

<b>Test ID</b>					
<b>Student ID</b>					

**Time: 45 Minutes**

**Maximum Marks: 96**

**Important Instructions**

1. The test is of **45 minutes** duration.
2. The Test consists of **18** questions. The maximum marks are **72**.
3. There are three parts in the question paper. The distribution of marks subject wise in each part is as under for each correct response.

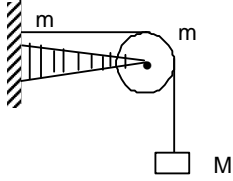
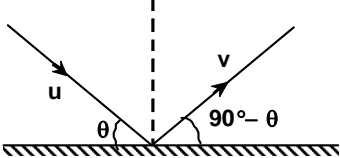
**Part A – Physics (32 marks)** – Questions No. 1 to 3 and 6 consist of **FOUR (4)** marks each and Questions No. 4 and 5 consist of **EIGHT (8)** marks each for each correct response.

**Part B – Math (32 marks)** – Questions No. 7 to 9 and 12 consist of **FOUR (4)** marks each and Questions No. 10 and 11 consist of **EIGHT (8)** marks each for each correct response.

**Part C – Chemistry (32 marks)** – Questions No.13 to 15 and 18 consist of **FOUR (4)** marks each and Questions No. 16 and 17 consist of **EIGHT (8)** marks each for each correct response.

4. Candidates will be awarded marks as stated above in Instruction No. 3 for correct response of each question.  $\frac{1}{4}$  (one fourth) marks will be deducted for indicating incorrect response of each question. No. **deduction** from the total score will be made if no response is indicated for an item in the Answer Sheet.

**Part 1 (Physics)**

- Refer to above figure. If  $L$  is varying so that resonance took place then power factor of the circuit and supply voltage will be equal to  
 (A) 1,40 V                      (B) 0,40 V                      (C) 1,30 V                      (D) 0,30 V
  - A light string going over a clamped pulley of mass  $m$  supports a block of mass  $M$  as shown in the figure. The force on the pulley by the clamp is given by  
 (A)  $\sqrt{2}Mg$                       (B)  $\sqrt{2}mg$   
 (C)  $g\sqrt{(M+m)^2 + m^2}$                       (D)  $g\sqrt{(M+m)^2 + M^2}$
- 
- A point charge having charge  $q$  and mass  $m$  is held at a distance  $r$  from a long string of charge per unit length. If the particle is released, the velocity of the charged particle when it reaches a distance  $2r$  from the string is  
 (A)  $\sqrt{\frac{\lambda q}{\pi \epsilon_0 m}}$                       (B)  $\sqrt{\frac{\lambda q}{2\pi \epsilon_0 m}}$                       (C)  $\sqrt{\frac{\lambda q \ln 2}{\pi \epsilon_0 m}}$                       (D)  $\sqrt{\frac{\lambda q}{\pi \epsilon_0 m \ln 2}}$
  - A uniform wire of resistance is  $30 \Omega$  is shaped into a regular hexagon. The equivalent resistance between any two corners can have  
 (A) the minimum value is 4.2 ohm and maximum value is  $7.5 \Omega$   
 (B) the minimum value is 6 ohm and maximum value is  $9 \Omega$   
 (C) the maximum value is 9 ohm and minimum value is  $4 \Omega$   
 (D) the maximum value is 6 ohm and minimum value is  $4 \Omega$
  - At what angle  $\theta$  must a ball strike a horizontal surface so that after the impact its direction of motion is perpendicular to the direction of incidence? Assuming that friction is absent and  $e =$  coefficient of restitution  
 (A)  $\sin^{-1}\left(\frac{e}{1+e}\right)$                       (B)  $\tan^{-1}\sqrt{\frac{1+e}{e}}$   
 (C)  $\tan^{-1}\sqrt{\frac{1}{e}}$                       (D)  $\tan^{-1}\left(\frac{1}{e}\right)$
- 
- A disc having mass  $m$  and radius  $r$  is given a linear velocity  $v_0$  at centre along  $x$ -axis. Simultaneously if it is given that angular velocity is  $2v_0/r$  anticlockwise and gently kept on horizontal frictional surface will it perform pure rolling, choose correct answer.  
 (A) yes.                      (B) No.                      (C) Data insufficient.                      (D) can not say.



**Part 3 (Chemistry)**

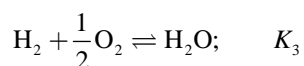
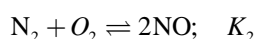
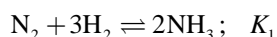
13. Which of the following has all four type of major chemical bonds, viz., ionic bond, covalent bond, coordinate bond and hydrogen bond?

- (A)  $\text{NH}_4\text{Cl}$                       (B)  $\text{NH}_2-\overset{+}{\text{N}}\text{H}_3$                       (C)  $\text{NaOH}$                       (D)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

14. If the heats of neutralisation of  $\text{HCl}$  and  $\text{HCN}$  with  $\text{NaOH}$  are  $-56 \text{ kJ}$  and  $-12 \text{ kJ}$  respectively, the enthalpy of ionisation of  $\text{HCN}$  is :

- (A)  $-44 \text{ kJ}$                       (B)  $+44 \text{ kJ}$                       (C)  $78 \text{ kJ}$                       (D)  $-78 \text{ kJ}$

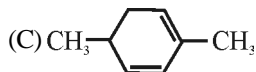
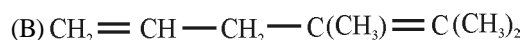
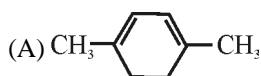
15. The following equilibrium constants are given



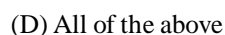
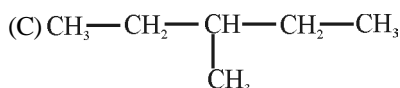
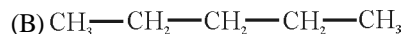
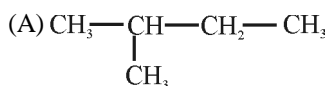
The equilibrium constant for the oxidation of  $\text{NH}_3$  by oxygen to give  $\text{NO}$  is :

- (A)  $\frac{K_2 K_3^2}{K_1}$                       (B)  $\frac{K_2^2 K_3}{K_1}$                       (C)  $\frac{K_1 K_2}{K_3}$                       (D)  $\frac{K_2 K_3^3}{K_1}$

16.  $\text{C}_8\text{H}_{12}$  on ozonolysis followed by hydrolysis in the presence of  $\text{Zn}$ , produces one mole of each of  $\text{HCHO}$ ,  $\text{CH}_3-\text{CO}-\text{CH}_3$  and  $\text{OCH}-\text{CH}_2-\text{CO}-\text{CH}_3$ . The compound is :



17. Which of the following will give six isomers in all after monochlorination ?



18. The edge length of face centred unit cubic cell is  $508 \text{ pm}$ . If the radius of the cation is  $110 \text{ pm}$ , the radius of anion is :

- (A)  $110 \text{ pm}$                       (B)  $249 \text{ pm}$                       (C)  $618 \text{ pm}$                       (D)  $398 \text{ pm}$

\*\*\*\*\*End of the paper\*\*\*\*\*