FIITJEE RET – 8

(2017 – 2019)(2ND YEAR_CHAMPIONS)

IIT-2014 (P1)

DATE: 27.08.2018

Time: 3 hours **Maximum Marks: 180**

INSTRUCTIONS:

A. General

1. This booklet is your Question Paper containing 60 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. Fill in the boxes provided for Name and Enrolment No.
4. The answer sheet, a machine-readable Objective Response (ORS), is provided separately.
5. DO NOT TAMPER WITH / MULTILATE THE ORS OR THE BOOKLET.

B. Filling in the OMR:

6. The instructions for the OMR sheet are given on the OMR itself.

C. Question paper format:

7. The question paper consists of **3 parts (Physics, Chemistry and Mathematics)**. Each part consists of **two sections**.
8. **Section I** contains **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE** are correct.
9. **Section II** contains **10 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).

D. Marking Scheme

10. For each question in **Section I**, you will be awarded **3 marks** if you darken ALL the bubble(s) corresponding to the correct answer(s) **ONLY**. In all other cases **zero (0) marks** will be awarded. **No negative marks** will be awarded for incorrect answers in this section.
11. For each question in **Section II**, you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY.** In all other cases **zero (0) marks** will be awarded. **No negative marks** will be awarded for incorrect answers in this section.

Don't write / mark your answers in this question booklet.
If you mark the answers in question booklet, you will not be allowed to continue the exam.

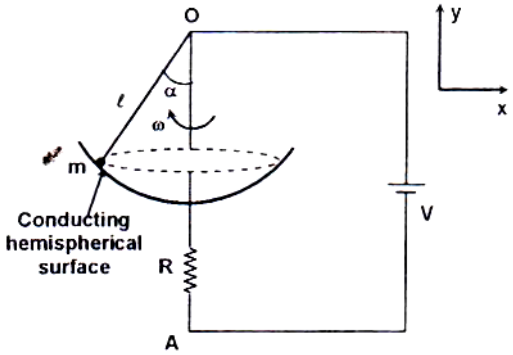
NAME: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ENROLLMENT NO.: ☐☐☐☐☐☐☐☐☐☐

PAPER–I
PART I: PHYSICS
SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

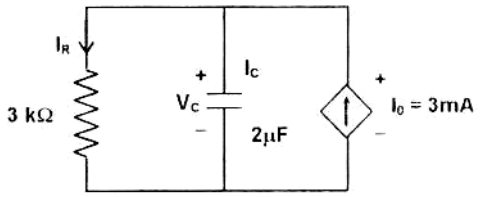
1. A pendulum has conducting bob of mass m and conducting string of length ℓ. Pendulum is rotating freely about vertical axis OA with uniform angular speed ω in uniform vertical magnetic field $\vec{B} = B\hat{j}$ such that bob always touches the smooth conducting hemi – spherical surface centred at O as shown in the figure. Choose the correct option(s) (given $\omega = 5$ rad/s, $\ell = 0.8$m, $g = 10$m/s^2, $B = 0.5$T)

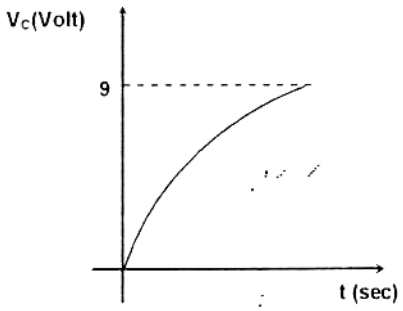


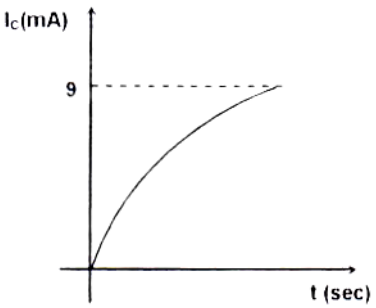
(A) $\sigma = 30^0$ (B) $\alpha = 60^0$

(C) $V = 0.60$ Volt (D) $V = 0.80$ Volt

2. Consider a circuit with constant current source of $I_0 = 3$mA with capacitor of 2μF and resistor R = 3 kΩ. At t= 0 the switch is closed. I_R and I_C denotes the current in the circuit in resistor branch and capacitor branch, and V_C represents potential difference across the capacitor. Choose the correct graph(s)







