

# JEE-ADVANCE: TEST-15

## TEST SERIES

**PAPER-I**

Time : 3 hrs.

M.M.: 180

**TEST CODE - A**

*TOPIC COVERED :*

*PHYSICS:* Complete XI and XII Syllabus

*CHEMISTRY:* Complete XI and XII Syllabus

*MATHEMATICS:* Complete XI and XII Syllabus

**ATTENTION:** *Kindly ask for the Roll No. from the invigilator to fill in OMR SHEET. Mark the Roll No. & Test code on the answer sheet properly. (No other sheet will be issued)*

**GENERAL INSTRUCTIONS :**

1. The Test Paper consists of **60** questions
2. There are **Three Subjects (Physics, Chemistry & Mathematics)** in the question paper.
3. **This paper is divided into 3 parts: Physics Section (I), (II) and (III); Chemistry Section (I), (II) and (III) & Mathematics Section (I), (II) and (III).**
  - **Single Choice: Physics Section (I) (1 to 10) Chemistry Section I (16 to 25) and Mathematics Section I (31 to 40), 2 marks for each correct answer and no negative marking for incorrect answer.**
  - **Multiple correct answer type questions : Physics Section (II) (11 to 15) Chemistry Section II (26 to 30) and Mathematics Section II (41 to 45), 4 marks for each correct answer and -1 mark for incorrect answer.**
  - **Integer Type: Physics Section-III (1 to 5); Chemistry Section-III (6 to 10) and Mathematics Section- III (11 to 15), for each question you will be awarded 4 marks if you darken the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. In all other cases, minus one (-1) mark will be awarded.**

Name of the Student : \_\_\_\_\_

Section : \_\_\_\_\_

Centre : \_\_\_\_\_

Invigilator's Signature : \_\_\_\_\_

**SECTION- I: STRAIGHT OBJECTIVE TYPE**

This section contains 10 multiple choice questions numbered 1 to 10. Each question has 4 choice (A), (B), (C) and (D), out of which ONLY-ONE is correct

1. A circuit has a self inductance of 1 henry and carries a current of 2A. To prevent sparking when the circuit is broken, a capacitor which can withstand 400 volts is used. The least capacitance of the capacitor connected across the switch must be equal to

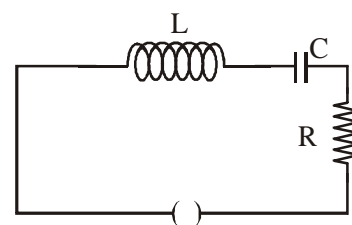
- (a)  $12.5 \mu\text{F}$                       (b)  $25 \mu\text{F}$                       (c)  $50 \mu\text{F}$                       (d)  $100 \mu\text{F}$

2. A spherical conductor has a radius of R and charge Q. A spherical shell of thickness R and uniform charge Q, is kept so as to be concentric to the conductor and touching the conductor. The electric field at a distance of  $1.5 R$  from the centre of the sphere is

- (a)  $\frac{83Q}{504\pi\epsilon_0 R^2}$                       (b)  $\frac{75Q}{504\pi\epsilon_0 R^2}$                       (c)  $\frac{83Q}{252\pi\epsilon_0 R^2}$                       (d)  $\frac{53Q}{252\pi\epsilon_0 R^2}$

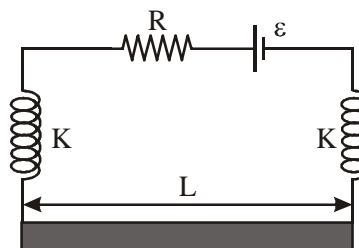
3. Figure shows a series LCR circuit connected to a variable frequency 200 V source.  $L = 5\text{H}$ ,  $C = 80 \mu\text{F}$  and  $R = 40\Omega$ . What is the source frequency which drives the circuit at resonance?

- (a) 25 Hz    (b)  $25/\pi$  Hz  
(c) 50 Hz    (d)  $50/\pi$  Hz



4. A perfectly conducting straight rigid rod of mass m and length L is suspended symmetrically from two identical perfectly conducting springs as shown in the figure. The springs stretch a distance of  $x_0$  due to the weight of the wire. The circuit has a total resistance of  $R\Omega$ . When the magnetic field perpendicular to the plane of the paper is switched on, springs are observed to extend further by the same distance. The magnetic field strength is

- (a)  $\frac{mgR}{\epsilon L}$ ; directed outward from the plane of the paper  
(b)  $\frac{mgR}{2\epsilon x_0}$ ; directed outward from the plane of the paper  
(c)  $\frac{mgR}{\epsilon L}$ ; directed into the plane of the paper  
(d)  $\frac{mgR}{\epsilon x_0}$ ; directed into the plane of the paper



