

# MELUHA INTERNATIONAL SCHOOL

HYDERABAD

SR  
Time: 3 Hours

JEE ADVANCE  
(IIT 2016 PAPER-2 MODEL – 54 BITS)

Date: 11-05-2020  
Max. Marks: 186

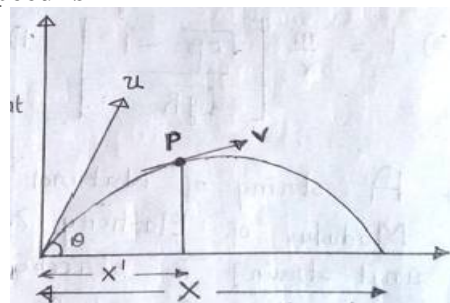
## PHYSICS

### SYLLABUS: - unit -4.

#### Section – 1 : (Maximum Marks : (18)

- This section contains **SIX** questions
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
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1. A cork three cm long is drawn slowly from the neck of a bottle , the force exerted at any instant being proportional to area of the cork in contact with the bottle. Find the work done in drawing the cork, assuming that and that the pull at the startinge is 48 dynes.  
A) 72 erg                      B) 144 erg                      C) 48 erg                      D) 216 erg
2. If 'R' radius of curvature at point p and  $\beta$  is angle of rotation of velocity vector during the time speed of projectile changes from u and v, then the component of acceleration which is responsible for change in speed is



- A)  $\frac{V}{RX} \left[ \frac{2 \sin^2 \theta (u^2 \times -2u^2 x^1)}{2u^2 \sin \beta \sin^2 \theta + g \times \cos \beta} \right]$                       B)  $\frac{V}{RX} \left[ \frac{2 \sin^2 \theta (u^2 \times +2u^2 x^1)}{2u^2 \sin \beta \sin^2 \theta + g \times \cos \beta} \right]$
- C)  $\frac{V}{RX} \left[ \frac{2 \sin^2 \theta (u^3 \times -2u^3 x^1)}{2u^2 \sin \beta \sin^2 \theta + g \times \cos \beta} \right]$                       D)  $\frac{V}{RX} \left[ \frac{2 \sin^3 \theta (u^2 \times -2u^2 x^1)}{2u^2 \sin \beta \sin^2 \theta + g \times \cos \beta} \right]$

3. An artificial satellite of the moon revolves in a circular orbit whose radius exceeds the radius of the moon " $\beta$ " times. In this process of motion , the satellite experience a slight resistance due to cosmic dust. Assuming the resistive force to depend on the velocity of the satellite as  $F=\alpha v^2$ , where  $\alpha$  is a constant. Find how long the satellite will stay in orbit until it falls on to the moon's surface

A)  $t = \frac{m}{\alpha} \left[ \frac{\sqrt{\beta} - 1}{\sqrt{rg}} \right]$                       B)  $t = \frac{m}{\alpha} \left[ \frac{\sqrt{\beta} - 1}{\sqrt{rg}} \right]$                       C)  $t = \frac{m}{\alpha} \left[ \frac{\sqrt{2\beta} - 1}{\sqrt{rg}} \right]$                       D)  $t = \frac{m}{\alpha} \sqrt{\frac{\beta}{rg}}$

4. A string of natural length  $2a$  and modulus of Elasticity  $\lambda$  [ $\lambda$  is a force per unit strain] is stretched between two fixed points A and B on a smooth horizontal table such that  $AB=3a$ . A mass of magnitude " $m$ " is attached to the mid point of the string and makes small oscillations in a horizontal line perpendicular to AB. The frequency of oscillation is

A)  $\frac{1}{\pi} \sqrt{\frac{\lambda}{am}}$       B)  $\frac{1}{2\pi} \sqrt{\frac{\lambda}{am}}$       C)  $\frac{1}{2\pi} \sqrt{\frac{\lambda}{3am}}$       D)  $\frac{1}{\pi} \sqrt{\frac{\lambda}{6am}}$

5. A rigid box contains one mole of a monoatomic ideal gas. The walls of the box have thermal conductivity  $K$ . Initially the gas is at a temperature  $T_0$  and pressure  $P_0$ . The temperature of the surrounding is  $\frac{1}{2}T_0$ . Then the pressure of the gas as a function of time is

