SAMPLE PAPER Engineering

M-STAR

Momentum Scholarship Test for Admission & Rewards

11th Edition, 2026

Talent HUNT Exam

(Class XII Studying Moving to XII Passed)
Physics, Chemistry & Mathematics

INSTRUCTIONS FOR CANDIDATE

1. Duration of Test is 1 hr.
2. The Test Booklet consists of 40 questions. The maximum marks are 90. There is **no negative marking** for wrong answer.
3. **Pattern of the questions are as under:**

   The question paper consists of three subjects i.e., , **Physics, Chemistry** and **Mathematics .** There are two sections in this question paper**.**

(i) **Section-I:** This section contains **35 multiple choice questions**, which have **only one correct** answer. Each question carries **+2 marks** for correct answer.

(ii) **Section-II:** This section contains 5 multiple choice questions, in which **one or more than one choice(s)** is/are correct. Each question carries **+4 marks** for correct answer.

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MOMENTUM Talent Search Exam 2026

Sample Paper

(*Class XII Studying Moving to XII Passed*)

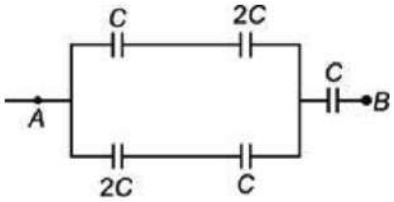
Time : 1 Hour **MM : 90**

PHYSICS

SECTION-I : SINGLE CORRECT ANSWER TYPE

This section contains 11 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** choice is correct.

1. For the circuit shown in figure, equivalent capacitance between points *A* and *B*, is



(1) $\frac{3C}{7}$ (2) $\frac{4C}{5}$

(3) $\frac{3C}{5}$ (4) $\frac{4C}{7}$

2. A magnetic field intensity at the centre of a circular wire of radius 0.1 m carrying a current 0.2 A is

(1) $2\pi\times10^{-5}$ T (2) $\pi\times10^{-7}$ T

(3) 10^{-7} T (4) $4\pi\times10^{-7}$ T

3. Among the following, Ampere's circuital law is represented by

(1) $\oint B.dl = 0$ (2) $\oint B.dl = \mu_0 I$

(3) $\oint B.dl = \frac{\mu_0}{I}$ (4) $\oint B.dl = \mu_0$

4. A heater of 220 V heats a volume of water in 5 minute time. A heater of 110 V heats the same volume of water in

(1) 5 minutes (2) 8 minutes

(3) 10 minutes (4) 20 minutes

5. Which of the following is not equivalent to mass?

(1) Electron volt/(speed)^2 (2) Impulse/momentum

(3) Force/acceleration (4) Impulse/kinetic energy

6. *n* identical bulbs, each designed to draw a power *p* from a certain voltage supply, are joined in series across that supply. The total power which they will draw is

(1) p/n^2 (2) p/n

(3) p (4) np

7. A parallel plate capacitor of capacitance C is connected to a battery of emf V. If a dielectric slab is completely inserted between the plates of the capacitor and battery remains connected, then electric field between plates

(1) Decreases (2) Increases

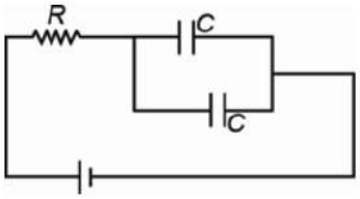
(3) Remains same (4) May increase or decrease

8. Electric charge on 1 gm of proton is nearly

(1) 96 C (2) 96000 C

(3) 96×10^6 C (4) 48 C

9. In charging two neutral capacitors, heat produced in resistor is H and energy stored in one of capacitor is U then H/U is



(1) 1 (2) 2

(3) 4 (4) $\frac{1}{2}$

10. In uniform magnetic field, the ratio of radii of two charged particles having same specific charge are in

(1) Proportional to ratio of speeds (2) Inversely proportional to ratio of speed

(3) Proportional to square of ratio of speed (4) Independent of ratio of velocities