5. In a series LCR circuit, if  $V$  is the root mean square (rms) value of the applied voltage. Across resistor ( $R$ ) inductor ( $L$ ) and capacitor ( $C$ ) the rms values of the potential difference are  $V_R$ ,  $V_L$  and  $V_C$ , respectively

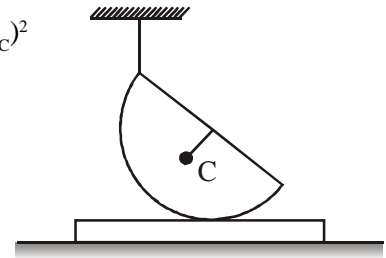
(a)  $V = V_R + V_L + V_C$

(b)  $V^2 = V_R^2 + V_L^2 + V_C^2$

(c)  $V^2 = V_R^2 + (V_L - V_C)^2$

(d)  $V^2 = V_L^2 + (V_R - V_C)^2$

6. Lower surface of a plank is rough and lies over a rough horizontal surface. Upper surface of the plank is smooth and has a smooth hemisphere placed over it through a light string as shown. After the string is burnt trajectory of C.M of sphere is



- (a) circle                      (b) ellipse                      (c) straight line

(d) none of these

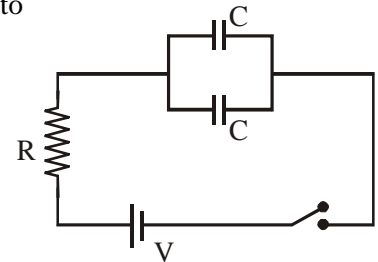
7. If switch  $S$  closed at  $t = 0$  then work done by battery upto time  $t$  is equal to

(a)  $\frac{CV^2}{2} \left( 1 - e^{-\frac{2t}{CR}} \right)$

(b)  $CV^2 \left( 1 - e^{-\frac{t}{2CR}} \right)$

(c)  $CV^2 \left( 1 - e^{-\frac{t}{CR}} \right)$

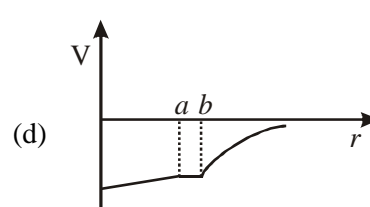
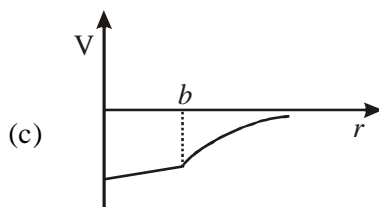
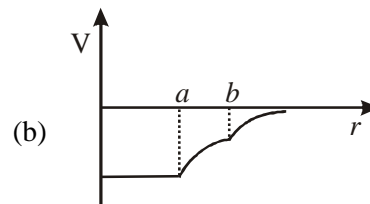
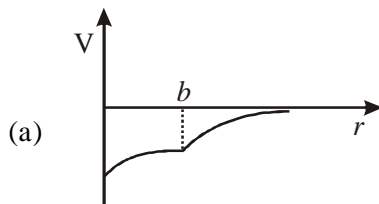
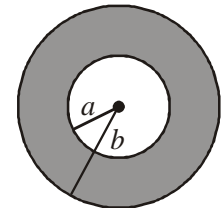
(d) none of these



8. Circuit scale of a screw gauge moves through 4 divisions of main scale in one rotation. If the number of divisions on the circular scale is 200 and each division of the main scale is 1 mm., the least count of the screw gauge is

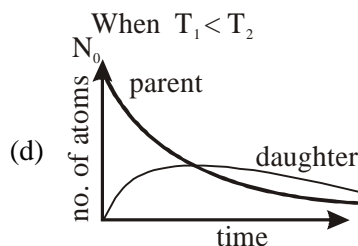
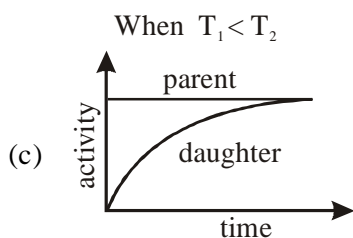
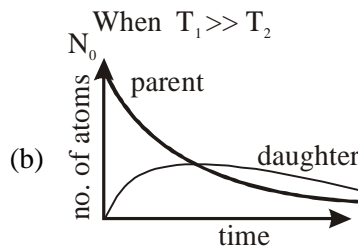
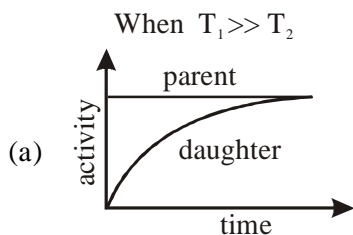
- (a) 0.01 mm                      (b) 0.02 mm                      (c) 0.03 mm                      (d) 0.04 mm

