



IPEC EXPLORER METICULOUS TEST-2024

(Admission Cum Scholastic Aptitude test)
For
CLASS - IX
(For IX to X Moving Students)

Time : 3 Hrs.

Maximum Marks : 300

INSTRUCTIONS

1. The booklet is your Question Paper. Do not break the seal of this booklet before being instructed to do so by the invigilator.
2. Blank spaces and blank pages are provided in the question paper for your rough work. No additional sheets will be provided for rough work.
3. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers and electronic gadgets are **NOT** allowed inside the examination hall.
4. The answer sheet, a machine-readable Optical Response Sheet (**ORS**), is provided separately.
5. On breaking the seal of the booklet check that it contains **13** pages and all the **75** questions.
6. A candidate has to write his / her answers in the ORS sheet by darkening the appropriate bubble with the help of **Black/Blue ball point pen** as the correct answer of the question attempted.

7. Question Paper Format :

This question paper consists of **five** Parts.

Part - I : Physics - 15 Questions

Part - II : Chemistry - 15 Questions

Part - III : Mathematics - 15 Questions

Part - IV : Biology - 15 Questions

Part - V : Mental Ability - 15 Questions

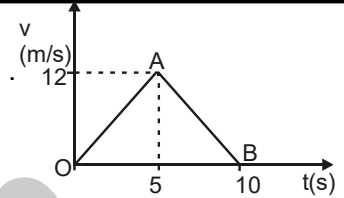
8. Marking Scheme :

Each question carries **+4 marks** for correct answer and **-1** for wrong answer.

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PART -I [Physics]**[SINGLE CORRECT TYPE]**

Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

1. The $v-t$ graph of a particle moving in a straight line is shown. Obtain the distance travelled by the particle from $t=0$ to $t=10$ s.
- 
- (A) 60m (B) 36m
(C) 40m (D) 120m
2. A ball having a mass of 1.0 kg is falling to the Earth at a constant acceleration of 9.8m/s^2 . What is the magnitude of the force acting on it (force of gravity)?
(A) 4.9 N (B) 9.8 N (C) 98 N (D) 49 N
3. A car whose mass is 2160 kg starts from rest and moves with constant acceleration for 30 s. During this interval, the car covers a distance of 500m. What is the magnitude of the force acting on the car during this ?
(A) 1200 N (B) 1800 N (C) 2400 N (D) 3000 N
4. A monkey standing on the ground wants to climb to the top of a vertical pole 13 m tall. He climbs 5m in 1s and then slips downwards 3m in the next second. He again climbs 5m in 1s and slips by 3m in the next second and so on. Find the time he will take to reach top of the pole.
(A) 9 s (B) 10s (C) 11s (D) 12s
5. A motorcycle starting from rest, moves with constant acceleration of $+2.6\text{ms}^{-2}$. After travelling a distance of 120m, it accelerates with -1.5ms^{-2} till its velocity becomes $+12\text{ms}^{-1}$. Calculate the total distance travelled by the motorcycle during this journey.
(A) 240 m (B) 260 m (C) 275 m (D) 280 m
6. A ball thrown in vertically upward direction attains maximum height of 16m. At what height would its velocity be half of its initial velocity?
(A) 8 m (B) 10 m (C) 12 m (D) 14 m
7. An object is allowed to fall freely from a tower of height 39.2 m; exactly at the same time another stone is thrown from the bottom of the tower in vertically upward direction with a velocity of 19.6ms^{-1} . Calculate when these two stones would meet?
(A) 1s (B) 1.5s (C) 2s (D) 3s

(Space for rough work)

8. A bomb of mass 9 kg explodes into two pieces of masses 3 kg and 6 kg. The velocity of mass 3 kg is 16 m/s. The KE of mass 6 kg in joule is
 (A) 96 (B) 384 (C) 192 (D) 768
9. A person moves to and fro along a straight line. Starting from rest during 1st second he moves 1 m towards right, during 2nd second 2m towards left, then during 3rd second 3m towards right and so on. What will be the average velocity of the man during first 6 seconds.