11. Minimum speed with which an electron can move unaccelerated in electric and magnetic field of 15 V/m and 1 μT, is

(1) 15 m/s (2) 1.5×10^7 m/s

(3) 6.7×10^{-6} m/s (4) 20 m/s

SECTION-II : ONE OR MORE THAN ONE CORRECT ANSWER TYPE

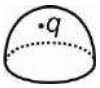
This section contains 2 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONE OR MORE THAN ONE** choice(s) is(are) correct.

12. Electric flux through a Gaussian surface containing an electric dipole is

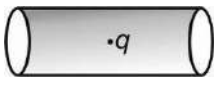
(1) Positive at some part of surface (2) Negative at some part of surface

(3) Zero everywhere on the surface (4) Zero when added over all the surface

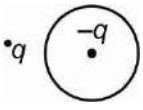
13. In which of the following case(s), the flux crossing through the surface is not zero?

(1) 

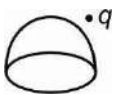
Hemispherical surface

(2) 

Cylindrical curved surface

(3) 

Spherical surface

(4) 

Closed hemisphere

CHEMISTRY

SECTION-I : SINGLE CORRECT ANSWER TYPE

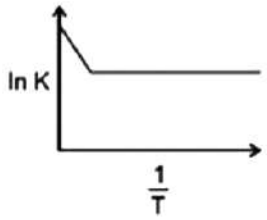
This section contains 11 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** choice is correct.

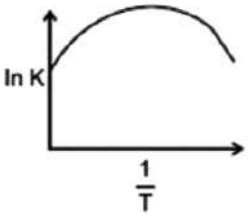
14. The product obtained when $I^{\ominus}$ is treated with $MnO_4^{\ominus}$ in faintly alkaline medium is

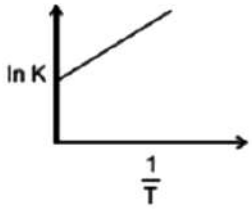
(1) I_2 (2) $IO^{\ominus}$

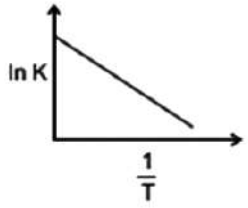
(3) $IO_3^{\ominus}$ (4) $IO_4^{\ominus}$

15. Among the following graphs which shows variation of ln(K) with (1/T) for a reaction, the one that exhibits Arrhenius behaviour over the entire temperature range is (K → rate constant; T → temperature)

(1) 

(2) 

(3) 

(4) 

16. During rusting of iron, the reaction taking place at cathode is

(1) $Fe^{2+} + 2e^- \rightarrow Fe$ (2) $Fe^{3+} + e^- \rightarrow Fe^{2+}$

(3) $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$ (4) $H_2O + e^- \rightarrow \frac{1}{2}H_2 + OH^-$

17. The emf of the cell in which the following reaction takes place is

$Zn(s) + Cu^{2+}(0.02\ M) \rightarrow Zn^{2+}(0.4\ M) + Cu(s)$

Given that $E^{\circ}_{cell} = 1.1\,V$ at 298 K; $\frac{2.303RT}{F} = 0.06$ [log2 = 0.30]

(1) 0.96 V (2) 1.5 V

(3) 1.01 V (4) 1.06 V

18. For the ideal solution formed by two liquids A and B which of the following is correct? (Here X_A & X_B represent mole fraction of solvent & solute in liquid phase respectively and Y_A & Y_B represents mole fraction of solvent & solute in vapour phase respectively. P_{Total} is total vapour pressure of solution)

(1) Plot of P_{Total} versus Y_A is linear (2) Plot of P_{Total} versus Y_B is linear

(3) Plot of P_{Total} versus X_A is linear (4) Plot of P_{Total} versus X_B is non-linear