9. A sphere of mass  $M$  and radius  $b$  and a concentric cavity of radius  $a$  as shown in figure. The graph showing variation of gravitational potential  $V$  with distance  $r$  from the centre of sphere is





14. A nucleus A decays into B with half life  $T_1$  and B decays into C with half life  $T_2$ . Graph is drawn between number of atoms/activity versus time. Select the correct graph (s)



15. A lens of focal length ' $f$ ' is placed in between an object and screen at a distance ' $D$ '. The lens forms two real images of object on the screen for two of its different positions, a distance ' $x$ ' apart. The two real images have magnifications  $m_1$  and  $m_2$  respectively ( $m_1 > m_2$ ). Then

(a)  $f = \frac{x}{m_1 - m_2}$       (b)  $m_1 m_2 = 1$       (c)  $f = \frac{D^2 - x^2}{4D}$       (d)  $D \geq 4f$

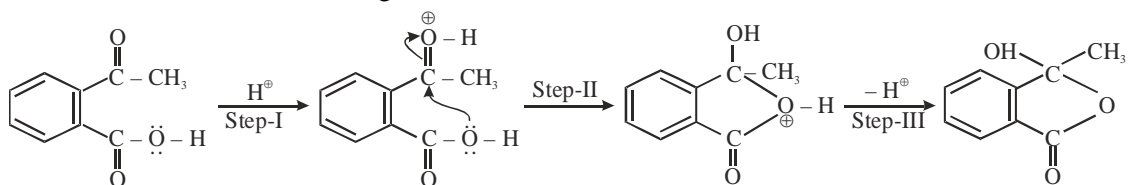
## CHEMISTRY

### SECTION- I: STRAIGHT OBJECTIVE TYPE

This section contains 10 multiple choice questions numbered 16 to 25. Each question has 4 choice (A), (B), (C) and (D), out of which ONLY-ONE is correct

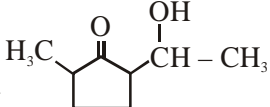
16. During electrolysis of an aqueous solution of  $\text{CuSO}_4$  using copper electrodes, if 2.5 g of Cu is deposited at cathode, then at anode
- (a) 890 ml of  $\text{Cl}_2$  at STP is liberated      (b) 445 ml of  $\text{O}_2$  at STP is liberated  
(c) 2.5 g of copper is deposited      (d) a decrease of 2.5 g of mass takes place

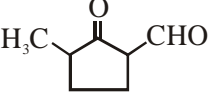

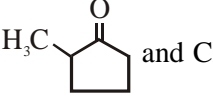
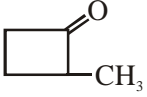
17. Consider the mechanism of the given reaction



Which of these statements are correct?

- (a) First step is protonation reaction which is reversible
- (b) Second step is nucleophilic addition reaction which is rate determining step
- (c) Product of the reaction is ester
- (d) all of these

18. In the given reaction  $A + B \xrightarrow{\text{dil. base}}$   (A) and (B) will be

- (a)  and  $\text{CH}_3 - \text{CHO}$
- (b)  and  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$
- (c)  and  $\text{CH}_3 - \text{CHO}$
- (d)  and  $\text{CH}_3 - \text{CH}_2 - \text{CHO}$

19. For the cell  $\text{Pt}|\text{H}_2(0.4 \text{ atm})|\text{H}^+(\text{pH} = 1)||\text{H}^+(\text{pH} = 2)|\text{H}_2(0.1 \text{ atm})|\text{Pt}$ . The measured potential at  $25^\circ\text{C}$  is

- (a)  $-0.1 \text{ V}$
- (b)  $-0.5$
- (c)  $-0.041$
- (d) none of these

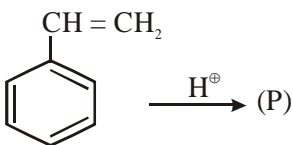
20. Which of the following compounds can be prepared using aldol condensation?

