

# FIITJEE COMMON TEST (PHASE - IV)

## PHYSICS, CHEMISTRY & MATHEMATICS

CPT1 - 1

CODE:

SET: A

PAPER - 1

Time Allotted: 3 Hours

Maximum Marks: 210

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

### INSTRUCTIONS

**Caution:** Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

#### A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains **Three Sections**.
3. **Section-I** is Physics, **Section-II** is Chemistry and **Section-III** is Mathematics.
4. Each **Section** is further divided into **Two Parts: Part-A & Part-C**
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

#### B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with **blue / black ball point pen** for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.

#### C. Marking Scheme For All Two Parts.

- (i) **Part-A (01 – 10)** contains 10 multiple choice questions which have one or more than one correct answer. Each question carries **+4 marks** for correct answer and **-2 marks** for wrong answer.
- (ii) **Part-C (01 – 10)** contains 10 Numerical based questions with single digit integer as answer, ranging from 0 to 9 (both inclusive) and each question carries **+3 marks** for correct answer and **-1 mark** for wrong answer.

Name of the Candidate : \_\_\_\_\_

Batch : \_\_\_\_\_ Date of Examination : \_\_\_\_\_

Enrolment Number : \_\_\_\_\_

BATCHES – 1719

## USEFUL DATA

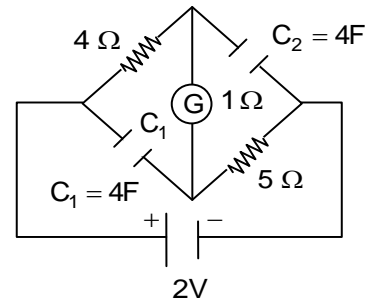
PHYSICS		CHEMISTRY	
Acceleration due to gravity	: $g = 10 \text{ m/s}^2$	Gas Constant	$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$
Planck constant	: $h = 6.6 \times 10^{-34} \text{ J-s}$		$= 0.0821 \text{ Lit atm}$
Charge of electron	: $e = 1.6 \times 10^{-19} \text{ C}$	$\text{K}^{-1} \text{ mol}^{-1}$	$= 1.987 \approx 2 \text{ Cal}$
Mass of electron	: $m_e = 9.1 \times 10^{-31} \text{ kg}$	$\text{K}^{-1} \text{ mol}^{-1}$	
Permittivity of free space	: $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{N-m}^2$	Avogadro's Number $N_a$	$= 6.023 \times 10^{23}$
Density of water	: $\rho_{\text{water}} = 10^3 \text{ kg/m}^3$	Planck's constant $h$	$= 6.625 \times 10^{-34} \text{ J.s}$
Atmospheric pressure	: $P_a = 10^5 \text{ N/m}^2$		$= 6.625 \times 10^{-27} \text{ erg.s}$
Gas constant	: $R = 8.314 \text{ J}$	1 Faraday	$= 96500 \text{ coulomb}$
	$\text{K}^{-1} \text{ mol}^{-1}$	1 calorie	$= 4.2 \text{ joule}$
		1 amu	$= 1.66 \times 10^{-27} \text{ kg}$
		1 eV	$= 1.6 \times 10^{-19} \text{ J}$
Atomic No:	H = 1, He = 2, Li = 3, Be = 4, B = 5, C = 6, N = 7, O = 8, F = 9, Ne = 10, Na = 11, Mg = 12, Si = 14, Al = 13, P = 15, S = 16, Cl = 17, Ar = 18, K = 19, Ca = 20, Cr = 24, Mn = 25, Fe = 26, Co = 27, Ni = 28, Cu = 29, Zn = 30, As = 33, Br = 35, Ag = 47, Sn = 50, I = 53, Xe = 54, Ba = 56, Pb = 82, U = 92.		
Atomic masses:	H = 1, He = 4, Li = 7, Be = 9, B = 11, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Si = 28, Al = 27, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Co = 59, Ni = 58.7, Cu = 63.5, Zn = 65.4, As = 75, Br = 80, Ag = 108, Sn = 118.7, I = 127, Xe = 131, Ba = 137, Pb = 207, U = 238.		