19. The rate of reaction between A and B increases by a factor of 100, when the concentration of A is increased 10 folds. The order of reaction with respect to A is

(1) 10 (2) 1

(3) 4 (4) 2

20. The magnetic moment of which of the following complexes is maximum?

(1) $[Co(CN)_6]^{3-}$ (2) $[Ni(CN)_4]^{2-}$

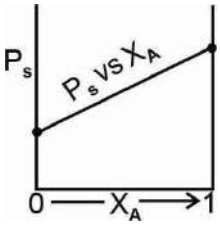
(3) $[CoF_6]^{3-}$ (4) $[NiCl_4]^{2-}$

21. 0.1 m aqueous solution of $K_4[Fe(CN)_6]$ will have the same freezing point as 0.1 m aqueous solution of all except (Assume 100% dissociation of electrolyte)

(1) $Al_2(SO_4)_3$ (2) $Ca_3(PO_4)_2$

(3) $Na_2SO_4 \cdot MgSO_4 \cdot 4H_2O$ (4) $K_3[Fe(CN)_6]$

22. A and B are volatile liquids and form an ideal solution. Variation of vapour pressure of solution with mole fraction of A is given below. The correct relation is



(1) $P_A^o = P_B^o$ (2) $P_A^o > P_B^o$

(3) $P_A^o < P_B^o$ (4) $BP_A > BP_B$

23. Chrome green is

(1) Chromium sulphate (2) Chromium chloride

(3) Chromium nitrate (4) Chromium oxide

24. Which among the following statements is incorrect for interstitial compounds?

(A) They are very hard and rigid (B) They have higher melting point than pure metal

(C) They do not show conductivity (D) They are chemically inert

(1) A (2) B

(3) C (4) D

SECTION-II : ONE OR MORE THAN ONE CORRECT ANSWER TYPE

This section contains 2 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONE OR MORE THAN ONE** choice(s) is(are) correct.

25. The melting point of solution containing 0.522 g of compound 'x' (M. wt. 152 g/mol) and 0.0386 g of an unknown non-electrolyte (y) compound is 430 K. Given, the melting point of 'x' = 450 K.

ΔH_{fus} 'x' = 8.53 kJ/mol

The correct statement(s) is/are

(1) K_f of 'x' = 30 K kg/mol

(2) Molality of solution is 0.667 mol/kg

(3) The molecular weight of solute = 0.157 kg/mol (nearly)

(4) The molecular weight of solute = 0.111 kg/mol (nearly)

26. Which of the following is(are) correct for non-ideal solution with positive deviation?

(1) $\Delta V_{mix} < 0$, $\Delta G_{mix} < 0$ (2) $\Delta V_{mix} > 0$, $\Delta H_{mix} > 0$

(3) $\Delta V_{mix} > 0$, $\Delta G_{mix} < 0$ (4) $\Delta V_{mix} = 0$, $\Delta H_{mix} = 0$

MATHEMATICS

SECTION-I : SINGLE CORRECT ANSWER TYPE

This section contains 13 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** choice is correct.

27. The value of $\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)$ is

(1) $\frac{-5\pi}{6}$ (2) $\frac{-3\pi}{6}$

(3) $\frac{5\pi}{6}$ (4) $\frac{\pi}{6}$

28. $\int_0^{2\pi}(\sin x+\cos x)(\cos x-\sin x)dx =$

(1) Zero (2) 2

(3) –2 (4) 1

29. Area bounded by the curve $y = \sin x$ and x-axis between $x = 0$ and $x = 2\pi$ is

(1) 2 square units (2) 4 square units

(3) 8 square units (4) 3 square units

30. The number of point(s) of discontinuity of the function $f(x)=[x]$ for $x \in (0, 4)$ is (where $[.]$ represents greatest integer function)