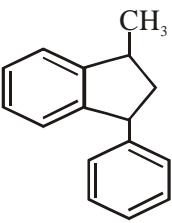
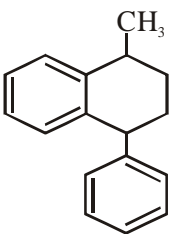
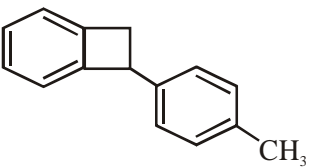
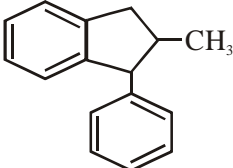
- (a)  $\text{CH}_2 = \text{CH} - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3$
- (b)  $\text{CH}_2 = \underset{\text{CH}_3}{\text{C}} - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_2 - \text{CH}_3$
- (c)  $\text{CH}_3 - \text{CH} = \underset{\text{CH}_3}{\text{C}} - \text{CHO}$
- (d)  $\text{CH}_2 = \underset{\text{CH}_3}{\text{C}} - \overset{\text{O}}{\parallel} \text{C} - \text{C}_6\text{H}_5$

21. In the given reaction  $\text{CH}_3-\text{CHO} \xrightarrow{\text{CH}_3\text{MgBr}} \xrightarrow{\text{HOH}/\text{H}^+} [\text{X}]$ . [X] will be  
 (a) 1°-alcohol (b) 2°-alcohol (c) 3°-alcohol (d) open chain ether

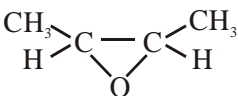
22. The equilibrium  $\text{SO}_2\text{Cl}_2(\text{g}) \rightleftharpoons \text{SO}_2(\text{g}) + \text{Cl}_2(\text{g})$  is attained at 25°C in a closed rigid container and an inert gas, helium is introduced. Which of the following statement/s is/are correct.

- (a) concentrations of  $\text{SO}_2$ ,  $\text{Cl}_2$  and  $\text{SO}_2\text{Cl}_2$  do not change  
 (b) more chlorine is formed  
 (c) concentration of  $\text{SO}_2$  is reduced (d) more  $\text{SO}_2\text{Cl}_2$  is formed

23. Identify the final product of the following reaction  (P)

- (a) 
- (b) 
- (c) 
- (d) 

24. In the given reaction sequence  $\text{CH}_3-\text{C} \equiv \text{C}-\text{CH}_3 \xrightarrow{\text{Na}/\text{NH}_3(\text{l})} \xrightarrow{\text{C}_6\text{H}_5\text{COOH}} [\text{X}]$ . [X] will be

- (a)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$
- (b) 
- (c) 
- (d)  $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3$

25. Hydrolysis of one mole of peroxodisulphuric acid produces

- (a) two moles of sulphuric acid  
 (b) two moles of sulphuric acid and one mole of hydrogen peroxide  
 (c) one mole of sulphuric acid and one mole of peroxomonosulphuric acid  
 (d) one mole of sulphuric acid, one mole of peroxomonosulphuric acid and one mole of hydrogen peroxide

## SECTION- II: MULTIPLE CORRECT ANSWERS TYPE

This section contains 5 multiple choice questions numbered 26 to 30. Each question has 4 choice (A), (B), (C) and (D), out of which ONE OR MORE is/are correct

26. In which of the following pairs of solutions, there will be no effect upon the pH on dilution?
- (a) 1 M  $\text{CH}_3\text{COOH}$  + 1 M  $\text{CH}_3\text{COONa}$       (b) 0.5 M  $\text{H}_2\text{CO}_3$  + 0.05 M  $\text{HCO}_2\text{Na}$   
(c) 0.1 M  $\text{NH}_4\text{OH}$  + 0.1 M  $\text{NH}_4\text{Cl}$       (d) 0.1 M  $\text{KCl}$  + 0.1 M  $\text{HCl}$
27. Which of the following condition/s is/are correct for a binary solution in which the solute as well as the solvent are liquid?
- (a)  $\text{C}_6\text{H}_6$  and  $\text{C}_6\text{H}_5\text{CH}_3$   $\Delta H_{\text{solution}} = 0$ ;  $\Delta V_{\text{solution}} = 0$   
(b)  $\text{CH}_3\text{COCH}_3$  and  $\text{CHCl}_3$   $\Delta H_{\text{solution}} < 0$ ;  $\Delta V_{\text{solution}} < 0$   
(c)  $\text{H}_2\text{O}$  and  $\text{HCl}$   $\Delta H_{\text{solution}} > 0$ ;  $\Delta V_{\text{solution}} < 0$   
(d)  $\text{H}_2\text{O}$  and  $\text{C}_2\text{H}_5\text{OH}$   $\Delta H_{\text{solution}} > 0$ ;  $\Delta V_{\text{solution}} > 0$
28. The borax bead test can be used to detect the presence of
- (a) Al                      (b) Cr                      (c) Fe                      (d) Co
29. Which elements exhibit inert pair effect
- (a) B                      (b) Al                      (c) Tl                      (d) Ga
30. Under Wolf-Kishner reduction conditions, the conversions which may be brought about are
- (a) Benzophenone into diphenylmethane      (b) Benzaldehyde into benzyl alcohol  
(c) Cyclohexanone into cyclohexane      (d) Cyclohexanone into cyclohexanol

