-y)}$

55. The sum of series $\sum_{n=1}^{\infty} \frac{6}{(2n-1)(2n+1)}$ is

- (A) 2 (B) 6
(C) 3 (D) 4

56. The non-homogeneous system of linear equations in matrix form $AX = B$ in 'n' unknowns has a unique solution if

- (A) $\text{rank } A = n$ (B) $\text{rank } [AB] = n$
(C) $\text{rank } A = \text{rank } [AB]$ (D) $\text{rank } A = \text{rank } [AB] = n$

57. If $F = 3xyi - y^2j$, evaluate $\int_C F(r) \cdot dr$

where C is the curve in the xy-plane $y = 2x^2$ from (0, 0) to (1, 2)

- (A) $\frac{5}{6}$ (B) $\frac{-7}{6}$
(C) $\frac{-7}{3}$ (D) $\frac{5}{4}$

58. The area shared by circles $r = 2 \cos \theta$ and $r = 2 \sin \theta$ is

- (A) $\pi - 2$ (B) $\frac{2\pi}{3} - 1$
(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2} - 1$

59. If α, β, γ are roots of the equation $x^3 + ax^2 + bx + c = 0$, the value of $\Sigma \alpha^2 \beta$ is

- (A) $3a - bc$ (B) $3c - ab$
(C) $3b - ac$ (D) $-ab$

60. For the function $y = x^4 - 4x^3 + 10$, $x = 0$ is a point

- (A) local maximum and no inflection (B) local minimum and no inflection
(C) with inflection and no extrema (D) no extrema and no inflection

61. The radioisotope of hydrogen is
(A) Hydrogen (B) Protium
(C) Deuterium (D) Tritium
62. Hybridisation of carbon in methane is
(A) sp (B) sp^2
(C) sp^3 (D) sp^3d
63. The energy production in the Sun and Stars is due to
(A) Nuclear fusion (B) Nuclear fission
(C) Thermolysis (D) Photolysis
64. An element which does not exhibit allotropy
(A) Oxygen (B) Fluorine
(C) Sulphur (D) Phosphorus
65. Organomagnesium compounds are known as
(A) Grignard reagent (B) Wilkinson catalyst
(C) Friedel Crafts catalyst (D) Grebbs catalyst
66. Global warming occurs mainly due to increase in concentration of
(A) CO (B) CO_2
(C) SO_2 (D) SO_3
67. Minamata disease is caused by _____ poisoning.
(A) Cd (B) Co
(C) Hg (D) Pb
68. The carbohydrate which cannot be hydrolysed in human digestive system
(A) Starch (B) Sucrose
(C) Lactose (D) Cellulose
69. The main source of aromatic hydrocarbons is
(A) Benzene (B) Coal tar
(C) Natural gas (D) Petroleum gas
70. Bakelite is formed by the condensation of phenol with
(A) Melamine (B) Glycol
(C) Styrene (D) Formaldehyde

71. The temperature above which a gas cannot be liquified by applying pressure, is called
(A) Boyle temperature (B) Inversion temperature
(C) Critical temperature (D) Limiting temperature
72. Electrolysis of fused salt is used to extract
(A) Silver (B) Lead
(C) Sodium (D) Iron
73. Emission of light as a result of chemical reaction is
(A) Fluorescence (B) Chemiluminescence
(C) Phosphorescence (D) Photosensitization
74. _____ is used to provide inert atmosphere.
(A) He (B) Ne
(C) Ar (D) None
75. Isotonic solution have the same
(A) Osmotic pressure (B) Vapour pressure
(C) Atmospheric pressure (D) Internal pressure
76. In Wurtz reaction, the metal used is
(A) Mg (B) Sn
(C) Zn (D) Na
77. Peroxide effect is also known as
(A) Steric effect (B) Kharasch effect
(C) Electromeric effect (D) Markownikoff's rule
78. _____ is an example of natural fuel.
(A) CNG (B) Coal gas
(C) Water gas (D) Producer gas
79. Temporary hardness of water is due to the presence of _____ of Ca and Mg.
(A) Sulphates (B) Chlorides
(C) Nitrates (D) Bicarbonates
80. The colour of phenolphthalein in the pH range 8.0 – 9.8 is
(A) Pink (B) Orange red
(C) Yellow (D) Colourless