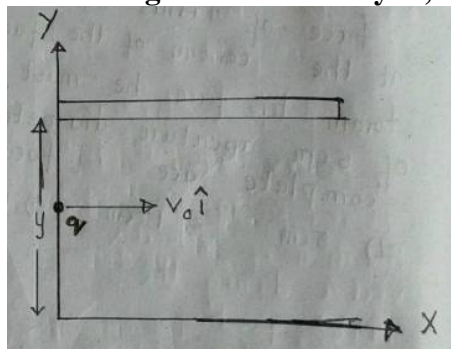
A)  $P = 2P_0 \left[ 1 + e^{\frac{-2kAt}{3dR}} \right]$       B)  $P = \frac{P_0}{2} \left[ 1 + e^{\frac{-2kAt}{3dR}} \right]$       C)  $P = 2P_0 \left[ 1 + e^{\frac{-2kAt}{3dR}} \right]$       D)  $P = \frac{P_0}{4} \left[ 1 + e^{\frac{-2kAt}{3dR}} \right]$

6. A one-eyed devil has a circular face of radius  $a_0 = 10\text{cm}$ . The eye is located at the centre of the face. At what distance from his face must he hold a convex mirror of  $5\text{cm}$  aperture diameter so as to see his complete face [focal length =  $10\text{cm}$ ]  
 A)  $5\text{cm}$       B)  $10\text{cm}$       C)  $15\text{cm}$       D)  $20\text{cm}$

**Section – 2 : (Maximum Marks : (3B))**

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- For example, if (A), (C) and (D) are all the correct options for a question, darkening all these three will result in +4 Marks; darkening only (A) and (D) will result in +2 marks and darkening (A) and (B) will result in -2 marks, as a wrong option is also darkened.

7. Suppose in an insulating Medium having dielectric constant  $K=1$ . Volume density of positive charge varies with  $y$ -coordinates according to law  $e=ay$ . A particle of mass  $m$  having positive charge  $q$  is placed in the medium at point  $(0, y_0)$  and projected with velocity  $\vec{v} = v_0 \hat{y}$  as shown in figure. Neglecting gravity and frictional resistance of the medium and assuming electric field strength to be zero at  $y=0$ , then



A) Electric field as a function of  $y$  is  $E = \frac{ay^2}{4E_0}$

B) Component of velocity along y-axis is  $v_y = \sqrt{\frac{q_a}{3\epsilon_0 m} [y^3 - y_0^3]}$

C) Net velocity of particle is given by  $v = \sqrt{v_0 + \frac{q_a}{3\epsilon_0 m} [y^2 - y_0^2]}$

D) Electric field as a function of y is  $E = \frac{ay^2}{3\epsilon_0}$

8. A parallel plate capacitor is located horizontally so that one of its plates is just submerged in to liquid while the other is over the surface . The permittivity of other is over the surface . The permittivity of the liquid is equal to k and its density is e. Then the height will the level of liquid rise after its plates get a charges of surface density is

A)  $h = \frac{\sigma_0^2 (k^2 - 1)}{\pi\epsilon_0 k^2 eg}$       B)  $h = \frac{\sigma_0^2 (k^2 - 1)}{2\epsilon_0 k^2 eg}$       C)  $h = \frac{\sigma_0^2 (k^2 - 1)}{4\epsilon_0 k^2 eg}$       D)  $h = \frac{\sigma_0^2 (k^2 - 1)}{2\epsilon_0 k^2 eg}$

9. A conducting Ming of mass m and radius R has charge 'Q' uniformly distributed over its circumference is placed on a rough surface of coefficient of friction.  $\mu$  A vertical magnetic field  $B = B_0 t^2$  tesla is switched on. The ring starts rotating about its natural axis after  $t=25$  on switching the field



A)  $\mu = \frac{2B_0 Rq}{mg}$       B)  $\mu = \frac{B_0 Rq}{mg}$

C) If magnetic field switched off at  $t=45$ , angular velocity of Ring after switching off field is  $\frac{B_0 q}{m}$

D) The angle rotated by the ring before coming to rest after switching off Magnetic field a  $t=4$  is  $\mu = \frac{B_0 q^2 R}{Pgm^2}$

10. A choke coil is needed o operate an are lamp at 160 V(rms ) and 50Hz . The are lamp has an effective resistance of 5  $\Omega$  when running at 10A (rms).