## MATHEMATICS

### SECTION- I: STRAIGHT OBJECTIVE TYPE

This section contains 10 multiple choice questions numbered 31 to 40. Each question has 4 choice (A), (B), (C) and (D), out of which ONLY-ONE is correct

31. The coefficient of  $x^8$  in the expression  $(2 + x)^2 (3 + x)^3 (4 + x)^4$  is
- (a) 0                      (b) 29                      (c) 31                      (d) 28
32. If all the entries in a  $3 \times 3$  determinant are either 1 or  $-1$ . Then maximum value of such a determinant is
- (a) 6                      (b) 0                      (c) 5                      (d) 4



33. If  $\frac{r}{a} \cdot \frac{r}{a} = \frac{i}{b} \cdot \frac{i}{b} = \frac{r}{c} \cdot \frac{r}{c} = \frac{1}{2}$ ,  $\frac{r}{a} \cdot \frac{r}{b} = \frac{1}{\sqrt{2}}$ ,  $\frac{r}{b} \cdot \frac{r}{c} = 1$ ,  $\frac{r}{c} \cdot \frac{r}{a} = \frac{\sqrt{3}}{2}$ . Then value of  $a \cdot (b \times \frac{r}{c})$  is
- (a)  $\sqrt{\frac{\sqrt{6}-2}{2}}$       (b)  $\sqrt{\frac{\sqrt{6}-1}{2}}$       (c)  $\sqrt{-1+\sqrt{6}}$       (d) none of these
34. Tangent is drawn to the hyperbola  $\frac{x^2}{8} - \frac{y^2}{1} = 1$  at an arbitrary point P in the first quadrant. If sum of the intercepts made by this tangent is maximum, then eccentric angle of P is
- (a)  $\pi/4$       (b)  $\pi/3$       (c)  $\pi/2$       (d)  $\pi/6$
35. A position number is such that its fractional part, its integral part and the number itself are the first three terms of a G.P, then common ratio of the G.P is
- (a)  $\frac{\sqrt{5}+1}{2}$       (b)  $\frac{\sqrt{5}-1}{2}$       (c)  $\frac{1-\sqrt{5}}{2}$       (d) none of these
36. Let  $f(x)$  be a real polynomial of degree 3 with all roots of  $f(x) = 0$  as real and distinct. Then number of real roots of the equation  $(f'(x))^2 - f(x)f''(x) = 0$  is
- (a) 0      (b) 4      (c) 3      (d) at least one
37. The area bounded by the curve  $(y-x-2)^2 = 9x$  and the coordinate axes is
- (a) 0      (b) 1      (c)  $5/2$       (d) 3
38. When  $(30!)$  is computed, it ends in 7 zeros. The digit that immediately precedes these zeros is
- (a) 5      (b) 3      (c) 8      (d) 7
39. The value of  $\int_0^{\pi} [\cos x + [\cos x + [\cos x]]] dx$  where  $[x]$  is the greatest integer  $\leq x$ , is
- (a)  $-\frac{3\pi}{2}$       (b)  $\frac{3\pi}{2}$       (c)  $3\pi$       (d) 0
40. The value of  $\int_{-1}^1 (\tan^{-1} + \tan^{-1} \frac{1}{x}) dx$  is
- (a)  $-\pi$       (b)  $\pi$       (c)  $\pi/2$       (d) 0

**SECTION- II: MULTIPLE CORRECT ANSWERS TYPE**

This section contains 5 multiple choice questions numbered 41 to 45. Each question has 4 choice (A), (B), (C) and (D), out of which ONE OR MORE is/are correct

41. The function  $f(x) = [x] (x^2 - 25)^n (x^4 + 3x^3 + 7x^2 + 9x + 12)^m$  where  $m$  and  $n$  are natural numbers, attains a local minima at  $x = 5$  (where  $[x]$  is G.I.F) then
- (a)  $n = 11, m = 10$  (b)  $n = 10, m = 10$   
(c)  $n = 2, m$  any odd natural number (d)  $m$  and  $n$  can be natural number with  $(mn)$  as even

42. The sum of two non-negative numbers is  $2a$ . If  $p$  be the probability that the product of these numbers is not less than  $m$  times their greatest possible product, then