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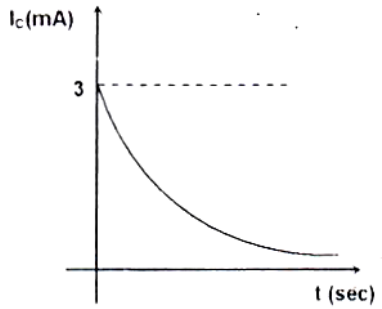
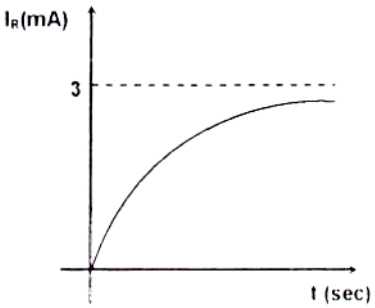
(A)



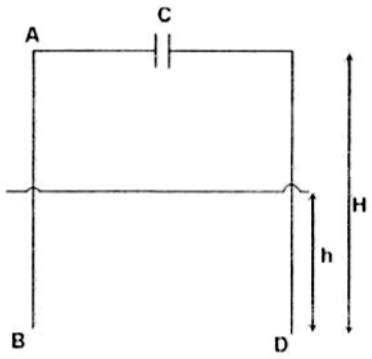
(B)



(C)

(D)

3. A conductor of length ℓ and mass m can slide without friction but with an ideal electrical contact along two vertical conductors AB and CD connected through a capacitor. Perpendicular to the plane of figure uniform magnetic field B is set up.



(A) The voltage across the capacitor as a function of h is $B\ell\sqrt{\frac{2g(H-h)}{1+\frac{CB^2\ell^2}{m}}}$

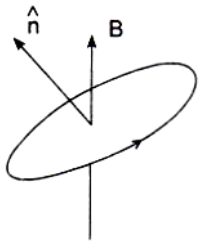
(B) The voltage across the capacitor as a function of h is zero

(C) If a resistance R is connected to the circuit instead of capacitor, the constant velocity is $\frac{mgR}{B^2\ell^2}$

(D) If a resistance R is connected to the circuit instead of capacitor, the constant velocity is $\frac{mgR}{2B^2\ell^2}$

Space for rough work

4. An electron in the ground state of hydrogen atom is revolving in anticlockwise direction in a circular orbit of radius R. The atom is placed in a uniform magnetic field $\vec{B}$ such that the plane normal of the electron orbit makes an angle of 30^0 with the magnetic induction . (The symbols have their usual meaning)



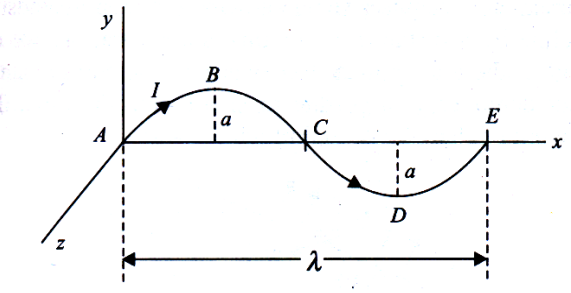
(A) The orbital magnetic dipole moment of the electron is $\frac{eh}{4\pi m_e}$

(B) The orbital magnetic dipole moment of the electron is $\frac{eh}{\pi m_e}$

(C) The torque experienced by the orbiting electron is $\frac{ehB}{8\pi m_e}$

(D) The torque experienced by the orbiting electron is $\frac{ehB}{4\pi m_e}$

5. A conductor ABCDE, shaped as $y = a\sin(2\pi x/\lambda)$ as shown, carries current I. It is placed in the x–y plane with the ends A and E on the x-axis. A uniform magnetic field of magnitude B exists in the region. The force acting on ABCDE will be



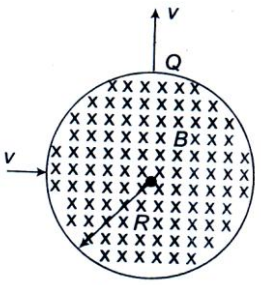
(A) zero, if B is in the x-direction

(B) λBI in the z-direction, if B is in the y–direction

(C) λBI in the negative y-direction, if B is in the z-direction

(D) λaBI, if B is in the x-direction

6. A particle of charge q and mass m enters normally (at point P) in a region of magnetic field with speed v. It comes out normally from Q after time T as shown in figure. The magnetic field B is present only in the region of radius R al is uniform. Initial and final velocities are along radial direction and they are perpendicular to each other. For this to happen, which of the following expression (s) is/are correct.