- A) The inductance of chocke coil is  $4.8 \times 10^{-2}$  H  
 B) If the same arc lamp is to be operated on 160V(dc), the additional resistance Required is 11 $\Omega$   
 C) Power consumed by the (A.C) circuit =1000w  
 D) Power consumed by the d.c circuit =1600w

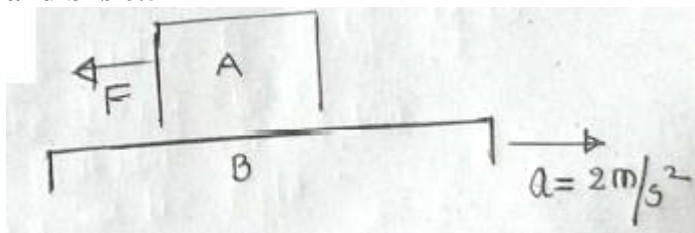
11. A 10m long wire carries a current of 2A.

- A) The specific charge of each electron in the wire is  $1.76 \times 10^{11}$  c/kg<sup>2</sup>  
 B) the acceleration of m w.r.t. ground is zero  
 C) The momentum of all charges responsible for flow all charges responsible for flow of current is  $11.37 \times 10^{-11}$  kgm/s  
 D) Momentum of charges depends upon area of cross-section of wire

12. A water drop of radius 1cm is broken up in to tiny droplets of water each of radius 1mm. surface tension of water is  $7 \times 10^{-2}$  N/m. Assume iso thermal conditions

- A) The number of tiny drops formed will be 1000    B) Surface energy decreases  
 C) Work is done by surface tension  
 D)work done by external agency is  $79.17 \times 10^{-9}$  J

13. Mass of block A=15kg and mass of block B which is accelerating is 10kg friction between A and b is 0.5



- A) If  $F=10\text{N}$  , then the block “A” is moving relative to ground with an acceleration  $a=2\text{m/s}$   
 B) If  $F=15\text{N}$  , then the block “A” is ready to slip relative to contact surface  
 C) If  $F=19\text{N}$  , then the block “A” is slipping relative to block B  
 D) Friction between A and B is zero
14. Choose the correct options
- A) If displacement is zero , then work done by a force is always zero  
 B) law of conservation of energy can be proved  
 C) Kinetic energy is a function of velocity if mass is constant  
 D) Uniform circular motion is an example of non uniform motion

**Section – 3 : (Maximum Marks : (1B))**

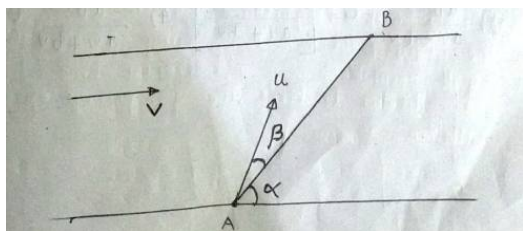
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**Passage – 1**

A ferry boat travels between two points A and B on the banks of a river as shown and always following the Line AB. The distance S between points A and B is 1200m . The velocity of the river current  $V=1.9\text{m/s}$  is constant over the entire width of the water . the line AB makes an angle  $\alpha=60^\circ$  with the direction of the current . The ferry boat move to cover the distance AB and back in a time =5 minutes. The angle  $\beta$  remains the same during the passage from A to B and from B to A 3.

15. The magnitude of velocity u is  
 A) 8.3m/s                      B) 7.3m/s                      C) 6.3m/s                      D) 5.3m/s

16. The angle  $\beta$  is



- A)  $\beta = \sin^{-1} [0.178]$     B)  $\beta = \sin^{-1} [0.978]$     C)  $\beta = \sin^{-1} [0.678]$     D)  $\beta = \sin^{-1} [0.578]$

Passage – 2

Two points P and Q are describing coplanar concentric circle of radii a and b with uniform speeds u and v in the same way round the center O. P is in circle of radius a and Q is in circle of radius b with  $a < b$ . Angle POQ is  $\theta$ .

