MODEL QUESTIONS – MATHEMATICS

I) The coefficient of x⁵ in (1 - x - x² + x³)⁶ is 20.
 II) If p and q are the coefficients of x⁴ in (1 + x)²ⁿ and (1 + x)²ⁿ⁻¹ respectively then 2p=q.
 Which of the above statements is/are true?

1) only I2) Only II3) Both I and II4) Neither I nor II

2). Assertion (A): If $A+B=45^{\circ}$ then (1+TanA)(1+TanB)=2.

Reason(R): Tan 22 $\frac{1}{2}^{\circ} = \sqrt{2} - 1$.

- 1) Both (A) & (R) are True and (R) is the correct explanation of (A).
- 2) Both (A) & (R) are True and (R) is not correct explanation of (A).
- 3) (A) is True but (R) is False.
- 4) (A) is False but (R) is True

3) Arrange the following statements in ascending order of their results A) The order of $\left(\frac{d^4y}{dx^4} + \frac{d^2y}{dx^2}\right)^{3/2} = a \left(\frac{d^3y}{dx^3}\right)$ B) The degree of $\left(\frac{dy}{dx} + \frac{d^2y}{dx^2}\right)^{5/4} = a \left(\frac{d^3y}{dx^3}\right)^{2/3}$ C) The degree of $y = \left(1 + \left(\frac{dy}{dx}\right)^2\right)^{3/2} \left(\frac{d^2y}{dx^2}\right)$ D) The order of $x^3 + \left(\frac{d^3y}{dx^3}\right)^2 + 2x^2 \left(\frac{d^2y}{dx^2}\right) - 3y = x^2$

1) D, C, B, A 2) D, C, A, B 3) C, D, B, A 4) C, D, A, B

A and B are two independent events of a sample space such that P(A)=0.2, P(B)=0.5.

4)

| List I | | | List | II |
|---|-------------------------------------|---|--|---------------------------------|
| A) P(B/ B) P(A/ C) P(A D) P(A The correct mat | (A) (B) ∩ B) ∪ B) ch is | | I) (II) (III) (IV) (V) (|).2).1).3).6).5 |
| 1) | А | В | С | D |
| | IV | V | III | Ι |
| 2) | А | В | С | D |

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| | V | Ι | II | IV |
|----|-----|---|----|----|
| 3) | А | В | С | D |
| | III | Ι | II | IV |
| 4) | А | В | С | D |
| | II | Ι | IV | V |

5) The line ax + by + c = 0 is a normal to the circle $x^2 + y^2 + 4x + 6y + 8 = 0$ if and only if

(1) 2a + 3b = c (2) 3a + 2b = c (3) 2a + 3b + c = 0 (4) 3a + 2b + c = 0

6)
$$\begin{vmatrix} al & bm & cn \\ l^2 & m^2 & n^2 \\ 1 & 1 & 1 \end{vmatrix} = \Delta_1 \text{ and } \begin{vmatrix} a & b & c \\ l & m & n \\ mn & ln & lm \end{vmatrix} = \Delta_2 \text{ then}$$

(1) $\Delta_1 = \Delta_2$ (2) $\Delta_1 = 2\Delta_2$ (3) $2\Delta_1 = \Delta_2$ (4) $\Delta_1 + \Delta_2 = 0$

7) If \bar{a} is a non-zero vector and \bar{b} , \bar{c} are two vectors such that $\bar{a} X \bar{b} = \bar{a} X \bar{c}$ and $\bar{a} \cdot \bar{b} = \bar{a} \cdot \bar{c}$ then 1) $\bar{b} - \bar{c}$ is collinear with \bar{a} 2) $\bar{b} - \bar{c}$ is perpendicular with \bar{a} 3) $\bar{b} = \bar{c}$ 4) $\bar{b} \neq \bar{c}$

8) If L₁: 2x + 3y - 20 = 0, L₂: 2x + 3y - 14 = 0, then the straight line represented by a(2x + 3y - 20) + b(2x + 3y - 14) = 0 is

- 1) Parallel to $L_1=0$ and $L_2=0$.
- 2) Perpendicular to $L_1=0$ and parallel to $L_2=0$
- 3) Perpendicular to $L_1 = 0$ and $L_2 = 0$
- 4) Parallel to $L_1 = 0$ and Perpendicular to $L_2 = 0$

9) The interval in which $f(x) = x^n (x>0)$ is increasing in

1) (0, 1/e) 2) $(1/e, \infty)$ 3) $(-\infty, 1/e)$ 4) (-1/e, 1/e)

10) If f:
$$R \rightarrow R$$
 is such that $f(x+y) = f(x) + f(y)$ and f is continuous at a point $a \in R$ then

1) f is discontinuous function on R

- 2) f is increasing function on R
- 3) f is continuous on R
- 4) f is decreasing on R

MODEL QUESTIONS – PHYSICS

 A particle performs simple harmonic motion with amplitude A and time period T. The mean velocity of the particle over the time interval during which it travels a distance of A/2 starting from extreme position.