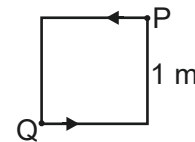
- (A) 1 m/s (B) 3 m/s (C) $\frac{1}{2}$ m/s (D) $\frac{3}{2}$ m/s

10. A constant force of 5N acts on a body of mass 2 kg for 2 second. If initially the body was at rest on a smooth surface, find the distance travelled by the body in 4 second



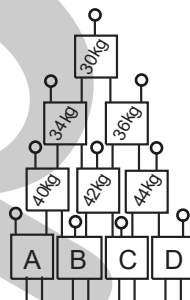
- (A) 5 m (B) 15 m (C) $\frac{15}{2}$ m (D) $\frac{5}{2}$ m

11. Two particles P and Q moves with speed 4m/s and 1 m/s respectively along the side of square in the direction shown in picture. If a side of a square is of 1 m length and both particles start moving simultaneously, then after how much time they will meet each other



- (A) 2s (B) 3s (C) $\frac{3}{2}$ s (D) $\frac{2}{3}$ s

12. In a game students form an array as shown in figure. If student exerts equal force by each kg then which student will bear the maximum weight



- (A) A (B) B (C) C (D) D

(Space for rough work)

13. The distance between two stations is 40 km. A train takes 1 hour to travel this distance. The train, after starting from the first station, moves with constant acceleration for 5 km; then it moves with constant velocity for 20 km and finally its velocity keeps on decreasing continuously for 15 km and it stops at the other station. Find the maximum velocity of the train
(A) 45 kmh^{-1} (B) 60 kmh^{-1} (C) 75 kmh^{-1} (D) 90 kmh^{-1}
14. A car moves a distance of 200m. It covers first half of the distance at speed 60 kmh^{-1} and the second half at speed v . If the average speed is 40 kmh^{-1} , then the value of v is
(A) 30 kmh^{-1} (B) 13 kmh^{-1} (C) 60 kmh^{-1} (D) 40 kmh^{-1}
15. If the distance between two masses is doubled, the gravitational attraction between them
(A) Is doubled (B) Becomes four times
(C) Is reduced to half (D) Is reduced to a quarter

PART - II [Chemistry]

[SINGLE CORRECT TYPE]

Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

16. What will be mass/mass percentage of a solution containing 30gm of common salt of common salt in 220 gm of water?
(A) 3% (B) 1.2% (C) 12% (D) 22%
17. Which of the following substance is not a compound?
(A) Water (B) Air (C) Glucose (D) Salt
18. Which of the following are physical changes?
I. Melting of iron metal II. Rusting of iron
III. Bending of an iron rod IV. Drawing a wire of iron metal
The correct choice is:
(A) I, II and III (B) I, II and IV (C) I, III and IV (D) II, III and IV
19. A chemical equation is always balanced to fulfil the condition of:
(A) Law of conservation of mass (B) Law of multiple proportions.
(C) Law of constant proportions (D) All of these

(Space for rough work)

20. What is the atomicity of the Calcium carbonate?
(A) 2 (B) 3 (C) 6 (D) 5
21. The principal behind fractional distillation technique in separation of two liquids is:
(A) Difference in melting point (B) Difference in boiling point
(C) Difference in concentration (D) Difference in solubility
22. A large quantity of impure substance is dissolve in a hot liquid from time to time, a small sample of the solution is transferred to a test tube and cooling under a running tap. When the sample on-cooling give crystals, whole solution is covered with a watch glass and allowed to cool. The method described above is:
(A) Crystalization (B) Evaporation (C) Centrifugation (D) None of the above
23. A few substances are arragned in the increasing order of forces of attraction between their particles. Which one of the following represents a correct arrangement?
(A) water, air, wind (B) oxygen, water, sugar
(C) air, sugar, oil (D) salt, juice, air
24. The melting point of a solid is an indication of:
(A) its rigidity
(B) its shape
(C) the strength of the force of attraction between its particles
(D) its ability to intermix with other solids
25. Which of the following is not a matter?
(A) Air (B) Feeling of cold (C) Dust (D) Humidity
26. Which of the following will not undergo sublimation?
(A) Camphor (B) Ammonium Chloride
(C) Iodine (D) Sodium Chlrde
27. The latent heat of vaporisation of water is:
(A) $2.26 \times 10^5 \text{ Jkg}^{-1}$ (B) $22.6 \times 10^5 \text{ Jkg}^{-1}$ (C) $0.226 \times 10^5 \text{ Jkg}^{-1}$ (D) $6.22 \times 10^5 \text{ Jkg}^{-1}$
28. Bronze is an alloy of:
(A) Cu and Zn (B) Zn and Sn (C) Zn and Pb (D) Cu and Sn
29. The size of particles in a true solution is:
(A) Less than 10 nm (B) Less than 10 \AA
(C) More than 100 \AA (D) Between 1 and 100nm

