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EDUDIGM APTITUDE CUM SCHOLARSHIP TEST

Class- XI

Time: 1 hr.   M.M. 200

General Instructions (To be read carefully before answering the paper)

1. The Test Booklet consists of **50** questions divided into three sections - Question number 1 to 10 **(Physics),** Question number 11 to 20 **(Chemistry),** Question number 21 to 30 **(Aptitude),** Question number 31 to 40 **(Mathematics)** and Question number 41 to 50 **(Biology).**

2. **Note that the Physics, Chemistry and Aptitude sections are compulsory for all to attempt. Students can choose between the Mathematics and Biology section and should attempt only one of them completely. The maximum number of questions that a student can therefore attempt is 40 from 4 sections (either PCAM or PCAB).**

3. All the questions carry equal marks. For each correct answer, you shall be awarded **+5** marks and **– 1** for an incorrect answer. **0** marks shall be awarded in case of not attempting a question.

4. Mark only one correct answer out of four alternatives. Darken the circle completely in the OMR Answer sheet.

5. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager mobile phone, any electronic device, etc., inside the examination hall/room.

6. On completion of the test, the candidate must hand over the OMR Answer Sheet to the Invigilator on duty in the Room/Hall.

7. **Do not fold or make any stray marks on the OMR Answer Sheet.**

8. **Resorting to unfair means shall lead to cancellation of the paper**

9. No extra sheets shall be provided to do rough work. You can only use the space provided in this question booklet. For doing rough work you may use either pen or pencil

10. Make sure that you have filled in your personal details completely before starting the test.

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PHYSICS

1. The equation $\left(P + \dfrac{a}{V^2}\right)(V - b) = $ constant. The units of a is

   (a) $Dyne \times cm^5$ (b) $Dyne \times cm^4$ (c) $Dyne / cm^3$ (d) $Dyne / cm^2$

2. A body moves over one fourth of a circular arc in a circle of radius r. The magnitude of distance travelled and displacement will be respectively

   (a) $\dfrac{\pi r}{2}, r\sqrt{2}$ (b) $\dfrac{\pi r}{4}, r$ (c) $\pi r, \dfrac{r}{\sqrt{2}}$ (d) $\pi r, r$

3. The relation $3t = \sqrt{3x} + 6$ describes the displacement of a particle in one direction where x is in metres and t in sec. The displacement, when velocity is zero, is

   (a) 24 metres   (b) 12 metres   (c) 5 metres   (d) Zero

4. A particle is moving eastwards with velocity of 5 m/s. In 10 sec the velocity changes to 5 m/s northwards. The average acceleration in this time is

   (a) Zero   (b) $\dfrac{1}{\sqrt{2}}$ m/s^2 toward north-west

   (c) $\dfrac{1}{\sqrt{2}}$ m/s^2 toward north-east   (d) $\dfrac{1}{2}$ m/s^2 toward north-west

5. In a projectile motion, velocity at maximum height is

   (a) $\dfrac{u\cos\theta}{2}$ (b) $u\cos\theta$ (c) $\dfrac{u\sin\theta}{2}$ (d) None of these

6. A cricketer can throw a ball to a maximum horizontal distance of 100 m. The speed with which he throws the ball is (to the nearest integer)

   (a) 30 ms^{-1} (b) 42 ms^{-1} (c) 32 ms^{-1} (d) 35 ms^{-1}

7. A force of 10 Newton acts on a body of mass 20 kg for 10 seconds. Change in its momentum is

   (a) 5 kg m/s   (b) 100 kg m/s   (c) 200 kg m/s   (d) 1000 kg m/s

8. A block of mass 50 kg slides over a horizontal distance of 1 m. If the coefficient of friction between their surfaces is 0.2, then work done against friction is

   (a) 98 J   (b) 72J   (c) 56 J   (d) 34 J

9. A particle of mass 0.01 kg travels along a curve with velocity given by $4\hat{i} + 16\hat{k}$ ms^{-1}. After some time, its velocity becomes $8\hat{i} + 20\hat{j}$ ms^{-1} due to the action of a conservative force. The work done on particle during this interval of time is