**SECTION – I (PHYSICS)****PART – A****(Multi Correct Answer Type)**

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

1. Two identical charged particles enter a uniform magnetic field with same speed but at angles  $30^\circ$  and  $60^\circ$  with the field. Let  $a$ ,  $b$  and  $c$  be the ratios of their time periods, radii and pitches of the helical paths. Then
- (A)  $abc = 1$  (B)  $abc > 1$   
 (C)  $abc < 1$  (D)  $a = bc$

2. In the circuit show below the cell is ideal, with emf = 2 v. The resistance of the coil of Galvanometer G is  $1\ \Omega$
- (A) No current flows in G  
 (B) 0.2 A current flows in G  
 (C) Potential difference across  $C_1 = 1\ \text{V}$   
 (D) Potential difference across  $C_2$  is 1.2 V



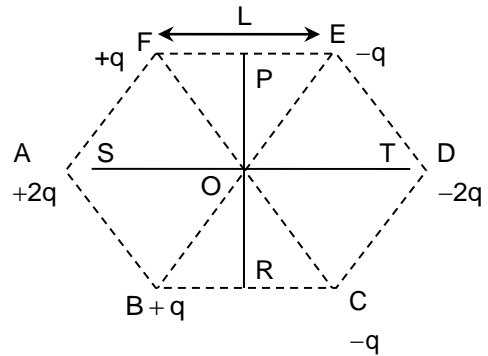
3. When two capacitors are charged to different potentials and then connected in parallel to each other (plates of same polarity are connected), then
- (A) Final charge is equal to the sum of initial charges  
 (B) Final potential difference is equal to the average of the initial potential difference  
 (C) Final potential difference is different from the sum of initial potential difference  
 (D) Final energy stored is less than the sum of initial stored energy
4. When 0.4 V is applied to the ends of mercury column contained in a thin glass tube X, 5 A current flows. Same mercury is poured into a glass tube Y which has diameter one third of the tube X and same voltage is applied to it. Then
- (A) ratio of resistance of mercury in the tube X to tube Y is  $1/81$ .  
 (B) ratio of resistance of mercury in the tube X to tube Y is  $1/9$   
 (C) Current in tube Y is  $5/81\ \text{A}$ .  
 (D) Current in tube Y is  $1/81\ \text{A}$

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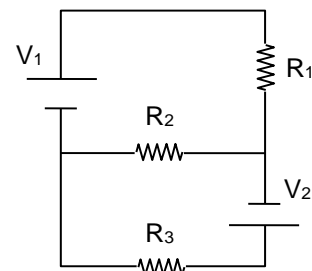
**Space for rough work**

5. A charged particle shoots through a space and continues its path undeflected. Then in that space.  
 (A) The uniform electric and magnetic fields, perpendicular to each other may be present.  
 (B) Electric field alone may be present.  
 (C) Electric field and magnetic field parallel to each other may be present.  
 (D) Uniform electric field may be present.

6. Six point charges are kept at the vertices of a regular hexagon of side  $L$  and centre  $O$ , as shown in the figure. Given that  $k = \frac{1}{4\pi\epsilon_0} \frac{q}{L^2}$ , Which of the following statements(s) is (are) correct?  
 (A) The electric field at  $O$  is  $6k$  along  $OD$ .  
 (B) The potential at  $O$  is zero  
 (C) The potential at all points on the line  $PR$  is same  
 (D) The potential at all points on the line  $ST$  is same.