17. The angular velocity of either point relative to the other vanishes when

A)  $\cos \theta = \frac{au - bv}{av - bu}$     B)  $\cos \theta = \frac{au + bv}{av - bu}$     C)  $\cos \theta = \frac{au - bv}{av + bu}$     D)  $\cos \theta = \frac{au + bv}{av + bu}$

18. IF initially the points be collinear with the centre on the same side of it, and if the angular velocity of Q be greater than that of P, then Relative velocity vanishes after time

A)  $\frac{ab}{av - bv} \cos^{-1} \left[ \frac{au - bv}{av - bu} \right]$     B)  $\frac{ab}{av - bv} \cos^{-1} \left[ \frac{au + bv}{av + bu} \right]$   
 C)  $\frac{ab}{av - bv} \cos^{-1} \left[ \frac{av + bu}{au + bv} \right]$     D)  $\frac{ab}{av + bv} \cos^{-1} \left[ \frac{av + bu}{au + bv} \right]$

**CHEMISTRY**

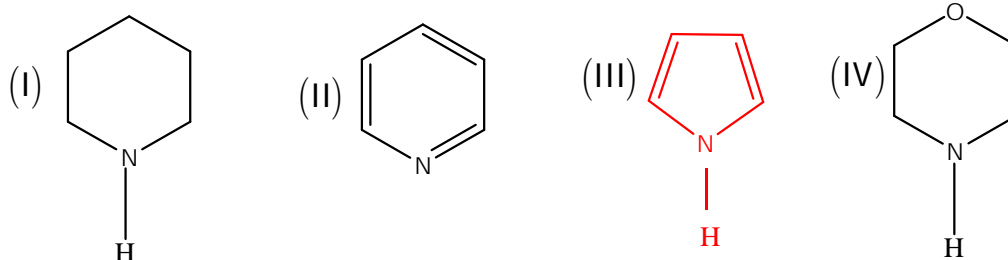
**Syllabus: TOTAL FIRST YEAR, SECOND YEAR INORGANIC AND PHYSICAL.**

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19. 42 gm of iron metal reacts with excess of HCl acid at 25°C. The work done by the hydrogen gas is  
 A) 21.86 Kcal    B) 1.86 KJ    C) 2.86KJ    D) 3.86KJ

20. In the following compounds the order of basicity is



- A) I > IV > II > III    B) II > I > IV > III  
 C) III > I > IV > II    D) IV > I > III > II

21.  $NH_4Cl$  crystallizes in a body centred cubic lattice with edge length of unit cell equal to 387 pm. If the radius of the  $Cl^-$  ion is 181 pm, radius for  $NH_4^+$  ion is

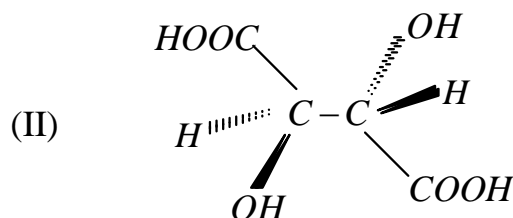
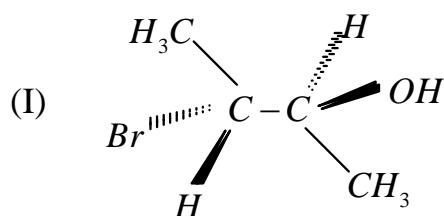
- A) 154.1 pm    B) 92.6 pm    C) 366.3 pm    D) 206 pm