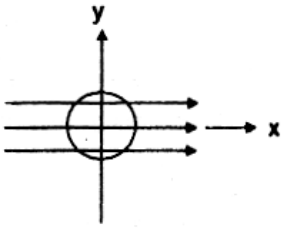


(A) $B = \frac{mv}{qR}$ (B) $T = \frac{\pi R}{2v}$

(C) $T = \frac{\pi m}{2qB}$ (D) none of these

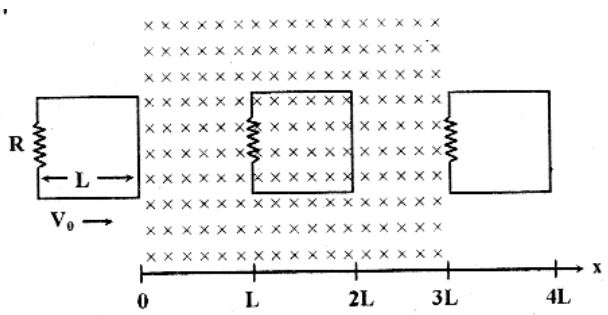
Space for rough work

7. A conducting loop of resistance R and radius r has its center at the origin of the co-ordinate system in a magnetic field of induction B. When it is rotated about Y – axis through 90^0, net charge flows in the coil is directly proportional to

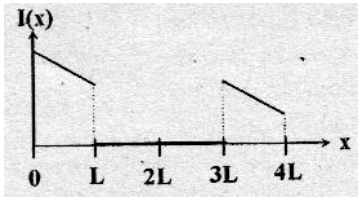


(A) **B** (B) **R**
(C) $\mathbf{r^2}$ **(D) r**

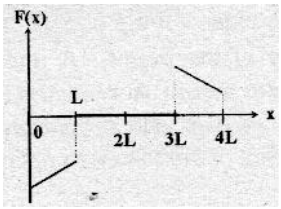
8. A rigid wire loop of square shape having side of length L and resistance R is moving along the x-axis with a constant velocity v_0 in the plane of the paper. At t= 0 the right edge of the loop enters a region of length 3 L where there is a uniform magnetic field B_0 into the plane of the paper, as shown in the figure. For sufficiently large v_0, the loop eventually crosses the region. Let x be the location of the right edge of the loop. Let v (x), I(x) and F (x) represent the velocity of the loop, current in the loop, and force on the loop, respectively, as a function of x. Counter – clockwise current is taken as positive



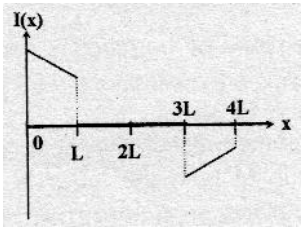
Which of the following schematic plots(s) is (are) correct ? (Ignore gravity)



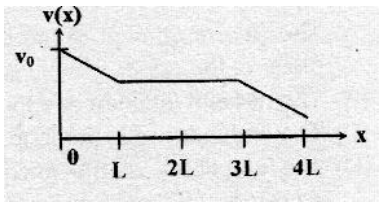
A



B

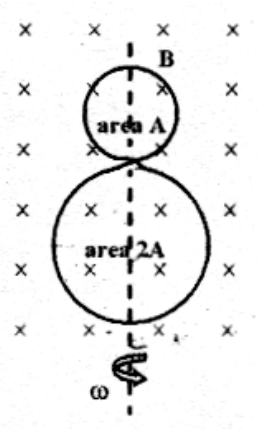


C



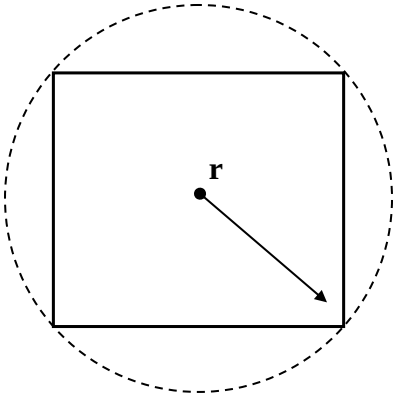
D

9. A circular insulated copper wire loop is twisted to form two loops of area A and 2 A as shown in the figure. At the point of crossing the wires remain electrically insulated from each other. The entire loop lies in the plane (of the paper). A uniform magnetic field $\vec{B}$ points into the plane of the paper. A uniform magnetic field $\vec{B}$ points into the plane of the paper. AT t=0, the loop starts rotating about the common diameter as axis with a constant angular velocity ω in the magnetic field. Which of the following options is / are correct ?