7. Two ideal batteries of emf  $V_1$  and  $V_2$  and three resistances  $R_1$ ,  $R_2$  and  $R_3$  are connected as shown in the figure. The current in resistance  $R_2$  would be zero if  
 (A)  $V_1 = V_2$  and  $R_1 = R_2 = R_3$   
 (B)  $V_1 = V_2$  and  $R_1 = 2R_2 = R_3$   
 (C)  $V_1 = 2V_2$  and  $2R_1 = 2R_2 = R_3$   
 (D)  $2V_1 = V_2$  and  $2R_1 = R_2 = R_3$



8. Consider the motion of a positive point charge in a region where there are simultaneous uniform electric and magnetic field  $\vec{E} = E_0\hat{j}$  and  $\vec{B} = B_0\hat{j}$ . At time  $t = 0$  this charge has velocity  $\vec{v}$  in the  $x - y$  plane, making an angle  $\theta$  with the  $x -$  axis. Which of the following options(s) is (are) correct? (time  $t > 0$ )  
 (A) If  $\theta = 0^\circ$ , the charge moves in a circular path in the  $x - z$  plane  
 (B) If  $\theta = 0^\circ$ , the charge undergoes helical motion with constant pitch along the  $y -$  axis.  
 (C) If  $\theta = 10^\circ$ , the charge undergoes helical motion with its pitch increasing with time, along the  $y -$  axis  
 (D) If  $\theta = 90^\circ$ , the charge undergoes linear but accelerated motion along the  $y -$  axis

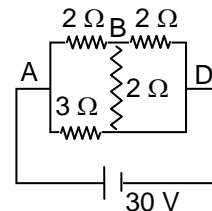
**Space for rough work**

9. A charged particle with velocity  $\vec{V} = x\hat{i} + y\hat{j}$  moves in magnetic field  $\vec{B} = y\hat{i} + x\hat{j}$ . The magnitude of magnetic force acting on the particle is F. Identify the correct statements.  
 (A) No force will act on a particle if  $x = y$   
 (B)  $F \propto (x^2 - y^2)$  if  $x > y$   
 (C) the force will act along positive z-axis if  $x < y$   
 (D) the force will act along negative y – axis if  $x > y$
10. A charge particle of mass m and charge (-q) is revolving around a long wire of charge density ' $\lambda$ ' along a circle of radius r. Then  
 (A) Time period  $T = \sqrt{\frac{8\pi^3 \epsilon_0 m r^2}{\lambda q}}$   
 (B) speed =  $\sqrt{\frac{2\lambda q}{\pi \epsilon_0 m}}$   
 (C) speed  $v = \sqrt{\frac{\lambda q}{2\pi \epsilon_0 m}}$   
 (D) Time period =  $\sqrt{\frac{2\pi^3 \epsilon_0 m r^2}{\lambda q}}$

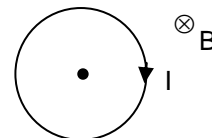
**PART – C**  
**Integer Answer Type**

This part contains **10 questions**. The answer to each of the questions is a **single-digit integer**, ranging from 0 to 9.

1. Find the current in the branch BD of the circuit (in ampere).

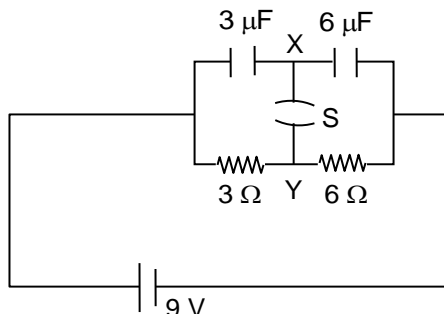


2. A current  $I = 10$  A flows in ring of radius  $r = 15$  cm made of a very thin wire. The tensile strength of the wire is equal to  $T_0 = 1.5$  N. The ring is placed in a uniform magnetic field of strength B as shown in figure. Determine the value of B in tesla so that the ring is just going to rupture.

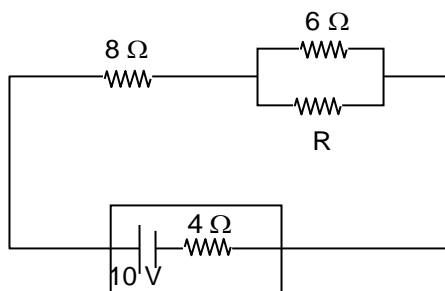


**Space for rough work**

3. Two spherical conductors of radii  $r$  and  $2r$  having surface charge densities  $-\sigma$  and  $+\sigma$  respectively are connected with each other. Final surface charge density of the smaller sphere is found to be  $K$  times that of  $\sigma$ . What is the value of  $K$ ?
4. A circuit is connected as shown in the figure with switch  $S$  open. When the switch is closed the total amount of charge that flows from  $Y$  to  $X$  is  $3\text{ K}\mu\text{C}$ . The value of  $K$  is