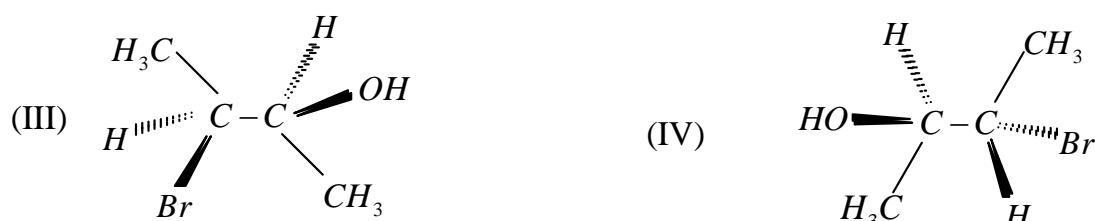
22. A substance 'A' decomposes in solution by following the first order kinetics. Flask I contains 1 L of 1 M of solution of 'A' and flask II contains 100 ml of 0.6 M solution of 'A'. After 8 hrs the concentration of 'A' in flask I become 0.25 M. What will be the time for concentration of 'A' in flask II to become 0.3 M?
- A) 2.0 hrs                      B) 8.0 hrs                      C) 4.0 hrs                      D) 6.0 hrs
23. The  ${}_{92}^{238}\text{U}$  disintegrates to give  $4\alpha$  and  $6\beta$  particles. The group number of the daughter element is \_\_\_\_\_
- A) 4                                  B) 5                                  C) 3                                  D) 6
24. 3.6 gram of oxygen is adsorbed on 1.2 g of metal powder. What volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 273 K?
- A)  $0.19 \text{ L g}^{-1}$                   B)  $1 \text{ L g}^{-1}$                       C)  $2.1 \text{ L g}^{-1}$                   D)  $3.1 \text{ L g}^{-1}$

**Section – 2 : (Maximum Marks : (3B))**

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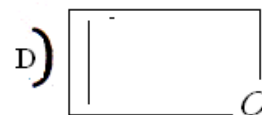
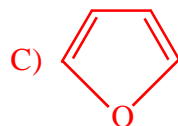
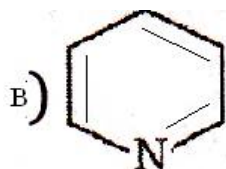
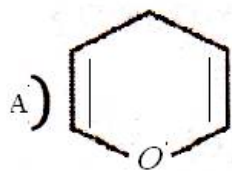
25. In the following structures



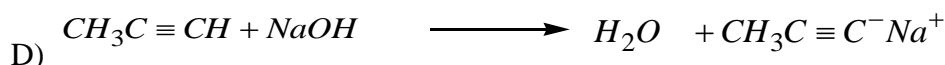
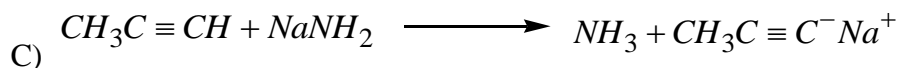
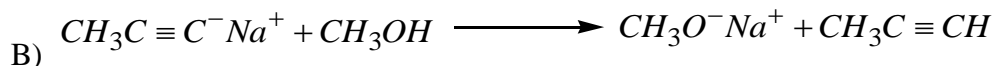


find the correct statements.