(A) The rate of change of the flux is maximum when the plane of the loops is perpendicular to plane of the paper.
(B) The net emf induced due to the both the loops is proportional to $\cos\omega t$
(C) The emf induced in the loop is proportional to the sun of the areas of the two loops
(D) the amplitude of the maximum net emf induced due to both the loops is equal to the amplitude of maximum emf induced in the smaller loop alone.

10. A square wire loop (non- conducting) with uniformly distributed charge q distribution and mass m is placed in a certain region. Now a uniform time – varying magnetic field, B perpendicular to the square loop's plane is switched on in a cylindrically symmetrical manner (centred at the circum- center of the square loop). The radius of the circum – circle is r. Pick the correct option(s) situation just after switching on the magnetic filed.



(A) Angular speed of the square loop is $\frac{qB}{2m}$

(B) Angualr speed of the square loop is $\frac{2qB}{m}$

(C) Kinetic energy of square loop will be $\frac{q^2B^2r^2}{24m}$

(D) Kinetic energy of square loop will be $\frac{q^2B^2r^2}{48m}$

Space for rough work

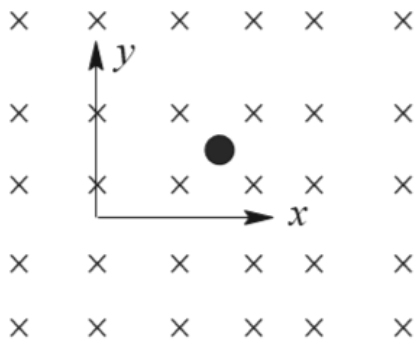
SECTION – II: (Integer value type)

This section contains **10 questions.** The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

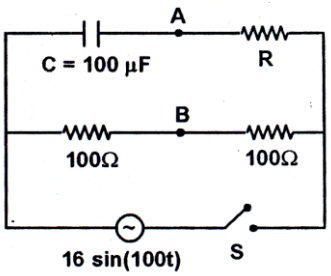
11. In a series LCR the voltage across resistance, capacitance and inductance is 10 V each. If the capacitance is short circuited, the voltage across the inductance will be: $x\sqrt{2}$ V. Find the value of ***x***.

12. A coil has a resistance of 10 2 and an inductance of 0.4 Henry. It is connected to an AC source of 6.5 V, $\frac{30}{\pi}$ Hz. The average power consumed in the circuit is $\frac{x}{8}$ w. Find the value of x.

13. A neutral particle at rest in a uniform magnetic field B as shown in figure. The particle then spontaneously decays into two fragments, one with a positive charge +q and mass 3 m and other with a negative charge –q and mass m. Neglecting the interaction between two charge particles and assuming speed is very much less than speed of light. The time (in μs) after the decay at which two fragments meet (for first time) is 250 x N. Find the value of N : (Neglect gravity)
(q=1 μc, B = 2πμT, m = 10^{-15} kg). Both charges have velocity in xy plane

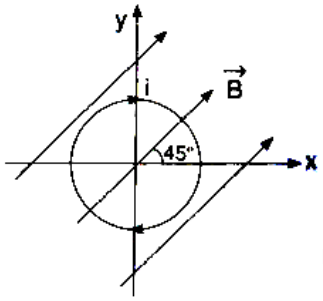


14. An uncharged capacitor C = 100 μF with a resistor R is connected with AC source as shown in the figure. If R is 50 Ω) and switch S is closed at t = 0, the maximum value of (V_A – V_B) is K volt. Calculate K.

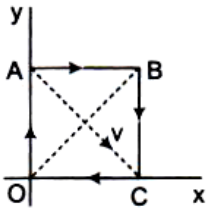


Space for rough work

15. A circular loop of a radius $R = \left(\frac{2}{\sqrt{\pi}}\right)$ m is placed in a uniform magnetic filed $\vec{B}$ = 1 T in x–y plane as shown in figure. The loop carries a current I = 1.0 A in the direction shown in figure. Find the magnitude of torque in Nm acting on the loop.



16. OABC is a current carrying square loop.An electron is projected from the centre of loop along its diagonal AC as shown. Unit vector in the direction of initial acceleration will be $-\left(\frac{\hat{i}+\hat{j}}{\sqrt{n}}\right)$, Find n.