(Space for rough work)

30. A true solution:
 (A) is a heterogeneous mixture (B) is highly unstable
 (C) cannot pass through a filter paper (D) does not scatter light

PART - III [Mathematics]

[SINGLE CORRECT TYPE]

Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

31. The sides of a regular octagon are extended to form a star. Find the measure of the internal angle at each point of the star.
 (A) 45° (B) 90° (C) 135° (D) 60°
32. The angles of a triangle are in the ratio of 4 : 1 : 1. Then the ratio of the largest side to the perimeter is
 (A) $\frac{2}{3}$ (B) $\frac{1}{2+\sqrt{3}}$ (C) $\frac{\sqrt{3}}{2+\sqrt{3}}$ (D) $\frac{2}{1+\sqrt{3}}$
33. What is the maximum area of quadrilateral with sides 1, 4, 7 and 8.
 (A) $\sqrt{61}$ (B) $\sqrt{62}$ (C) $\sqrt{63}$ (D) None of these
34. Let P be a point inside a triangle ABC with $\angle ABC = 90^\circ$. Let P_1 and P_2 be the images of P under reflection in AB and BC respectively. The distance between the circumcentre of triangle ABC and P_1PP_2 is -
 (A) $\frac{AB}{2}$ (B) $\frac{AP + BP + CP}{3}$ (C) $\frac{AC}{2}$ (D) $\frac{AB + BC + AC}{2}$
35. All the vertices of a rectangle are of the form (a, b) which a, b integers satisfying the equation $(a - 8)^2 - (b - 7)^2 = 5$. Then perimeter of the rectangle is ____
 (A) 20 (B) 22 (C) 24 (D) 26

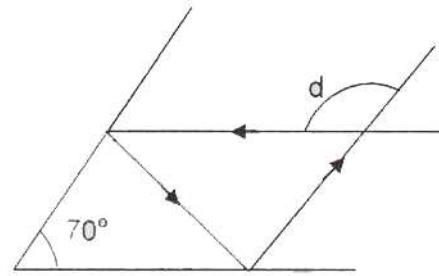
(Space for rough work)

36. The number of positive integers n in the set $\{2, 3, \dots, 200\}$ such that $1/n$ has a terminating decimal expansion is _____
 (A) 16 (B) 18 (C) 40 (D) 100
37. If $x + \frac{1}{x} = a, x^2 + \frac{1}{x^3} = b$, then $x^3 + \frac{1}{x^2}$ is ____
 (A) $a^3 + a^2 - 3a - 2 - b$ (B) $a^3 - a^2 - 3a + 4 - b$
 (C) $a^3 - a^2 + 3a - 6 - b$ (D) $a^3 + a^2 + 3a - 16 - 6$
38. $t^2 - 4t + 1 = 0$, then value of $\left(t^3 + \frac{1}{t^3}\right)$ is
 (A) 44 (B) 48 (C) 52 (D) 64
39. If $pqr = 1$ then $\frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$ is equal to
 (A) 0 (B) $\frac{1}{pr}$ (C) pr (D) None of these
40. The number $5\sqrt{41}$ lies between
 (A) 29 and 30 (B) 30 and 31 (C) 31 and 32 (D) 32 and 33
41. If $x = (\sqrt{21} - \sqrt{20})$ and $y = (\sqrt{18} - \sqrt{17})$, then
 (A) $x = y$ (B) $x + y = 0$ (C) $x > y$ (D) $x < y$
42. What will be the remainder if number 7^{2012} is divided by 25?
 (A) 24 (B) 18 (C) 7 (D) 1
43. The number of natural numbers $n \leq 30$ for which $\sqrt{n + \sqrt{n + \sqrt{n + \dots}}}$ is a prime number is
 (A) Three (B) Zero (C) Nine (D) Two
44. The sum of $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \dots - \frac{1}{2012} + \frac{1}{2013}$ equals
 (A) $\frac{1}{1006} + \frac{1}{1007} + \frac{1}{1008} + \dots + \frac{1}{2013}$ (B) $\frac{1}{1007} + \frac{1}{1008} + \frac{1}{1009} + \dots + \frac{1}{2013}$
 (C) $\frac{1}{1006} + \frac{1}{1007} + \frac{1}{1008} + \dots + \frac{1}{2012}$ (D) $\frac{1}{1007} + \frac{1}{1008} + \frac{1}{1009} + \dots + \frac{1}{2012}$