- (a)  $m = \frac{3}{4}, p = \frac{1}{2}$  (b)  $m = \frac{3}{4}, p = \frac{3}{4}$  (c)  $m = \frac{3}{16}, p = \frac{3}{4}$  (d)  $m = 1, p = 0$

43. The sequence  $\{x_k\}$  is defined by  $x_{k+1} = x_k^2 + x_k$  for  $k \geq 1$  and  $x_1 = \frac{1}{2}$ . Then the value of

$$\left[ \frac{1}{x_1 + 1} + \frac{1}{x_2 + 1} + \dots + \frac{1}{x_m + 1} \right] \text{ where } [x] \text{ is G.I.F is}$$

- (a) 0 for all  $m \leq 9$  (b) 1 for all  $m \leq 9$  (c) 1 for all  $m > 9$  (d) does not depend on  $m$ .

44. Let  $f(x) = \begin{cases} x^2 + 3x, & -1 \leq x < 0 \\ -\sin x, & 0 \leq x < \frac{\pi}{2} \\ -1 - \cos x, & \frac{\pi}{2} \leq x \leq \pi \end{cases}$  then

- (a)  $x = 0$  is a point of local maxima  
(b)  $x = \pi$  is a point of absolute maxima  
(c)  $f$  is non-differentiable at  $x = 0$  and  $x = \pi$   
(d)  $x = 0$  and  $x = \pi$  are neither point of local maxima nor point of local minima for  $f(x)$

45. A forecast is to be made of the results of five orbit matches, each of which can be a win or drawn or a loss for Indian team

Let  $p$  = number of forecasts with exactly one error.

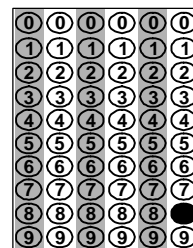
$q$  = number of forecasts with exactly three errors.

$r$  = number of forecasts with all five errors.

- (a)  $2q = 5r$  (b)  $pr = 4q$  (c)  $r^2 = 12q$  (d)  $2(p + r) > q$

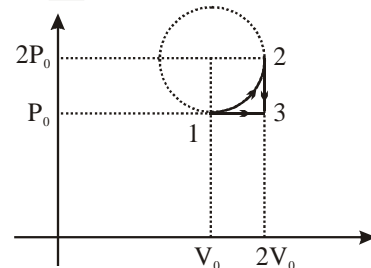
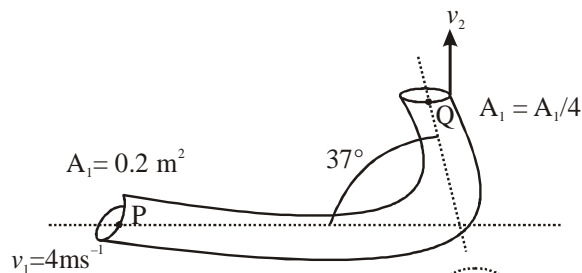
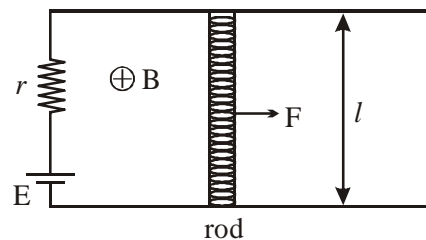
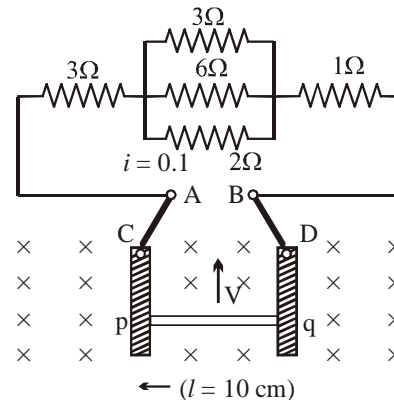
SECTION- III: INTEGER ANSWER TYPE

This section contains 15 questions. The answer to each of the question is a single digit integer, ranging from 0 to 9. The bubble corresponding to the correct answer is to be darkened in the ORS. The appropriate bubbles corresponding to the answers to these questions have to be darkened as illustrated in the following example: If answer of question number (1) is 8, then the correct darkening of bubbles will look like the following.