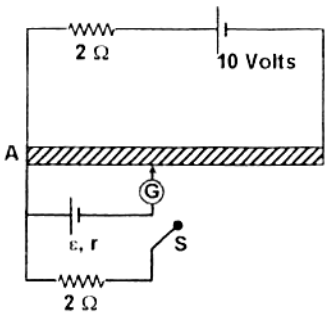


17. An alternating current having peak value 28A is used to heat a metal wire. To produce the same heating effect, a constant current I_0 = 5N Amp can be used. Find the value of N.

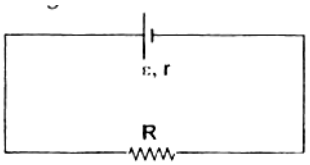
18. A current I flows through a thin cylinder of radius R along its length. If the pressure exerted on the cylinder due to the flow of current will be $\frac{\mu_0 I^2}{2K\pi^2R^2}$, Find the value of k.

Space for rough work

19. Circuit – 1 shows a potentiometer setup with length of potentiometer being 100 cm (given that potentiometer wire's resistance is 8Ω). Balance points are obtained with switch S opened and then closed, they are found at 50 cm and 25 cm respectively. Then, the unknown battery from circuit – 1 is used in circuit – 2 in order to deliver maximum possible power, to resistor R. The value of this maximum power will be x watt, find the integer value x.

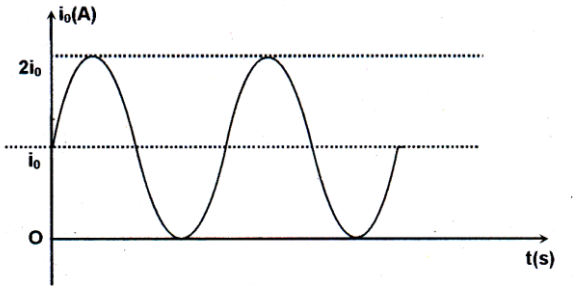


Circuit-1



Circuit-2

20. The current flowing in a wire fluctuates in a sinusoidal manner as described in the current (i) versus time (t) graph as shown in the diagram. The root mean square value of the current is $i_0\left(\frac{1}{\sqrt{X}}+1\right)^{1/Y}$ then X + Y =



Space for rough work

PART II: CHEMISTRY

SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

21. For a reaction $\frac{1}{2}A \rightarrow 2B$, rate of disappearance of 'A' is related to the rate of appearance of 'B' by the expression.

(A) $-\frac{d(A)}{dt} = \frac{1}{2}\frac{d(B)}{dt}$ (B) $-\frac{d(A)}{dt} = \frac{1}{4}\frac{d(B)}{dt}$

(C) $-2\frac{d(A)}{dt} = \frac{1}{2}\frac{d(B)}{dt}$ (D) $-\frac{1}{2}\frac{d[A]}{dt} = 2\frac{d(B)}{dt}$

22. Select the correct statement(s):

(A) the ionic crystal of Ag Br has Schottky defect

(B) the unit cell having crystal parameters, $a = b \neq c$, $\alpha = \beta = 90°$, $\gamma = 120°$ is hexagonal

(C) in ionic compounds having Frenkel defect the ratio r^+/r^- is high

(D) the coordination number of Na^+ ion in $NaCl$ is 6

23. For a reaction X $\rightarrow$ Y, the rate law is
Rate = $k[A]^{1/2}$ which of the following statements are correct

(A) Half life of the reaction is inversely proportion to the initial concentration.

(B) Half life of the reaction is directly proportional to the square root of the initial concentration.

(C) The rate constant of the reaction is constant at a particular temperature for this reaction.

(D) On increasing the concentration of the reactant 9 times ,the rate of reaction increases by 3 times

24. Which of the following can give carbylamine test ?

(A) $C_6H_5NH_2$ (B) $(CH_3)_2CHNH_2$ (C) $(CH_3)_2NH$ (D) CH_3NH_2

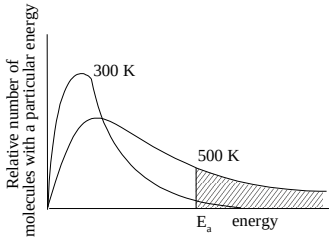
25. In the Hofmann bromamide degradation reaction, the number of moles of NaOH and Br_2 used per mole of amine produced are :

(A) One mole of NaOH and one mole of Br_2 (B) Four moles of NaOH and two moles of Br_2