1) A/T 2) 2A/T 3) 3A/T 4) A/2T

2. When a battery connected across a resistor of 16 Ω , the voltage across the resistor is 12V. When same battery is connected across a resistor of 10 Ω voltage across it is 11V. The internal resistance of the battery

1)
$$10/7\Omega$$
 2) $20/7\Omega$ 3) $25/7\Omega$ 4) $30/7\Omega$

3. Assertion (A): A given force applied in turn to a number of different masses may cause the same rate of change in momentum in each, but not same acceleration to all.

Reason (R): For particles $\mathbf{F} = \frac{dp}{dt}$ and $\mathbf{F} = \mathbf{ma}$ where the symbols have their usual meanings.

- 1) (A) is true & (R) is true and R is the correct explanation of (A)
- 2) (A) is true & (R) is true and R is not the correct explanation of (A)
- 3) (A) is true & (R) is false
- 4) (A) is false & (R) is true
- 4. Statement(A): A particle can have zero displacement and nonzero average velocity.

Statement (B): A particle can have zero acceleration and nonzero velocity

Statement (C): A particle can have zero velocity and non-zero acceleration.

| 1) | A, B and C True | 2) A and B True, C False |
|----|--------------------------|--------------------------|
| 2) | 3) B and C True, A False | 4) A, B and C False. |

5. Match the following:

In the experimental study of photoelectric effect:

| Column-I | Column-II |
|---|--|
| A. Intensity of incident light changes | I. Maximum K.E of photoelectrons changes |
| B. Frequency of incident light changes | II. Stopping potential changes |
| C. Target material changes | III . Saturation current changes. |

| 1. | A-III, | B-I,II | C-I,II |
|----|--------|----------|--------|
| 2. | A-II, | B-I,III | C-I,II |
| 3. | A-III, | B-III,II | C-I,II |
| 4. | A-I, | B-I,II | C-I,II |

MODEL QUESTIONS – CHEMISTRY

| 1. | Half-life of a first order reaction is 15min. The time required for completion of 87.5% of the reaction is | | | | | |
|----|--|---|--|--|--|--|
| | (1) 15 min | (2) 30 min | (3) 60 mi | n | (4) 45 min | |
| 2. | Arrange the followin I) $C_2H_5NH_2$ | ng in increasing o II) C ₆ H ₅ NH ₂ | order of their basi III) C ₆ H ₅ | c strength. CH ₂ NH ₂ | IV) (C ₂ H ₅) ₂ NH | |
| | (1) $I < II < IV < III$ (3) $I < IV < III < II$ | (2) II < (4) IV | : III < I < IV < I < III < II | | | |
| 3. | Which of the follow | Which of the following has least electron gain enthalpy? | | | | |
| | (1) Sulphur | (2) Chlorine | (3) Fluorine | (4) Oxyge | en | |
| 4. | Assertion (A): H_2O is liquid and H_2S is gas at room temperature Reason (R) : Molecules of H_2O are highly associated through hydrogen bonding The correct answer is: | | | | | |
| | (1) Both (A) and (R) are true and (R) is the correct explanation of (A) (2) Both (A) and (R) are true and (R) is not the correct explanation of (A) (3) (A) is true but (R) is false (4) (A) is false but (R) is true | | | | | |
| 5 | . Match the following | : | | | | |
| | LIST I (Crystal Sys | stem) | LIST II (Axial | Angle) | | |
| | (A) Cubic | | (I) $\alpha = \beta = 90^{\circ}$ | ; | | |
| | (B) Hexagonal | | (II) $\alpha \neq \beta \neq \gamma \neq \beta$ | 90° | | |
| | (C) Monoclinic | | (III) $\alpha = \beta = \gamma \neq$ | 90° | | |
| | (D) Triclinic | | (IV) $\alpha = \gamma = 90^{\circ}$ (V) $\alpha = \beta = \gamma =$ | ; β≠90° 90° | | |
| | The correct match is: | | | | | |
| | (1) | A B | С | D | | |

| <i>j</i> | | | | |
|----------|-------|-----------------------------|-------------------------------------|--|
| | (I) | $\alpha = \beta = 9$ | $90^{\circ}; \gamma = 12$ | |
| | (II) | $\alpha\neq\beta\neq\gamma$ | ≠ 90° | |
| | (III) |) $\alpha = \beta = \gamma$ | ′ ≠ 90° | |
| | (IV |) $\alpha = \gamma = 9$ | $00^{\circ}; \beta \neq 90^{\circ}$ | |
| | (V) | $\alpha = \beta = \gamma$ | ′ = 90° | |
| | В | С | D | |
| | Ι | III | IV | |
| | В | С | D | |

V Ι II IV (3) В С D А V Ι IV II (4) В С D А IV Π V III

V

А

(2)