   (a) 0.32 J   (b) 6.9 J   (c) 9.6 J   (d) 0.96 J

10. If the momentum of a body is increased by 100 %, then the percentage increase in the kinetic energy is

   (a) 150 %   (b) 200 %   (c) 225 %   (d) 300 %

CHEMISTRY

11. As the energy level increases, the gap between them

   (a) Remains constant   (b) Increases
   (c) Decreases   (d) Cannot be predicted

12. The radius of the second Bohr orbit in Li^{2+} ion is

   (A) 0.624Å   (B) 0.704Å   (C) 0.624 nm   (D) 0.704 nm

13. Which of the following represents the collection of isoelectronic species
   (A) NO^+, C_2^{2+}, O_2^-, CO   (B) N_2, C_2^{2-}, CO, NO
   (C) CO, NO^+, CN^-, N_2 (D) NO, CN^-, N_2, O_2^-

14. When a thin metal foil is bombarded with α-particles, most of them go through the foil because

   (A) α-particles are positively charged   (B) most part of the atom is empty space
   (C) α-particles move with high speed   (D) α-particles are heavier than electrons

15. Which molecule is T-shaped.

   (A) BeF_2 (B) BCl_3 (C) NH_3 (D) ClF_3

16. Which of the following molecule has highest dipole moment?

   (A) BF_3 (B) NH_3 (C) NF_3 (D) B_2H_6

17. The pair having similar geometry is
   (A) BF_3, NH_3 (B) H_2O, C_2H_2 (C) CO_2, SO_2 (D) NH_3, PH_3

18. Among HF, CH_3OH, N_2O_4 and CH_4 which would have inter molecular hydrogen bonding.

   (A) CH_3OH, CH_4 (B) HF, CH_4, CH_3OH (C) N_2O_4, HF   (D) HF, CH_3OH

19. Paramagnetism is not shown by

   (A) O_2^- (B) H_2^+ (C) O_2 (D) O_2^{2-}

20. 8 g of O_2 has the same number of molecules as in

   (A) 7 g of CO   (B) 14 g of CO   (C) 28 g of CO   (D) 11 g of CO_2

APTITUDE

Direction: (21 to 25) Read the following information carefully and answer the questions given below it. In a car exhibition, seven cars of seven different brands, viz Cadillac, Ambassador, Fiat, Maruti, Mercedes, Bedford and Fargo were displayed in a row, facing east direction such that :

I. Cadillac was to the immediate right of Fargo.
II. Fargo was fourth to the right of Fiat.
III. Maruti was between the Ambassador and Bedford.
IV. Fiat, which was third to the left of Ambassador, was at one of the extreme ends.

21. Which of the following was the correct position of the Mercedes ?

(A) To the Immediate right of Fargo (B) To the Immediate left of Bedford

(C) Between Bedford and Fargo   (D) Fourth to the right of Maruti

22. Which of the following is definitely true ?

(A) Fargo is between Ambassador and the Fiat

(B) Cadillac is to the immediate left of Mercedes

(C) Fargo is to the immediate right of Cadillac

(D) Maruti is fourth to the right of Mercedes

23. Which cars are neighbors of Cadillac ?

(A) Ambassador and maruti   (B) Maruti and Fiat

(C) Fiat and Mercedes   (D) Mercedes and Fargo

24. Which of the following is definitely true ?

(A) Maruti is to the immediate left of Ambassador

(B) Bedford is to the immediate left of Fiat.

(C) Bedford is at one of the ends   (D) Fiat is second to the right of Maruti

25. Which of the following groups of cars is to the right of the Ambassador ?

(A) Cadillac, Fargo and Maruti   (B) Maruti, Bedford and Fiat

(C) Mercedes, Cadillac and Fargo   (D) Bedford, Cadillac and Fargo

26. Which two months in a year have the same calendar?

(A)June, October (B) April, November (C) April, July (D) October, December

27. What is the number of straight lines in the following figure?
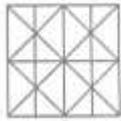
   (A) 11 (B) 14 (C) 16 (B) 17

28. If a clock shows 04:28 then its mirror image will be?
    (A) 07 : 42 (B) 07: 32 (C) 08: 32 (D) 08: 42

29. Kishen walks 10 km towards North. From there, he walks 6 km towards South. Then he walks 3 km towards East. How far and in which direction is he with reference to his starting point?
    (A) 5 km, North (B) 5 km, North-East (C) 7 km, East (D) 7 km, West

30. Select a figure from the four alternatives, which when placed in the blank space of figure (X) would complete the pattern.