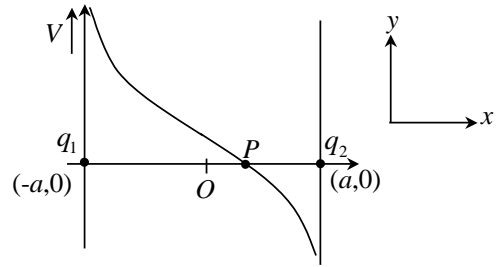
5. A steady current  $I$  goes through a wire loop  $PQR$  having shape of right angle triangle with  $PQ = 3x$ ,  $PR = 4x$  and  $QR = 5x$ . If the magnitude of magnetic field at  $P$  due to this loop is  $K\left(\frac{\mu_0 I}{48\pi x}\right)$ , the value of  $K$  is
6. A uniform electric field  $\vec{E} = (3\hat{i} + 4\hat{j})\text{N/C}$  exists in space. The potential difference between positions  $(2, 0)$  and  $(4, 0)$  will be
7. The value of  $R$  for which the heat developed across  $8\ \Omega$  is maximum, is  $3\lambda$ . The value of  $\lambda$  will be



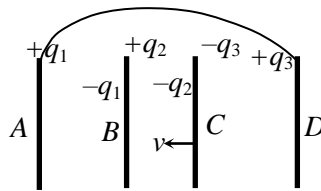

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**Space for rough work**

8. The following curve represents the variation of potential of points along x-axis due to two-point charges  $q_1$  and  $q_2$  separated by a distance  $2a$ . Find the ratio of magnitude of two charges (point O is origin and coordinates of point P is  $(\frac{a}{3}, 0)$ )



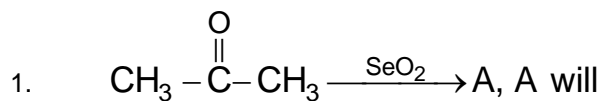
9. The region between  $X = 0$  and  $X = L$  metre is filled with uniform steady magnetic field  $2T\hat{k}$ . A particle of mass 2 kg, positive charge 1C and velocity  $2(\text{m/s}) \hat{i}$  travels along x-axis and enters the region of the magnetic field (neglect gravity). Find the value of  $L$  if the particle emerges from the region of magnetic field with its final velocity at an angle  $30^\circ$  to its initial velocity.
10. In the diagram there are four conducting plates A, B, C and D placed parallel to each other at equal separation  $L$ . If plate C starts moving towards plate B with velocity  $v$ . Find the current (in mA) flowing in the wire connecting A and D. (assume all other plates to be fixed)  
(Given:  $q_2 = 2\mu\text{C}$ ,  $q_3 = 3\mu\text{C}$ ,  $v = 30 \text{ m/s}$ ,  $L = 0.05 \text{ m}$ )



**Space for rough work**

**SECTION – II (CHEMISTRY)****PART – A****(Multi Correct Answer Type)**

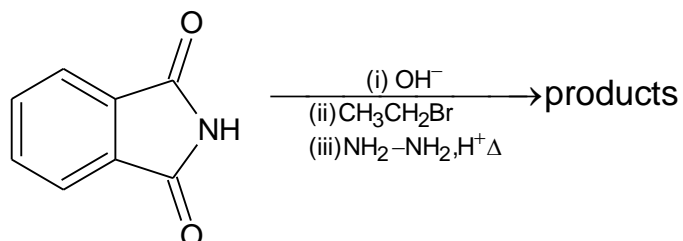
This part contains **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE is/are correct**.



- (A) Reduce Tollen's reagent  
(C) Form dioxime

- (B) give iodoform test  
(D) Give Cannizzaro reaction

2.