(Space for rough work)

45. A ray of light is incident on system of mirror as shown in the adjacent figure. What is the total deflection (d) of the ray when it emerges out after two reflections?

- (A) 220°
 (B) 180°
 (C) 140°
 (D) 120°



PART - IV [Biology]

[SINGLE CORRECT TYPE]

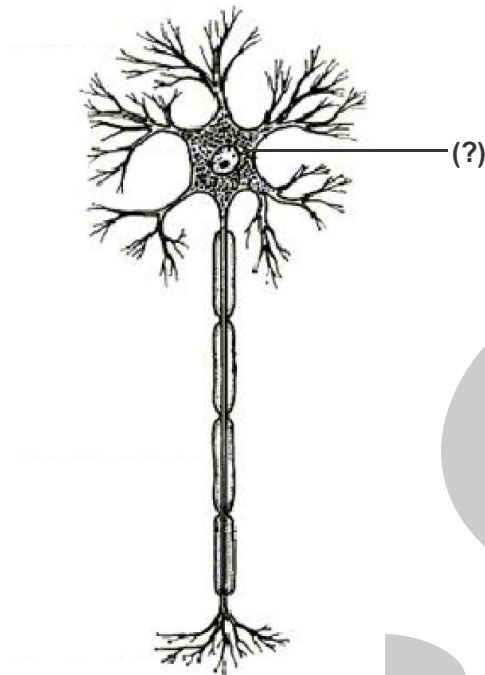
Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

46. The micro-organisms which helps in formation of soil is
 (A) Bacteria (B) Moss (C) Lichen (D) B and C
47. Burning of fossil fuels add
 (A) CO_2 , SO_2 , NO_2 , gases in air (B) C, CO_2 , N_2 , gases in air
 (C) CO, SO_3 , NO_3 , gases in air (D) CH_4 , CO_2 , NO_2 , gases in air
48. Nitrogen fixation can be done by
 (A) Industries (B) Rhizobium (C) Lightening (D) All of the above
49. Green house gases are
 (A) Industries (B) Rhizobium (C) Lightening (D) All of the above
50. Atmosphere maintain the temperature of earth because
 (A) It contains water vapour (B) It hold air, which is bad conductor of heat
 (C) It reflects the heat rays (D) It absorbs the heat rays

(Space for rough work)

51. Molecules of protein contain
(A) Carbon (B) Nitrogen (C) Oxygen (D) All of these
52. Life cannot sustain on Mars & Venus because major component in atmosphere is
(A) Oxygen (B) Carbon dioxide (C) Nitrogen (D) Ozone
53. On moon the temperature ranges from -190°C to 110°C . This is due to
(A) No water bodies present (B) Water bodies present
(C) No bio-geochemical cycle (D) No atmosphere
54. Depletion of Ozone molecules in the stratosphere is due to
(A) Chlorine compound (B) Fluorine Compound
(C) Halogen Compound (D) None of these
55. The life supporting zone of the earth is
(A) Lithosphere (B) Hydrosphere (C) Atmosphere (D) Biosphere
56. Nucleolus was discovered by
(A) Fontana (B) Robert Hooke (C) Robert Brown (D) Palade
57. One of the following is known as power house of the cell
(A) Chloroplast (B) Mitochondria (C) Lysosome (D) Ribosome
58. One of the following is known as suicidal bag of the cell
(A) Chloroplast (B) Mitochondria (C) Lysosome (D) Centrosome
59. Label the following diagram of neuron
(A) Cyton (B) Dendrite (C) Axon (D) Synapse

(Space for rough work)