(C) Two moles of NaOH and two moles of Br_2 (D) Four moles of NaOH and one mole of Br_2

Space for rough work

26. The distribution of molecular kinetic energy at two temperatures is as shown in the following graph.



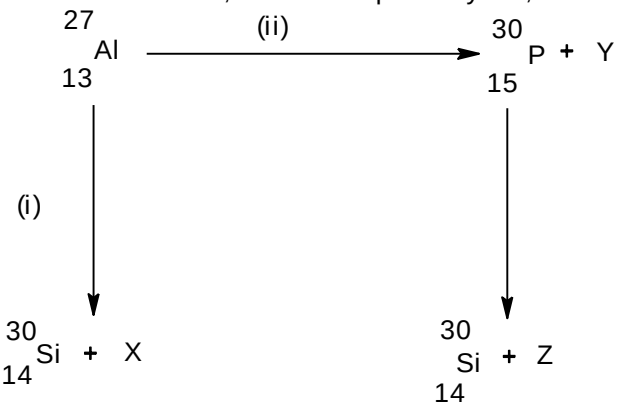
Which of the following conclusions are correct?
(A) The number of molecules with energy E_a or greater is proportional to the shaded area for each temperature
(B) The number of molecules with energy E_a or less is proportional to the shaded area for each temperature.
(C) The number of molecules with energy E_a is the mean of all temperatures
(D) The graph follows the Maxwell-Boltzmann energy distribution law.

27. In the nuclear transmutation

$${}^{9}_{4}Be + X \longrightarrow {}^{8}_{4}Be + Y$$

(X, Y) is (are)
(A) (γ, n) (B) (p, D) (C) (n, D) (D) (γ, p)

28. Bombardment of aluminium by α–particle leads to its artificial disintegration in two ways, (i) and (ii) as shown. Products X, Y and Z respectively are,



(A) proton, neutron, positron (B) neutron, positron, proton
(C) proton, positron, neutron (D) positron, proton, neutron

Space for rough work

29. Arrhenius equation is not applicable for
(A) Radioactive disintegration (B) first order reactions
(C) second order reactions (D) zero order reactions

30. Which of the following is/are true about schottky defect ?
(A) The number of missing cations and anions are equal
(B) No effect on density of substance
(C) It shown by ionic substances in which the cation & anion has large size difference.
(D) AgBr shows this effect.

SECTION – II: (Integer value type)

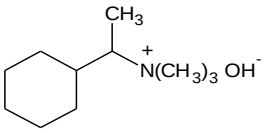
This section contains **10 questions.** The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

31. How many of the following amines reacts with HNO_2 to give yellow oily liquids ?

$Ph–NH_2$, $Ph-\ddot{N}H-CH_3$, $(CH_3)_2\ddot{N}H$, $C_2H_5\ddot{N}H_2$, $(C_2H_5)_2\ddot{N}H$, $(CH_3)_3\ddot{N}$, $Ph-CH_2-\ddot{N}H_2$,

$Ph-CH_2-\ddot{N}H-CH_3$, $H_3C-\ddot{N}H-C_2H_5$

32. The radius of Ag^+ ion is 126 pm while that of I^- ion is 216 pm. The co–ordination number of Ag in AgI is :

33. 

major hydrocarbon product is
'X'. number of hyperconjugable hydrogen atom in 'X' is?

34. The concentration of R in the reaction R → P was measured as a function of time and the following data is obtained :

[R] (molar)	1.0	0.75	0.40	0.10
t(min.)	0.0	0.05	0.12	0.18

The order of the reaction is

35. The number of neutrons emitted when $^{235}_{92}U$ undergoes controlled nuclear fission to $^{142}_{54}Xe$ and $^{90}_{38}Sr$ is

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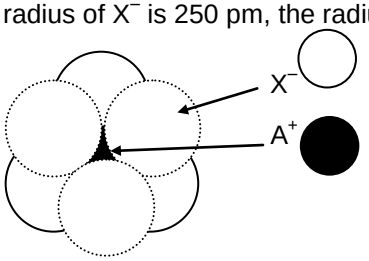
36. The arrangement of X^- ions around A^+ ion in solid AX is given in the figure (not drawn to scale). If the radius of X^- is 250 pm, the radius of A^+ is 26x, then 'x' is : (in pm)