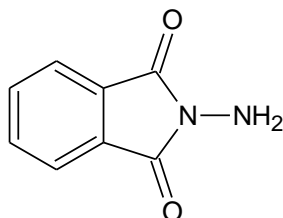


Product are

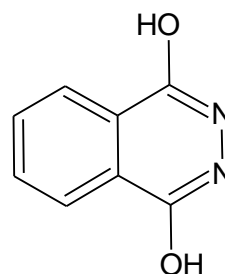
- (A)  $\text{CH}_3\text{CH}_2\text{NH}-\text{NH}_2$

- (B)  $\text{CH}_3\text{CH}_2\text{NH}_2$

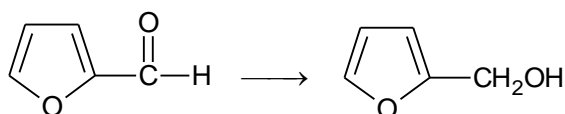
(C)



(D)



3.



Identify the reagents that can perform this conversion successfully

- (A)  $\text{H}_2$ , Raney Ni /  $\Delta$

- (B) Mg, THF,  $\text{H}_2\text{O}$

- (C)  $\text{NaBH}_4$ ,  $\text{H}_2\text{O}$

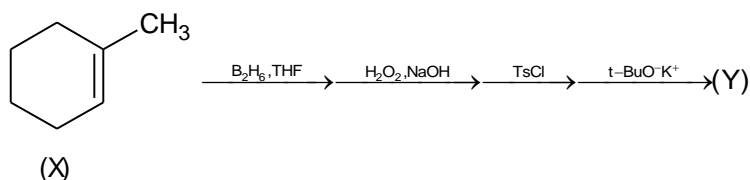
- (D)  $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$ ,  $\text{OH}^-$

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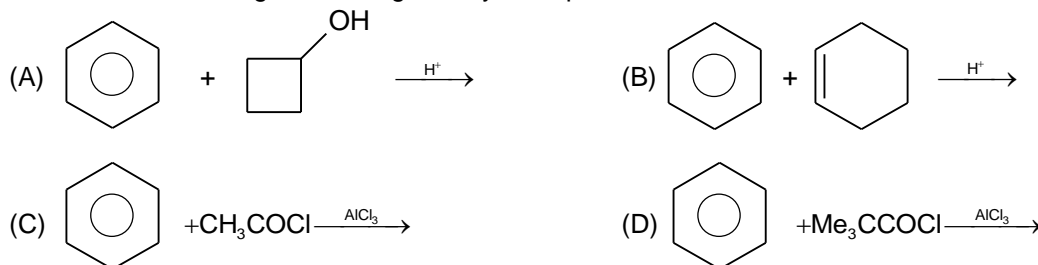
4. The correct statement(s) about solvent effect is/are
- (A) Decreasing solvent polarity causes a large increase in the rate of the  $S_N2$  attack by ammonia on an alkyl halide  $R-X + NH_3 \longrightarrow RNH_3^+ + X^-$
- (B) Increasing solvent polarity causes a large decrease in the rate of the  $S_N2$  attack by hydroxide ion on trimethyl sulphonium ion.
- $$HO^- + \underset{\text{Trimethyl sulphonium ion}}{(CH_3)_3S^+} \longrightarrow CH_3OH + \underset{\text{DMS}}{(CH_3)_2S}$$
- (C) Increasing solvent polarity causes a small decrease in the rate of the  $S_N2$  attack by trimethyl amine on trimethyl sulphonium ion
- $$(CH_3)_3N + (CH_3)_3S^+ \longrightarrow CH_3N^+(CH_3)_3 + (CH_3)_2S$$
- (D) All are incorrect.

5. In the given reaction



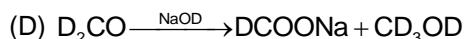
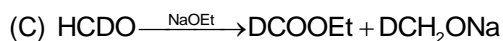
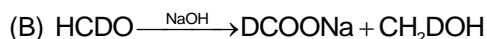
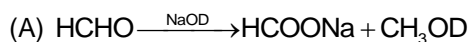
The product 'Y' is

- (A) Position isomer of X
- (B) Identical to X
- (C) Chain isomer of X
- (D) An oxidation product of (X)
6. Which of the following reactions give alkylation product?

