School Integrated Program

Class – XI

SAMPLE PAPER

INSTRUCTIONS

[Time: 3 Hours]   [Max Marks: 270]

A. General:

1. This booklet is your Question Paper containing 90 questions.
2. Blank Papers, Clipboards, Log Tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. The answer sheet, a machine-readable optical mark recognition sheet (OMR Sheet), is provided separately.
4. DO NOT TAMPER WITH / MULTIPLE THE OMR OR THE BOOKLET.
5. Please fill your roll number correctly in the OMR sheet (answer sheet).
6. Both Question Paper and OMR Answer Sheet will be submitted after completion of this examination.

B. Question Paper Format:

1. The Question Paper consists of five parts (Part I: MAT, Part II: Physics, Part III: Chemistry, Part IV: Mathematics).
2. Each Question carries +3 marks for correct answer and -1 mark for incorrect answer.

Note

A. Instructions mentioned on this page are of actual test. It has no reference with the questions / pattern of this paper.
B. This paper is provided just to share the pattern, format and level of questions that could be a part of actual test.

PHYSICS

1. Four particles of masses $m_1 = 2m$, $m_2 = 4m$, $m_3 = m_4$ are placed at four corners of a square. What should be the value of m_4, so that the centre of mass of all the four particles are exactly at the centre of the square?
   (A) 2m
   (B) 8 m
   (C) 6 m
   (D) none of these
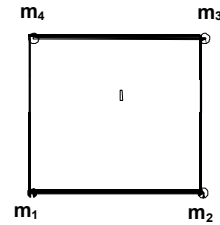
2. Consider the following two statements:
   (a) Linear momentum of the system remains constant.
   (b) Centre of mass of the system remains at rest.
   (A) a implies b and b implies a
   (B) a does not imply b and b does not imply a.
   (C) a implies b but b does not imply a
   (D) b implies a but a does not imply b.

3. If vectors $A \& B$ have an angle T between them than the value of $\dfrac{|\hat{A} \quad \hat{B}|}{|\hat{A} \quad \hat{B}|}$ will be
   (A) 2 cos T/2
   (B) 2 tan T/2
   (C) 2 sin T/2
   (D) tan T/2

4. The resultant of the following expression $\hat{i}.(\hat{j} \mathbf{u} \hat{k}) \quad \hat{j}.(\hat{i} \mathbf{u} \hat{k}) \quad \hat{k}.(\hat{j} \mathbf{u} \hat{i})$
   (A) 0
   (B) 1
   (C) –1
   (D) 3

5. Which one of the following represents uniformly accelerated motion ?
   (A) $x \quad \sqrt{\dfrac{t \quad a}{b}}$
   (B) $x \quad \dfrac{t}{a \, b}$
   (C) $t \quad \sqrt{\dfrac{x \quad a}{b}}$
   (D) $x \quad \sqrt{t \quad a}$

6. For a man walking on a level road at 5 km/h, the rain appears to be falling at 8 km/h at an angle of 60^0 with horizontal. The speed of the rain with respect to ground is
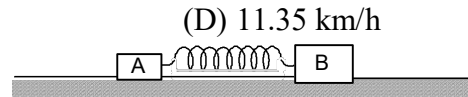   (A) 4.4 km/h
   (B) 12.6 km/h
   (C) 7 km/h
   (D) 11.35 km/h

7. Two blocks A and B each of mass m are connected by a massless spring in natural length and spring constant k.
   They are placed on a smooth horizontal plane. Spring is stretched by an amount x and then released from blocks at rest. The relative velocity of approach of the blocks when the spring comes to its natural length is
   (A) $\sqrt{\dfrac{3k}{2m}} \, x_1$
   (B) $\sqrt{\dfrac{2k}{m}} \, x_1$
   (C) $\sqrt{\dfrac{k}{m}} \, x_1$
   (D) $\sqrt{\dfrac{k}{2m}} \, m_1$

8. A block of mass m is placed at rest with respect to ground over a massive plank moving horizontally over a smooth ground with velocity 6 m/s. The coefficient of friction between the block and plank is 0.2. The distance traveled by the block in ground frame till it slide on the plank is ($g = 10$ m/s^2)
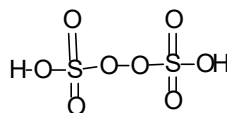   (A) 4 m
   (B) 6 m
   (C) 9 m
   (D) 12 m