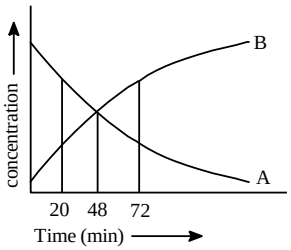


37. In HCP unit cell, an atom at the corner is shared by 'x' unit cells, then 'x' is

38. $^{238}_{92}U$ emits 'x' α–particles and 'y' β–particles. The resulting nucleide is $^{214}_{83}X$. Then the value of $(x+y) =$

39. The rate constant for the thermal decomposition of H_2O_2 aqueous solution is $3\times10^{-3}\,min^{-1}$. At what molar concentration of H_2O_2 the rate of the reaction will be 2 x 10^{-4} mol. L^{-1} sec^{-1}.

40. For a first order reaction nA $\rightarrow$ B whose concentration Vs time curve is as shown in the figure. If half life for the reaction is 24 minutes. Find out the value of n.



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PART III: MATHEMATICS

SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

41. The normal at a point P on the ellipse $x^2 + 4y^2 = 16$ meets the x-axis at Q. If M is the midpoint of the line segment PQ, then locus of M intersects the latus rectums of the given ellipse at the points

(A) $\left(\pm\frac{3\sqrt{5}}{7},\pm\frac{2}{7}\right)$ (B) $\left(\pm\frac{3\sqrt{5}}{2},\pm\frac{\sqrt{19}}{4}\right)$ (C) $\left(\pm2\sqrt{3},\pm\frac{1}{7}\right)$ (D) $\left(\pm2\sqrt{3},\pm\frac{4\sqrt{3}}{7}\right)$

42. $P(x_1, y_1)$ and $Q(x_2, y_2)$, $y_1 < 0$, $y_2 < 0$ be the end points of the latus rectum of the ellipse $x^2 + 4y^2 = 4$, the equations of the parabolas with latus rectum PQ are

(A) $x^2 + 2\sqrt{3}y = 3 + \sqrt{3}$ (B) $x^2 - 2\sqrt{3}y = 3 + \sqrt{3}$ (C) $x^2 + 2\sqrt{3}y = 3 - \sqrt{3}$ (D) $x^2 - 2\sqrt{3}y = 3 - \sqrt{3}$

43. If $\int\frac{\cos 8x - \cos 7x}{1+2\cos 5x}dx$ is expressed as K sin 3x + M sin 2x + c

(A) K = $-\frac{1}{3}$ (B) K = $\frac{1}{3}$ (C) M = $-\frac{1}{2}$ (D) M = $\frac{1}{2}$

44. The line x – y = 1 intersects the parabola $y^2 = 4x$ at A and B. Normals at A and B intersect at C. If D is the point other than A and B at which CD is normal to the parabola, then the coordinates of D are

(A) (4, 4) (B) (4, –4) (C) (1, 2) (D) (16, –8)

45. If two distinct chords of a parabola $y^2 = 4ax$ passing through (a, 2a) are bisected on the line x + y = 1, their length of latus rectum can be

(A) 1 (B) 2 (C) 3 (D) 5

46. If $I = \int\frac{\sin x + \sin^3 x}{\cos 2x}dx$ = A cos x + B log |f(x)| + c, then

(A) A = $\frac{1}{4}$, B = $\frac{-1}{\sqrt{2}}$ (B) f(x) = $\frac{\sqrt{2}\cos x - 1}{\sqrt{2}\cos x + 1}$ (C) A = $\frac{1}{2}$, B = $-\frac{3}{4\sqrt{2}}$ (D) f(x) = $\frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

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47. A straight line touches the rectangular hyperbola $9x^2 - 9y^2 = 8$ and the parabola $y^2 = 32x$, the equation of the line is
(A) $9x + 3y - 8 = 0$ (B) $9x - 3y + 8 = 0$ (C) $9x + 4y + 8 = 0$ (D) $9x - 4y - 8 = 0$

48. If m_1 and m_2 are the slopes of the tangents to the hyperbola $\frac{x^2}{25} - \frac{y^2}{16} = 1$, which passes through the point (6, 2), then
(A) $m_1 + m_2 = \frac{24}{11}$ (B) $m_1 m_2 = \frac{20}{11}$ (C) $m_1 + m_2 = \frac{48}{11}$ (D) $m_1 m_2 = \frac{11}{20}$

49. If $\int \frac{\sin x}{\sin(x-a)} dx = Ax + B \ln \sin (x - a) + c$, then
(A) $A = \sin \alpha$ (B) $B = \cos \alpha$ (C) $A = \cos \alpha$ (D) $B = \sin \alpha$