PHYSICS

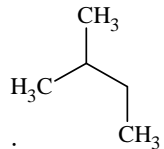
- A conducting rod  $Pq$  is sliding on two parallel conducting rods with constant velocity in a uniform magnetic field of induction  $B = 2 \text{ Wb/m}^2$  as shown in the figure. The rods are connected with a circuit. What should be velocity of rod  $Pq$  (in  $\text{m/s}$ ) if current in  $2\Omega$  resistor is  $0.1 \text{ A}$ ?
- Two parallel conducting rails are connected to a source of emf  $E$  and internal resistance  $r$ . Another conducting rod of length  $l$  having negligible resistance lies at rest and can slide without friction over the rails. A uniform magnetic field  $B$  is applied perpendicular to the plane of the rails. At  $t = 0$ , the rod is pulled along the rails by applying a force  $F$ . The velocity of the rod is observed to be  $v = v_0 \cos(\omega t)$  then find the power (in watt) spent by the force over 1 cycle. (Given  $B = 2 \text{ Tesla}$ ,  $r = 2 \times 10^{-4} \Omega$ ,  $v_0 = 2 \text{ ms}^{-1}$ ,  $l = 1 \text{ cm}$ ).
- Oil enters the bend of a pipe in the horizontal plane with velocity  $4 \text{ ms}^{-1}$  and pressure  $280 \times 10^3 \text{ Nm}^{-2}$  as shown in the figure. The pressure of oil at the point  $Q$  is  $86 \lambda$ . Find the value of  $\lambda$ . ( $\text{KNm}^{-2}$ ). (Take specific gravity of oil as  $0.9$  and  $\sin 37^\circ = 0.6$ ).
- One mole of ideal monatomic gas is taken along a cyclic process as shown in the figure. process  $1 \rightarrow 2$  shown is  $1/4$ th part of a circle as shown by dotted line process  $2 \rightarrow 3$  is isochoric while  $3 \rightarrow 1$  is isobaric. If efficiency of the cycle is  $n\%$  where  $n$  is an integer. Find  $n$ .



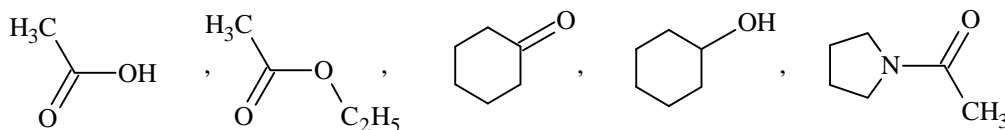
5. A spring of force constant  $k = 300 \text{ N/m}$  connects two blocks having masses  $2 \text{ kg}$  and  $3 \text{ kg}$ , lying on a smooth horizontal plane. If the spring block system is released from a stretched position, the number of complete oscillations in  $1 \text{ minute}$  is  $6n$ . Find the value of  $n$ . Take  $\pi = \sqrt{10}$ .

### CHEMISTRY

6. The maximum number of electron is  $2x$ , that may be present in all the atomic orbitals with principal quantum number  $3$  and azimuthal quantum number  $2$ . So find  $x$ .
7. Under same conditions of temperature and pressure a hydrocarbon of molecular formula  $\text{C}_n\text{H}_{2n-2}$  was found to diffuse  $3\sqrt{3}$  times slower than hydrogen. What is the value of  $n$ ?
8.  $\text{SO}_2\text{Cl}_2$  and  $\text{Cl}_2$  are introduced into a  $3\text{L}$  vessel. Partial pressure of  $\text{SO}_2\text{Cl}_2$  and  $\text{Cl}_2$  at equilibrium are  $1 \text{ atm}$  and  $2 \text{ atm}$  respectively. The value of  $K_p$  for the following reaction  $\text{SO}_2\text{Cl}_2(\text{g}) \rightleftharpoons \text{SO}_2(\text{g}) + \text{Cl}_2(\text{g})$  is  $10$ . The total pressure in atm at equilibrium would be \_\_\_\_\_

9.   $\xrightarrow{\text{Cl}_2, h\nu}$  A (Isomeric Products)  $\text{C}_5\text{H}_{11}\text{Cl}$   $\xrightarrow{\text{Fractional Distillation}}$  B (Isomeric Products). The value of 'B' is:

10. How many of the following compounds in which the present H-atom can as H-bond acceptors?



### MATHEMATICS

11. The number of all possible 5-tuples  $(a_1, a_2, a_3, a_4, a_5)$  such that  $a_1 + a_2 \sin x + a_3 \cos x + a_4 \sin 2x$  holds for all  $x$  is

12. If  $\alpha = \cos \frac{2\pi}{9} + i \sin \frac{2\pi}{9}$ , then value of  $\begin{vmatrix} \alpha^7 & \alpha^2 & 1 \\ \alpha^8 & \alpha^6 & \alpha^4 \\ \alpha^3 & \alpha & \alpha^5 \end{vmatrix}$  is

13. If  $a_n = \frac{3}{4} - \left(\frac{3}{4}\right)^2 + \left(\frac{3}{4}\right)^3 \dots + (-1)^{n-1} \left(\frac{3}{4}\right)^n$  and  $b_n = 1 - a_n$ . Then the smallest natural number  $n_0$  such that  $b_n > a_n$  for all  $n > n_0$

14. If  $A_1, A_2, A_3, \dots, A_n$  be the vertices of a  $n$ -shaped polygon such that  $\frac{1}{A_1 A_2} = \frac{1}{A_1 A_3} + \frac{1}{A_1 A_4}$ , then value of  $n$ .