CHEMISTRY

9. Find the oxidation number of S in $H_2S_2O_8$

$$H-O-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle O}{\|}}{S}}-O-O-\overset{\overset{\displaystyle O}{\|}}{\underset{\underset{\displaystyle O}{\|}}{S}}-OH$$

   (A) –6   (B) +6   (C) +4   (D) none of these

10. Correct set of four quantum numbers for the valence (outermost) electron of rubidium ($Z = 37$) is:
   (A) 5, 0, 0, +1/2   (B) 5, 1, 0, +1/2
   (C) 5, 1, 1, +1/2   (D) 6, 0, 0, +1/2

11. The correct order of second ionization potential of carbon, nitrogen, oxygen and fluorine is
   (A) $C > N > O > F$ (B) $O > N > F > C$
   (C) $O > F > N > C$ (D) $F > O > N > C$

12. After balancing the equation in alkaline medium how many OH⁻ ions would be required?
   $MnO_4^- \quad SnO_2^{2-} \quad H_2O \quad \longrightarrow \quad MnO_2 \quad {}^2OH$ (alkaline medium)
   $\qquad\qquad\qquad SnO_3$
   (A) 5   (B) 4   (C) 3   (D) 2

13. A toy balloon can occupy 500 ml at 27^0C. The minimum stretching capacity of the balloon is three times of this volume at 27^0C. What is the temperature above which the balloon will burst if pressure of the balloon does not change?
   (A) 327^0C (B) 627^0C (C) 927^0C (D) 1227^0C

14. Which of the following is paramagnetic?
   (A) O_2 (B) CN
   (C) CO   (D) NO

15. Among the following, the molecule that is linear is
   (A) CO_2 (B) NO_2
   (C) SO_2 (D) ClO_2

16. The types of bonds present in $CuSO_4.5H_2O$ are only
   (A) electrovalent and covalent
   (B) electrovalent and coordinate covalent
   (C) electrovalent, covalent and coordinate covalent
   (D) covalent and coordinate covalent

MATHEMATICS

17. The least integral value of k such that $(k-2)x^2 + 8x + k + 4$ is positive for all real values of x is
   (A) 1   (B) 2   (C) 3   (D) 5

18. If all the real solutions of the equation $4^x - (a-3)2^x + (a-4) = 0$ are non positive, then
   (A) $4 < a \leq 5$ (B) $0 < a < 4$ (C) $a > 4$ (D) $a < 3$

19. The value of 'a' for which the equation $(a^2 + 4a + 3)x^2 + (a^2 - a - 2)x + (a+1)a = 0$ has more than two roots is
   (A) 1   (B) 2   (C) -2   (D) –1

20. The number of solutions of the equation $x^3 + 2x^2 + 5x + 2\cos x = 0$ in $[0, 2\pi]$ is
   (A) 0   (B) 1   (C) 2   (D) 3

21. If the equation $ax^2 + bx + c = 0$ $(a > 0)$ has two roots $\mathbf{D}$ and $\mathbf{E}$ such that $\mathbf{D} < -2$ and $\mathbf{E} > 2$, then
    (A) $b^2 - 4ac > 0$ (B) $c < 0$ (C) $a + |b| + c < 0$ (D) all of them

22. If $\log 2$, $\log(2^x - 1)$ and $\log(2^x + 3)$ are in A.P. , then the value of x is
    (A) $5/2$ (B) $\log_2 5$ (C) $\log_3 5$ (D) $\log_5 3$

23. If the data given to construct a triangle ABC is $a = 5, b = 7, \sin A = \dfrac{3}{4}$, then it is possible to construct

    (A) only one triangle   (B) two triangles
    (C) infinitely many triangles   (D) no triangle

24. $\displaystyle\lim_{x \to 1} \dfrac{\sqrt{1 - \cos 2(x - 1)}}{(x - 1)}$

    (A) exist and equal to $\sqrt{2}$

    (B) exist and equal to $-\sqrt{2}$

    (C) does not exist because left hand limit is not equal to right hand limit.

    (D) none of these