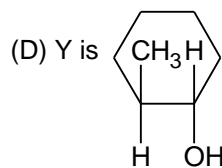
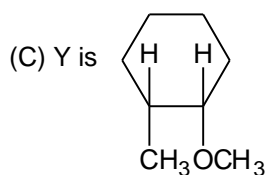
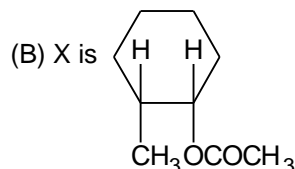
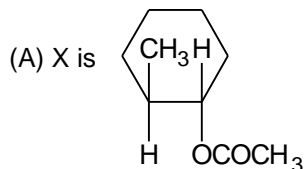
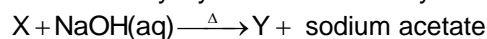


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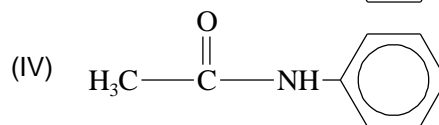
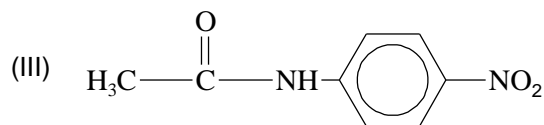
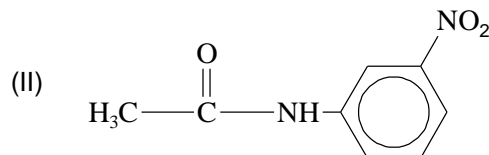
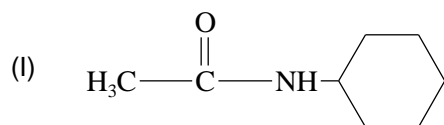
7. Which of the following products is/are correctly mentioned in the following reactions?



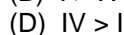
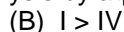
8. trans-2-methyl cyclohexanol + acetyl chloride  $\longrightarrow$  X



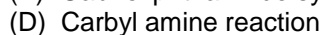
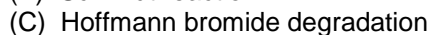
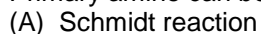
9. Consider the following compounds:



The decreasing order of reactivity towards hydrolysis by aqueous NaOH is:



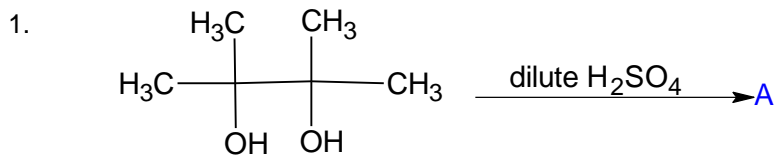
10. Primary amine can be formed by the following process?



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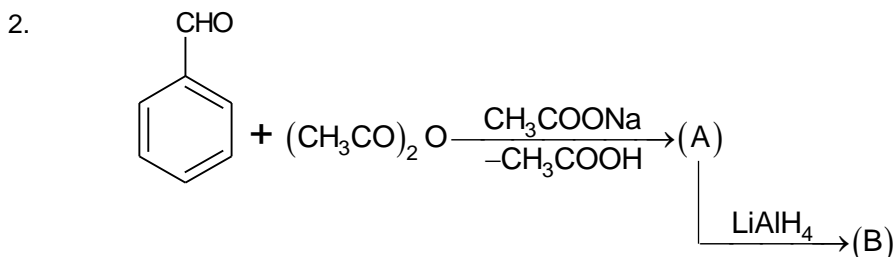
**PART – C**  
**Integer Answer Type**

This part contains **10 questions**. The answer to each of the questions is a **single-digit integer**, ranging from 0 to 9.



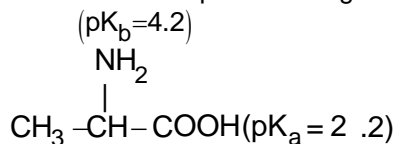
How many statements are true about A ?