(1) Zero (2) 4

(3) 3 (4) 5

31. $\int\left(\sqrt{x}+\frac{1}{2\sqrt{x}}\right)^2 dx$ equals (c is the constant of integration)

(1) $\frac{x^2}{2}+\frac{1}{2}\ln|x|+x+c$ (2) $x^2+\frac{1}{2}\ln|x|+x+c$

(3) $\frac{x^2}{2}+\frac{1}{4}\ln|x|+\frac{x}{2}+c$ (4) $\frac{x^2}{2}+\frac{1}{4}\ln|x|+x+c$

32. The matrix X for which $\begin{bmatrix}2 & 1\\ 1 & -1\end{bmatrix}X=\begin{bmatrix}1 & 10\\ 2 & 2\end{bmatrix}$ is

(1) $\begin{bmatrix}1 & -4\\ -1 & 2\end{bmatrix}$ (2) $\begin{bmatrix}1 & 4\\ 1 & 2\end{bmatrix}$

(3) $\begin{bmatrix}1 & 4\\ -1 & 2\end{bmatrix}$ (4) $\begin{bmatrix}1 & 4\\ -1 & -2\end{bmatrix}$

33. The range of $\tan^{-1}x$ is

(1) $\left(\pi, \frac{\pi}{2}\right)$ (2) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

(3) $(-\pi, \pi)$ (4) $(0, \pi)$

34. The value of $\lim_{x\to 0}\frac{1-\cos x}{x^2}$ is

(1) 1 (2) $\frac{1}{3}$

(3) $\frac{1}{2}$ (4) $\frac{4}{5}$

35. The maximum value of $f(x) = x\sin x \ \forall x \in \left[0, \frac{\pi}{2}\right]$ is

(1) $\frac{\pi}{2}$ (2) $\frac{\pi-1}{2}$

(3) $\frac{\pi+1}{2}$ (4) 1

36. Let A be a square matrix of 3 × 3 order and $|A| = 5$. Then value of $|4A|$ is

(1) 64 (2) 25

(3) 320 (4) 640

37. The domain of the function $f(x) = \cos^{-1}\left(\frac{1-|x|}{5}\right)$ is

(1) [–6, 6] (2) $(-\infty, 2) \cup (2, 3)$

(3) (2, 3) (4) $[-6, 2) \cup (2, 3)$

38. Let A be the 4 × 4 matrix and $\det(A^2) = 2^{2/3}$, then the value of $\det(\text{adj}(\text{adj}(A^2)))$ is equal to

(1) 16 (2) 32

(3) 128 (4) 64

39. $\frac{d}{dx}\left(x^3\cos\left(\frac{1}{x}\right)\right)$ is equal to

(1) $3x^2\cos\left(\frac{1}{x}\right)+x\sin\left(\frac{1}{x}\right)$ (2) $3x^2\cos\left(\frac{1}{x}\right)-x\sin\left(\frac{1}{x}\right)$

(3) $3x^2\sin\left(\frac{1}{x}\right)+x\cos\left(\frac{1}{x}\right)$ (4) $3x^2\sin\left(\frac{1}{x}\right)-x\cos\left(\frac{1}{x}\right)$

SECTION-II : ONE OR MORE THAN ONE CORRECT ANSWER TYPE

This section contains 1 multiple choice question, which has 4 choices (1), (2), (3) and (4) out of which **ONE OR MORE THAN ONE** choice(s) is(are) correct.

40. If A is a symmetric matrix and B is a skew symmetric matrix, then (assuming matrix multiplication is defined everywhere)

(1) ABA^T is symmetric matrix (2) A^TBA is skew-symmetric matrix

(3) BAB^T is symmetric matrix (4) B^TAB is skew-symmetric matrix

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MOMENTIAN'S RESULTS

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NEET

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KGMU Lucknow	IMS Banaras (BHU)	AIIMS Delhi	Govt. Medical Collage	AIIMS Gorakhpur