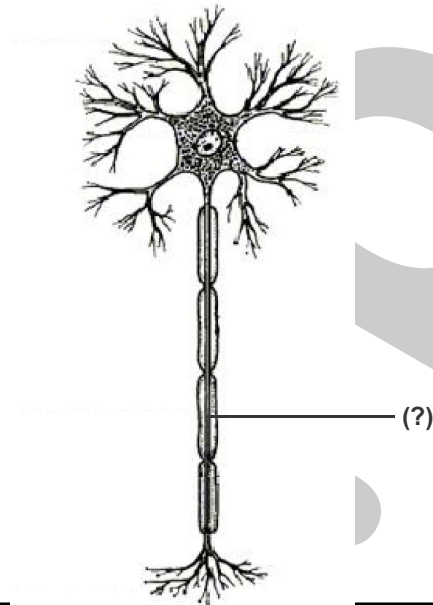
60. Label the following diagram of neuron

(A) Cyton

(B) Dandrite

(C) Axon

(D) Synapse



(Space for rough work)

PART -V [Mental Ability]**[SINGLE CORRECT TYPE]**

Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

Direction (61 - 63): In each of the following questions, a series of number/alphabets is given which follow certain rules. One of the number / alphabet is missing. Choose the missing number / alphabets from the alternatives given below and mark it on your answer sheet as directed.

61. m_pl_pplmp_lmpp_
 (A) pmpl (B) Impl (C) pmml (D) lmml
62. p_pq_qrqr_rprp_
 (A) qrqr (B) qrrp (C) prqp (D) qrpq
63. _psr, q_sr, qp_r, qps_
 (A) pqrs (B) psrp (C) qpsr (D) qspr

Direction (64 - 68): Read the following information carefully and answer the questions given below:

- (i) There is a group of five persons - A, B, C, D and E.
 (ii) One of them is a horticulturist, one is a physicist. One is a Journalist. One is an industrialist and one is an advocate.
 (iii) Three of them - A, C and advocate prefer tea to coffee and two of them - B and the Journalist prefer coffee to tea.
 (iv) The industrialist and D and A are friends to one another but two of them prefer coffee to tea.
 (v) The horticulturist is C's brother.

64. Who is the horticulturist?
 (A) A (B) B (C) C (D) D
65. Who is the industrialist?
 (A) E (B) C (C) B (D) A
66. Which of the following groups includes a person who likes tea but is not an advocate?
 (A) ACE (B) DE (C) BCE (D) None of these
67. Who is a physicist?
 (A) A (B) E (C) D (D) C

(Space for rough work)

68. Which of the statements given above is superfluous?
(A) (iii) (B) (iv) (C) (ii) (D) None of these
69. In a cricket match five batsman A, B, C, D and E scored an average of 36 runs. D scored 5 more than E; E scored 8 fewer than A; B scored as many as D and E combined; and B and C scored 107 between them. How many runs did E score?
(A) 62 (B) 45 (C) 28 (D) 20
70. Five bells begin to toll together and toll respectively at intervals of 6, 5, 7, 10 and 12 seconds. How many times will they toll together in one hour excluding the one at the start?
(A) 7 times (B) 8 times (C) 9 times (D) 11 times
71. There are Deer and Peacock in a zoo. By counting heads they are 80. The number of their legs is 200. How many Peacock are there?
(A) 20 (B) 30 (C) 50 (D) 60
72. Kunal walks 10 kilometers towards North. From there, he walks 6 kilometers towards South. Then he walks 3 kilometers towards East. How far and in which direction is he with reference to his starting points?
(A) 5 km West (B) 5 km North-East
(C) 7 km East (D) 7 km West
73. If in a certain code, SENIOR is written as NZIDJM. Then which word is written in the same code as XDODUZI.
(A) CISTERN (B) INQUIRE (C) CITIZEN (D) SUSTAIN
74. If SYSTEM is coded as SYSMET and NEARER as AENRER, then FRACTION will be coded as:
(A) CARFNOIT (B) NOITFRAC (C) FRACNOIT (D) CARFTION
75. If RED is coded as 6720, then how would GREEN be coded?
(A) 1677199 (B) 1677209 (C) 16717209 (D) 9207716

(Space for rough work)