MATHEMATICS

31. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of second set. The values of m and n are
    (A) 7, 6   (B) 6, 3   (C) 5, 1   (D) 8, 7

32. The relation R defined on the set A = {1, 2, 3, 4, 5} by R = {(x, y) : $\left|x^2 - y^2\right| < 16$ is   given by
    (A) R = {(1, 1) (2, 2), (3, 3), (2, 1), (1, 2), (2, 3), (3, 2)}
    (B) {(2, 2), (3, 2), (4, 2), (2, 4)}
    (C) {(3, 3), (4, 3), (5, 4), (3, 4)}   (D) None of these.

33. In a city 20 percent of the population travels by car, 50 percent travels by bus and 10 percent travels by both car and bus. Then the persons travelling by car or bus is
       (a) 80 percent   (b) 40 percent   (c) 60 percent   (d) 70 percent

34. The value of $x = \sqrt{2 + \sqrt{2 + \sqrt{2 + \ldots}}}$ is
    (a) –1   (b) 1   (c) 2   (d) 3

35. If the sum to n terms of a series be 5n² + 2n, then second term is
    (A) 15   (B) 17   (C) 10   (D) 5

36. The sum of the first n terms of the series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 + \ldots$ is $\frac{n(n+1)^2}{2}$, when n is even. When n is odd, the sum is

(A) $\frac{n^2(n+1)}{2}$ (B) $\frac{n(n+1)(2n+1)}{6}$ (C) $\frac{n(n+1)^2}{2}$ (D) $\frac{n^2(n+1)^2}{2}$

37. Consider the triangle OAB where O = (0, 0), B = (3, 4). If the orthocentre of a triangle is H(1, 4) then coordinate of A is

(A) (0, 15/4)   (B) (0, 17/4)   (C) (0, 21/4)   (D) (0, 19/4)

38. The angles of a quadrilateral are in A.P. and the greatest angle is 120°, the angles in radians are

(a) $\frac{\pi}{3}, \frac{4\pi}{9}, \frac{5\pi}{9}, \frac{2\pi}{3}$ (b) $\frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{3}$ (c) $\frac{5\pi}{18}, \frac{8\pi}{18}, \frac{11\pi}{18}, \frac{12\pi}{18}$ (d) None of these

39. If $\sin\theta + \mathrm{cosec}\,\theta = 2$, then $\sin^2\theta + \mathrm{cosec}^2\theta =$

(a) 1   (b) 4   (c) 2   (d) None of these

40. Which of the following number is rational

(a) $\sin 15°$ (b) $\cos 15°$ (c) $\sin 15°.\cos 15°$ (d) $\sin 15°.\cos 75°$

BIOLOGY

41. Identify the correct sequence of taxonomical categories.

(a) Species-Order-Genus-Kingdom   (b) Genus-Species-Order-Kingdom
(c) Species-Genus-Order-Kingdom   (d) Order-Species-Genus-Kingdom

42. Amongst the following, identify the correctly written scientific name of mango.

(a) Mangifera indica (b) Magnifera Indica (c) Ficus Benghalensis (d) None of these

43. Homeostasis is

(a) Tendency to change with change in the environment
(b) Tendency to resist change
(c) Disturbance in regulatory control
(d) Plants and animals extracts used in homeopathy

44. Which one is incorrect?

(a) New individuals replace the dead ones
(b) Homeostasis produces a self regulated steady state
(c) Most homeostatic mechanisms operate through feedback systems
(d) Cells obtain instruction for division from a hereditary

45. Habitat of euglenoids is

(a) Fresh river water   (b) Fresh stagnant water
(c) Marine water   (d) All

46. What is not true about the rhizophore of selaginella?

    (a) It has a single protostele
    (b) It grows endogenously
    (c) It is positively geotropic
    (d) It often bears some scaly leaves and even cones

47. In the phloem of *Gnetum*

    (a) Sieve tube and companion cells are absent
    (b) Sieve tube is present but companion cell is absent
    (c) Sieve tube and companion cell are present and are formed from two different cells
    (d) Sieve tube and companion cell are present and are formed from a single cell

48. Curing of tea leaves is brought about by

    (a) Fungi   (b) Bacteria   (c) Viruses   (d) Mycorrhiza

49. Auxospores and hormocysts are formed respectively by

    (a) Some diatoms and several cyanobacteria
    (b) Some cyanobacteria and several diatoms
    (c) Several cyanobacteria and several diatoms
    (d) Several diatoms and a few cyanobacteria

50. Diploblastic and triploblastic are terms that describe

    (a) the number of invaginations during embryonic development
    (b) the number of heads during embryonic development
    (c) the number of germinal layers during embryonic development
    (d) the number of cell types during development.