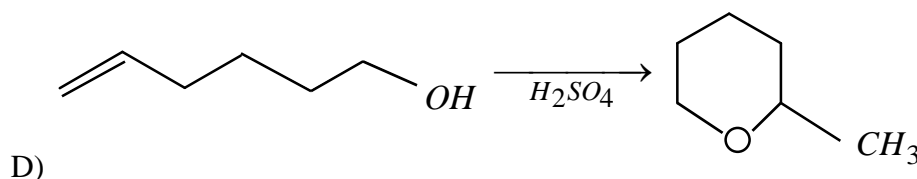
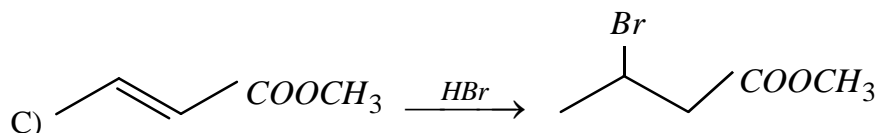
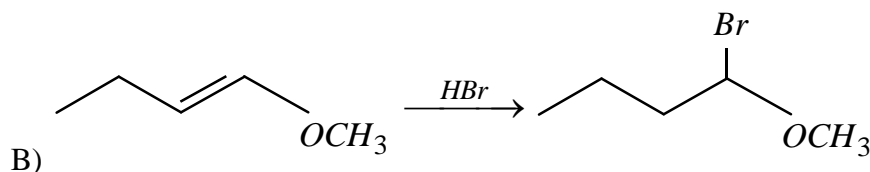
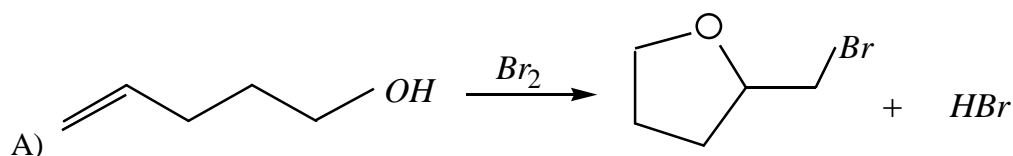
- A) Structure II is a meso compound  
 B) Structures I & III are diastereomers  
 C) Structures III & IV are diastereomers  
 D) Structures I & IV are enantiomers
26. Which of the following statement(s) is/ are correct ?  
 A) Ratio of wavelength of series limit of Paschen series to that of Brackett series for H atom is  $\frac{9}{16}$   
 B) All the photoelectrons emitted during photoelectric effect must have same kinetic energy  
 C) For 3p orbital, the number of radial nodes and the number of angular nodes is same and each is equal to 1  
 D) According to Bohr's model, frequency of revolution of an electron in an orbit  $\propto \frac{Z^2}{n^3}$
27. It is found that 0.1 M solution of three sodium salts NaX, NaY and NaZ have pH 7.0, 9.0 and 11.0 respectively. Which of the following statements is / are true?  
 A) NaY undergoes cationic hydrolysis  
 B) The relative order of acidic strength is  $HX > HY > HZ$   
 C)  $K_a$  of  $HZ = 10^{-9} M$  and that of  $HY = 10^{-5} M$   
 D) Solution with  $pH = 7$  does not undergo hydrolysis.
28. Identify the correct statement(s)  
 (A) Cu metal is extracted from its sulphide ore by reduction of  $Cu_2O$  with FeS.  
 (B) An ore of Tin containing  $FeWO_4$  is concentrated by magnetic separation method.  
 (C) Auto reduction process is used in the extraction of Cu & Hg from their sulphide ores  
 (D) Copper is refined by electrolysis
29.  $NH_3$  can be obtained by  
 (A) Heating of  $NH_4NO_3$  or  $NH_4NO_2$   
 (B) Heating of  $NH_4Cl$  or  $(NH_4)_2CO_3$   
 (C) Heating of  $NH_4NO_3$  with NaOH  
 (D) Reaction of AlN or  $Mg_3N_2$  or  $CaCN_2$  with  $H_2O$
30. Which of the following is aromatic?



31. Which of the following reactions does occur as shown (i.e., forward is favored)



32. Identify the correct chemical equations with respect to substance, reagent and product



**Section – 3 : (Maximum Marks : (1B))**

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### Paragraph for Questions 33 to 34

Solid  $\text{AgNO}_3$  is slowly added to a solution that is 0.0010 M each in NaCl, NaBr and NaI.

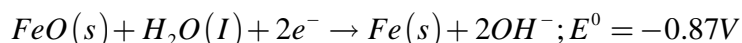
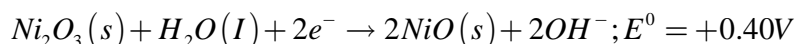
$K_{sp}$  for  $\text{AgI} = 1.5 \times 10^{-16}$ ,  $K_{sp}$  for  $\text{AgBr} = 3.3 \times 10^{-13}$ ,  $K_{sp}$  for  $\text{AgCl} = 1.8 \times 10^{-10}$

33. The concentration of  $\text{Ag}^+$  to initiate the precipitation of the silver chloride is
- A)  $[\text{Ag}^+] > 1.8 \times 10^{-7} \text{ M}$                       B)  $[\text{Ag}^+] > 1.5 \times 10^{-13} \text{ M}$   
C)  $[\text{Ag}^+] > 3.3 \times 10^{-10} \text{ M}$                       D)  $[\text{Ag}^+] < 1.8 \times 10^{-7} \text{ M}$
34. Percentage of  $\text{I}^-$  unprecipitated is when  $\text{AgBr}$  begins to precipitate is
- A) 99.955%                      B) 0.045 %                      C) 0.00083%                      D) 99.82%

### Passage-II:

#### Paragraph for Questions 35 and 36

The edison storage cell is represented as  $\text{Fe}(s) | \text{FeO}(s) | \text{KOH}(aq) | \text{Ni}_2\text{O}_3(s) | \text{NiO}(s)$ . The half cell reactions are