81. Which of the states has the smallest Legislative Council ?
 (A) Jammu Kashmir (B) Telangana
 (C) Andhra Pradesh (D) Pondicherry
82. Which amendment of Indian Constitution provided for annexation of the state of Sikkim ?
 (A) 33 (B) 34
 (C) 35 & 36 (D) 37 & 38
83. Joint Sitting of Rajyasabha and Lok Sabha is presided over by :
 (A) President (B) Vice President
 (C) Speaker of Lok Sabha (D) Speaker of Rajyasabha
84. Constitution Day is celebrated in India to commemorate :
 (A) Formation of Constituent Assembly
 (B) Adoption of Constitution by Constituent Assembly
 (C) Birthday of Dr. Rajendra Prasad
 (D) Birthday of Dr. B.R. Ambedkar
85. Purview of the legislation popularly known as Sarda Act was :
 (A) Practice of Sati (B) Widow Remarriage
 (C) Womens Education (D) Child Marriage
86. Juvenile Justice Boards were established in India in :
 (A) 1976 (B) 1986
 (C) 2000 (D) 2015
87. Sugamya Bharat Abhiyan is intended to develop :
 (A) Rural Roads
 (B) Rural Communication
 (C) Facilities for Differently Abled persons
 (D) Facilities for Tribal people
88. State which paid highest wages under Mahathma Gandhi National Rural Employment Guarantee Programme in 2017 ?
 (A) Haryana (B) Kerala
 (C) Tamilnadu (D) Delhi
89. E-Pos is a software application designed for :
 (A) Postal System (B) Panchayat Raj
 (C) Public Administration (D) Public Distribution
90. Who founded the daily Al Ameen ?
 (A) Vakkom Maulavi (B) Mohammed Abdur Rahiman
 (C) Vaikom Muhammad Basheer (D) E Moidu Moulavi

91. Sthree Vidya Poshini the poem advocating womens education was written by
 (A) Brahmananda Sivayogi (B) Ananda Theerthan
 (C) Chattambi Swami (D) Vaikunda Swami
92. Puthiya Manushyan Puthiya Lokam is collection of essays by :
 (A) M. Govindan (B) Kuttippuzha Krishna Pillai
 (C) Sukumar Azheekode (D) M. N. Vijayan
93. Who among the following organised womens wing of Atmavidya Sangham at Alappuzha ?
 (A) Arya Pallam (B) Devaki Narikkatteeri
 (C) K. Devayani (D) C. R. Devaki Amma
94. The Chastity-trial of Nambuthiri women that prevailed upto the beginning of 20th century :
 (A) Anyonyam (B) Hiranya Garbham
 (C) Upa Samvada (D) Smartha Vicharam
95. Guruvayur Temple thrown open to the depressed sections of Hindus in
 (A) 1932 (B) 1936
 (C) 1946 (D) 1947
96. Rohingyas are mainly the residents of
 (A) West Bengal (B) North East India
 (C) Bangladesh (D) Myanmar
97. Industrial group to construct the Statue of Unity in Gujarat :
 (A) Reliance (B) Larsen & Toubro
 (C) Tata (D) Adani
98. Dassault Aviation is company based in :
 (A) France (B) Germany
 (C) U.S.A. (D) U.K.
99. By profession Narendra Dabholkar was a
 (A) Journalist (B) Physician
 (C) Writer (D) Actor
100. Who won the P. F. A Players' Player award in 2018 ?
 (A) NGolo Kante (B) Mohammed Salah
 (C) Christiano Ronaldo (D) Harry Kane

SPACE FOR ROUGH WORK

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