15. If both the roots of the equation  $x^2 - 2ax + a^2 - 1 = 0$  lie between  $-3$  and  $4$  then number of possible integral values of  $a$ .

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# JEE-ADVANCE: TEST-15

## TEST SERIES

**PAPER-I**

Time : 3 hrs.

M.M.: 180

**TEST CODE - A**

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### ANSWERS

#### Physics: Section I to II

- |             |           |               |         |           |           |
|-------------|-----------|---------------|---------|-----------|-----------|
| 1. (b)      | 2. (b)    | 3. (b)        | 4. (a)  | 5. (c)    | 6. (c)    |
| 7. (b)      | 8. (b)    | 9. (b)        | 10. (d) | 11. (a,b) | 12. (b,d) |
| 13. (b,c,d) | 14. (a,d) | 15. (a,b,c,d) |         |           |           |

#### Chemistry: Section I to II

- |             |           |           |         |           |             |
|-------------|-----------|-----------|---------|-----------|-------------|
| 16. (d)     | 17. (d)   | 18. (c)   | 19. (c) | 20. (c)   | 21. (b)     |
| 22. (a)     | 23. (a)   | 24. (c)   | 25. (c) | 26. (a,c) | 27. (a,b,c) |
| 28. (b,c,d) | 29. (c,d) | 30. (a,c) |         |           |             |

#### Mathematics: Section I to II

- |             |             |             |         |           |             |
|-------------|-------------|-------------|---------|-----------|-------------|
| 31. (b)     | 32. (d)     | 33. (a)     | 34. (a) | 35. (a)   | 36. (a)     |
| 37. (b)     | 38. (c)     | 39. (a)     | 40. (d) | 41. (b,c) | 42. (a,c,d) |
| 43. (b,c,d) | 44. (a,b,c) | 45. (a,b,d) |         |           |             |

#### Section-III (PCM)

- |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|
| 1. (5)  | 2. (4)  | 3. (2)  | 4. (4)  | 5. (4)  | 6. (5)  |
| 7. (4)  | 8. (8)  | 9. (4)  | 10. (3) | 11. (1) | 12. (3) |
| 13. (5) | 14. (7) | 15. (4) |         |         |         |

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# JEE-ADVANCE: TEST-15

## TEST SERIES

**PAPER-II**

Time : 3 hrs.

M.M.: 180

**TEST CODE - A**

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### ANSWERS

#### Physics: Section I to III

- |          |          |          |              |            |            |
|----------|----------|----------|--------------|------------|------------|
| 1. (c,d) | 2. (a,c) | 3. (a,c) | 4. (a,b,c,d) | 5. (b,c,d) | 6. (a,c,d) |
| 7. (a,b) | 8. (b,c) | 9. (a)   | 10. (b)      | 11. (a)    | 12. (c)    |
| 13. (b)  | 14. (a)  | 15. (b)  | 16. (c)      | 17. (d)    | 18. (c)    |
| 19. (b)  | 20. (a)  |          |              |            |            |

#### Chemistry: Section I to III

- |             |             |           |           |           |           |
|-------------|-------------|-----------|-----------|-----------|-----------|
| 21. (a,b,c) | 22. (a,d)   | 23. (a,d) | 24. (a,d) | 25. (a,b) | 26. (a,d) |
| 27. (a,b,d) | 28. (a,b,c) | 29. (d)   | 30. (a)   | 31. (c)   | 32. (b)   |
| 33. (a)     | 34. (c)     | 35. (c)   | 36. (c)   | 37. (a)   | 38. (b)   |
| 39. (a)     | 40. (c)     |           |           |           |           |

#### Mathematics: Section I to III

- |             |             |           |           |           |           |
|-------------|-------------|-----------|-----------|-----------|-----------|
| 41. (a,c)   | 42. (a,c)   | 43. (a,b) | 44. (c,d) | 45. (a,b) | 46. (a,d) |
| 47. (a,b,c) | 48. (a,b,c) | 49. (d)   | 50. (c)   | 51. (b)   | 52. (a)   |
| 53. (b)     | 54. (a)     | 55. (a)   | 56. (b)   | 57. (a)   | 58. (b)   |
| 59. (d)     | 60. (c)     |           |           |           |           |