35. What is the cell reaction?
- A)  $\text{Ni}_2\text{O}_3(s) + \text{Fe}(s) \rightarrow 2\text{NiO}(s) + \text{FeO}(s)$   
B)  $2\text{NiO}(s) + \text{FeO}(s) \rightarrow \text{Ni}_2\text{O}_3(s) + \text{Fe}(s)$   
C)  $\text{Ni}_2\text{O}_3(s) + \text{FeO}(s) \rightarrow 2\text{NiO}(s) + \text{Fe}(s) + \text{O}_2$   
D) None of the above.
36. How does cell emf depends on increasing the concentration of KOH?
- A) Increases    B) decreases  
C) remains unaffected    D) none of these **MATHEMATICS**

### SYLLABUS: U T -4 TOTAL SYLLABUSES

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Negative Marks                      : -1    In all other cases.

37. If is given that complex numbers  $Z_1$  and  $Z_2$  satisfy  $|Z_1| = 2, |Z_2| = 3,$

$$\left| \frac{Z_1 + Z_2}{Z_1 - Z_2} \right| = \frac{\sqrt{n}}{7}$$

And the angle included between corresponding vectors is  $60^\circ$ . If

then  $n = \dots$  (where  $n \in \mathbb{N}$ )

- A) 126                      B) 119                      C) 133                      D) 19

38. If a, b, c are roots of the equation  $x^3 + 2x^2 + 1 = 0$ , then  $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = \text{-----}$
- A) 8                                  B) -8                                  C) 0                                  D) 2
39. In  $\Delta ABC$ , with usual notation, if  $\tan \frac{A}{2} \tan \frac{C}{2} = \frac{1}{3}$
- A) 2                                  B) 4                                  C) 3                                  D) 6
- 40) The common tangents to the circle  $x^2 + y^2 = 2$  and the  $y^2 = 8x$  Parabola touch the circle at the points P, Q and the parabola at the points R, S then the area of the quadrilateral PQRS is \_\_\_\_\_
- A) 3                                  B) 6                                  C) 9                                  D) 15
41.  $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (2 \cos x)^{17} dx = \text{_____}$
- A)  $\int_0^{\log(1+\sqrt{2})} 2(e^y + e^{-y})^{16} dy$                                   B)  $\int_0^{\log(1+\sqrt{2})} 2(e^y + e^{-y})^{17} dy$
- C)  $\int_0^{\log(1+\sqrt{2})} 2(e^y - e^{-y})^{17} dy$                                   D)  $\int_0^{\log(1+\sqrt{2})} 2(e^y - e^{-y}) dy$
42. The function  $y = f(x)$  is the solution of the differential equation  $\frac{dy}{dx} + \frac{xy}{x^2 - 1} = \frac{x^4 + 2x}{\sqrt{1 - x^2}}$  is  $(-1, 1)$  satisfying  $f(0) = 0$  then  $\int_{-\frac{\sqrt{3}}{2}}^{\frac{\sqrt{3}}{2}} f(x) dx = \text{_____}$  is
- A)  $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$                                   B)  $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$                                   C)  $\frac{\pi}{6} - \frac{\sqrt{3}}{4}$                                   D)  $\frac{\pi}{6} - \frac{\sqrt{3}}{2}$

**Section – 2 : (Maximum Marks : (3B))**

- This section contains **EIGHT** questions
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct.
- For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS.
- For each questions, marks will be awarded in one of the following categories :
 

Full Marks                   : +4 If only the bubble(s) corresponding to all the correct option(s) is(are) darkened.

Partial Marks               : +1 For darkening a bubble corresponding to **each correct option**, provided NO incorrect option is darkened.

Zero Marks                   : 0 If none of the bubbles is darkened.

Negative Marks             : -2 In all other cases.
- For example, if (A), (C) and (D) are all the correct options for a question, darkening all these three will result in +4 Marks; darkening only (A) and (D) will result in +2 marks and darkening (A) and (B) will result in -2 marks, as a wrong option is also darkened.