50. If the tangent at the point $\left(4\cos\theta, \frac{16}{\sqrt{11}}\sin\theta\right)$ to the ellipse $16x^2 + 11y^2 = 256$ is also a tangent to the circle $x^2 + y^2 - 2x = 15$, then θ is equal to
(A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$ (C) $-\frac{\pi}{3}$ (D) $\frac{5\pi}{3}$

SECTION – II: (Integer value type)

This section contains **10 questions.** The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

51. Tangents to the parabola at the extremities of a common chord AB of the circle $x^2 + y^2 = 5$ and the parabola $y^2 = 4x$ intersect at the point T. A square ABCD is constructed on this chord lying inside the parabola, then $\frac{(TC)^2 + (TD)^2}{16}$ is equal to

Space for rough work

52. If $I = \int \sec^2 x \operatorname{cosec}^4 x\, dx = K\cot^3 x + L\tan x - M\cot x + c$, then M is equal to

53. $\int \frac{\cos^2 x \sin x}{\sin x - \cos x}\, dx = \frac{A}{12}\log|\sin x - \cos x| + \frac{1}{8}(\sin 2x + \cos 2x) + c$, then A is equal to

54. The curves C_1: $y = x^2 - 3$, C_2: $y = Kx^2$, $k < 1$ intesect each other at two different points. The tangent drawn to C_2, at one of the points on intersection $A = (a, y_1)$ $(a > 0)$ meets C_1 again at $B(1, y_2)$ $(y_1 \neq y_2)$, then the value of a is

55. If F is one of the foci of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with 'O' as center. $\overline{AB}$ and $\overline{CD}$ are major & minor axes respectively. If OF = 6 and the diameter of incircle of ΔOCF is 2, then the value of a + b is

56. If the middle point of a chord of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ be $\left(\frac{1}{2}, \frac{2}{5}\right)$, then the length of the chord is $\frac{a}{b}\sqrt{41}$, then value of a – b is

57. From a point perpendicular tangents are drawn to ellipse $x^2 + 2y^2 = 2$. The chord of contact touches a circle which is concentric with given ellipse, then the ratio of maximum and minimum area of circle.

58. A tangent is drawn to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ to cut $\frac{x^2}{c^2} + \frac{y^2}{d^2} = 1$ at points P and Q. If tangent at P and Q to the ellipse $\frac{x^2}{c^2} + \frac{y^2}{d^2} = 1$ intersect at right angle, then $\frac{a^2}{c^2} + \frac{b^2}{d^2}$ is equal to

59. The locus of the middle points of chords of the hyperbola $3x^2 - 2y^2 + 4x - 6y = 0$ parallel to $y = 2x$ is $3x - 4y = k$, then the value of k is

60. From any point on the hyperbola S_1: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ tangents are drawn to the hyperbola S_2: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 2$, then the area of triangle formed by the corresponding chord and asymptotes of S_2 is Kab, then the value of K is

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FIITJEE RET – 8

(2017 – 2019)(2ND YEAR_CHAMPIONS)

IIT-2014 (P1)

DATE: 27.08.2018

ANSWERS

PHYSICS

1	**B,C**	2	**A, C,D**	3.	**A,C**	4.	**A,C**
5.	**A,B,C**	6.	**A,B,C**	7.	**A,C**	8.	**C,D**
9.	**A,D**	10.	**A**	11.	**5**	12.	**5**
13.	**3**	14.	**8**	15.	**4**	16.	**2**
17	4	18	**4**	19	**2**	20.	**6**

CHEMISTRY

21.	**BC**	22.	**ABD**	23.	**BCD**	24.	**ABD**
25.	**D**	26.	**AD**	27.	**AB**	28.	**A**
29.	**AD**	30.	**AD**	31.	**5**	32.	**6**
33.	**1**	34.	**0**	35.	**3**	36.	**4**
37.	**6**	38.	**9**	39.	**4**	40.	**3**

MATHEMATICS

41.	**C**	42.	**BC**	43.	**BC**	44.	**B**
45.	**ABC**	46.	**Bonus**	47.	**B**	48.	**AB**
49.	**CD**	50.	**ACD**	51.	**5**	52.	**2**
53.	**3**	54.	**3**	55.	**9**	56.	**2**
57.	**4**	58.	**1**	59.	**4**	60.	**4**