

AIEEE Sample paper-2

Test ID			
Student ID			

Maximum Marks: 96

Time: 45 Minutes

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)

- 1. 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
- 2. 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)
$$\sqrt{2} \text{ Mg}$$

(B) $\sqrt{2} \text{ mg}$
(C) $g \sqrt{(M+m)^2 + m^2}$
(D) $g \sqrt{(M+m)^2 + M^2}$

3. 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)
$$\sqrt{\frac{\lambda q}{\pi \varepsilon_0 m}}$$
 (B) $\sqrt{\frac{\lambda q}{2\pi \varepsilon_0 m}}$ (C) $\sqrt{\frac{\lambda q \ln 2}{\pi \varepsilon_0 m}}$ (D) $\sqrt{\frac{\lambda q}{\pi \varepsilon_0 m \ln 2}}$

4. A uniform wire of resistance is 30Ω 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 Ω

- (B) the minimum value is 6 ohm and maximum value is 9 Ω
- (C) the maximum value is 9 ohm and minimum value is 4 Ω
- (D) the maximum value is 6 ohm and minimum value is 4 Ω
- 5. At what angle θ 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) $\tan^{-1}\left(\frac{1}{e}\right)$

- 6. 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 2 (Mathematics)

7. If $1.2^{0} + 2.2^{1} + 3.2^{2} + 4.2^{3} + ... + 100.2^{99} = m.2^{n} + t$, where *m*, *n*, *t* are positive integers with gcd = 1, then the value of m + n + t =

(A) 199 (B) 200 (C) 201 (D) 202
n is natural number such that
$$\int_{0}^{\frac{\pi}{2n}} \frac{1}{(\tan nx)^{n} + 1} dx = \frac{\pi}{12}$$
. Hence $n =$
(A) 1 (B) 3 (C) 2 (D) 4

For Q.9 and Q.10

8.

This section contains two questions. Each question consists of two statements, an Assertion (A) and Reason(R). Select your option to each question according to the following code :

- $(A) \qquad Both \ A \ and \ R \ are \ true, \ and \ R \ is \ a \ correct \ explanation \ of \ A$
- $(B) \qquad Both A and R are true, but R is not a correct explanation of A \\$
- (C) A is true and R is false
- (D) A is false and R is true.
- 9. Let $f: \mathbb{R} \to \mathbb{R}$ be the function f(x) = (|x+1|+1)(x-3).
 - (A) : f has exactly one relative minima and exactly one relative maxima
 - (R) : The graph of y = f(x) intersects the x-axis at only one point.

10. Let
$$S_N = \sum_{n=2}^{N} \frac{1}{n^3 - n}$$

(A) : $\lim_{N\to\infty} S_N = \frac{1}{4}$

(R) :
$$S_{N} = \frac{1}{2} \left(\frac{1}{1.2} - \frac{1}{N(N+1)} \right)$$

- **11.** 1, $\alpha_1, \alpha_2, \dots, \alpha_9$ are the 10th roots of unity. The product $-(2\alpha_1 + 1)(2\alpha_2 + 1)\dots(2\alpha_9 + 1)$ equals a reduced rational number $\frac{m}{n}$. The value of m + n is (A) 341 (B) 342 (C) 340 (D) none of these
- 12. The tangent at a point P(θ), $\pi < \theta < \frac{3\pi}{2}$, which lies on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, is intercepted by the principal axes at A and B. If P *bisects* AB, then θ equals
 - (A) $\frac{7\pi}{6}$ (B) $\frac{5\pi}{4}$ (C) $\frac{4\pi}{3}$ (D) none of these



Part 3 (Chemistry)

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

(A)
$$NH_4Cl$$
 (B) $NH_2 - NH_3$ (C) $NaOH$ (D) $CuSO_4.5H_2O$

14. If the heats of neutralisation of HCl and HCN with NaOH are – 56 kJ and – 12kJ respectively, the enthalpy of ionisation of HCN is :

(A)
$$-44kJ$$
 (B) $+44kJ$ (C) $78kJ$ (D) $-78kJ$

15. The following equilibrium constants are given

$$N_2 + 3H_2 \rightleftharpoons 2NH_3; K_1$$

$$N_2 + O_2 \Longrightarrow 2NO; K_2$$

$$H_2 + \frac{1}{2}O_2 \Longrightarrow H_2O; \qquad K_3$$

The equilbrium constant for the oxidation of NH₃ by oxygen to give 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. C_8H_{12} on ozonolysis followed by hydrolysis in the presence of Zn, produces one mole of each of HCHO, CH_3 —CO—CH₃ and OCH—CH₂—CO—CH₃. The compound is :

(A)
$$CH_3$$
 (B) $CH_2 = CH - CH_2 - C(CH_3) = C(CH_3)_2$
(C) CH_3 (D) $CH_2 = C(CH_3) - CH_2 - C(CH_3) = C(CH_3)_2$

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

(A)
$$CH_3 - CH_2 - CH_2 - CH_3$$

(B) $CH_3 - CH_2 - CH_2 - CH_2 - CH_3$
(C) $CH_3 - CH_2 - CH_2 - CH_3$
(D) All of the above

18. The edge length of face centred unit cubic cell is 508 pm. If the radius of the cation is 110 pm, the radius of anion is :(A) 110 pm(B) 249 pm(C) 618 pm(D) 398 pm

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