43. Let  $S_n$  be the sum to n-terms of the series  $\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \frac{9}{1^2 + 2^2 + 3^2 + 4^2} + \dots$ , then

A)  $S_5=5$                       2)  $S_{50}=\frac{100}{17}$                       3)  $S_{1001}=\frac{1001}{97}$                       4)  $S_{\infty}=6$

44. The number of ways in which 200 people can be divided into 100 couples is---

A)  $\frac{200!}{(2^{100})(100!)}$                       B)  $1 \times 3 \times 5 \times \dots \times 199$

C)  $\left(\frac{101}{2}\right)\left(\frac{102}{2}\right)\dots\left(\frac{200}{2}\right)$                       D)  $\frac{200!}{100!}$

45. Consider the polynomial  $f(x) = (x-1)(x-2)(x-3)\dots(x-10)$ , then

- A) Coefficient of  $x^9$  is -45                      B) Coefficient of  $x^8$  is 1320  
 C) Constant term is 10!                      D) Sum of all coefficient is "0"

46. The equation  $\sin^4 x + \cos^4 x + \sin 2x + k = 0$  must have real solutions if

A)  $k=0$                       B)  $|k| \leq \frac{1}{2}$                       C)  $-\frac{3}{2} \leq k \leq \frac{1}{2}$                       D)  $-\frac{1}{2} \leq k \leq \frac{3}{2}$

47. A circle S passes through the point (0,1) and is orthogonal to the circles  $(x-1)^2 + y^2 = 16$  and  $x^2 + y^2 = 1$ . Then

- A) Radius of S is 8                      B) Radius of S is 7  
 C) Centre of S is (-7,1)                      D) Centre of S is (-8,1)

48. For  $a \in R(a \neq -1)$

$$\lim_{x \rightarrow \infty} \frac{1^a + 2^a + \dots + n^a}{(n+1)^{a-1} [(na+1) + (na+2) + \dots + (na+n)]} = \frac{1}{60}$$
 . Then a=\_\_\_\_\_

A) 5                      B) 7                      C)  $-\frac{15}{2}$                       D)  $-\frac{17}{2}$

49. Two lines  $L_1 : x = 5, \frac{y}{3-\alpha} = \frac{z}{-2}$  and

$L_2 : x = \alpha, \frac{y-0}{-1} = \frac{z}{2-\alpha}$  are coplanar then  $\alpha =$ \_\_\_\_\_

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

50. The function  $f(x) = 2|x| + |x+2| - ||x+2| - 2|x||$  has a local minimum or a local maximum at  $x$  is equal to

A) -2                      B)  $-\frac{2}{3}$                       C) 2                      D)  $\frac{2}{3}$

**Section – 3 : (Maximum Marks : (1B))**

- This section contains **TWO** paragraphs.
- Based on each paragraph, there are **TWO** questions
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
- For each questions, marks will be awarded in one of the following categories :  
 Full Marks : +3 If only the bubble corresponding to the correct answer is darkened  
 Zero Marks : 0 In all other cases

**Passage I :**

A JEE aspirant estimates that she will be successful with a 60% chance if she studies 7 hours per day and with a 40% chance if she studies 4 hours per day. She further believes that she will study 10 hours, 7 hours, 4 hours per day with probability 0.1, 0.2 and 0.7 respectively.

51. The chance that she will be successful is

A) 0.28                      B) 0.38                      C) 0.48                      D) 0.58

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52. Given that she is successful , the chance that she studied for 4 hours is-----

A)  $\frac{5}{12}$

B)  $\frac{12}{13}$

C)  $\frac{9}{13}$

D)  $\frac{7}{12}$

**PASSAGE:**

The circle  $x^2 + y^2 - 8x = 0$  and hyperbola  $\frac{x^2}{9} - \frac{y^2}{9} = 1$  intersects at the points A and B.

53. Equation of a common tangent with positive slope to the circle as well as to the hyperbola is \_\_\_\_\_

A)  $2x - \sqrt{5}y - 20 = 0$

B)  $2x - \sqrt{5}y + 4 = 0$

C)  $3x - 4y + 8 = 0$

D)  $4x - 3y + 4 = 0$

54. Equation of the circle with AB as its diameter is \_\_\_\_\_

A)  $x^2 + y^2 - 12x + 24 = 0$

B)  $x^2 + y^2 + 12x + 24 = 0$

C)  $x^2 + y^2 + 24x - 12 = 0$

D)  $x^2 + y^2 - 24x - 12 = 0$