1. A can give test with sodium
2. A shows iodoform test
3. A gives Tollens test
4. A gives slowly 2, 4-DNP test
5. A gives Schiff's test
6. A gives  $\text{FeCl}_3$  test

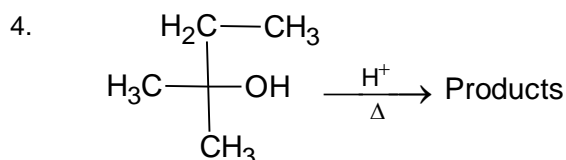


How many alkenes are formed if product (B) is treated with conc.  $\text{H}_2\text{SO}_4$ ? (Consider geometrical isomerism)

3. Find iso-electric point of the given amino acid

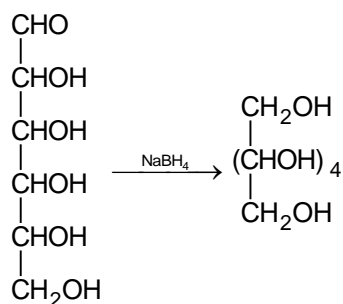


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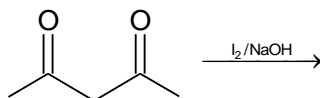


The number of possible organic products will be

5. The sum of total stereoisomers and fractions on the fractional distillation of 2,3-Dichloropentane is
6. Observe the following reaction and find out that how many number of reactant stereoisomers can be reduced to optically inactive meso products



7. How many  $\text{CHI}_3$  will be released from the given compound?



8. How many isomeric amines are possible with formula  $\text{C}_7\text{H}_9\text{N}$  containing benzene ring?
9. A tripeptide is a polymer of amino acids containing x peptide bonds. Then x is
10. A hydrocarbon  $\text{C}_8\text{H}_{10}$  (A) on ozonolysis gives compound  $\text{C}_4\text{H}_6\text{O}_2$  (B) only. The compound (B) can also be obtained from the alkyl bromide  $\text{C}_3\text{H}_5\text{Br}$  (C) upon treatment with magnesium in dry ether followed by  $\text{CO}_2$  and acidification. Find out the number of rings in compound (A).

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**Space for rough work**

**SECTION – III (MATHEMATICS)****PART – A****(Multi Correct Answer Type)**

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

1. Which of the following functions fail to satisfy the condition of Roll's theorem on the interval  $[-1, 1]$ , where  $[x]$  denotes the greatest integer less or equal to  $x$  and  $\{x\}$  denotes the fractional part of  $x$  respectively?
- (A)  $f(x) = |x| [x]$  (B)  $f(x) = \begin{cases} \frac{\tan x}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$
- (C)  $f(x) = \{x\} + \{-x\}$  (D)  $f(x) = |x| - |\sin x|$
2. The values of  $a$  for which  $y = ax^2 + ax + \frac{1}{24}$ ,  $x = ay^2 + ay + \frac{1}{24}$  touch each other are
- (A)  $\frac{2}{3}$  (B)  $\frac{3}{2}$
- (C)  $\frac{13 + \sqrt{601}}{12}$  (D)  $\frac{13 - \sqrt{601}}{12}$
3. Let  $f : \mathbb{R} \rightarrow \mathbb{R}$ ,  $g : \mathbb{R} \rightarrow \mathbb{R}$  and  $h : \mathbb{R} \rightarrow \mathbb{R}$  be differentiable functions such that  $f(x) = x^3 + 3x + 2$ ,  $g(f(x)) = x$  and  $h(g(g(x))) = x$  for all  $x \in \mathbb{R}$ . Then
- (A)  $g'(2) = \frac{1}{3}$  (B)  $h'(1) = 666$
- (C)  $h(0) = 16$  (D)  $h(g(3)) = 38$
4. If  $y = f(x)$  and  $y = g(x)$  are symmetrical about the line  $x = \frac{\alpha + \beta}{2}$ , then  $\int_{\alpha}^{\beta} f(x) g'(x) dx$  is equal to
- (A)  $\int_{\alpha}^{\beta} f'(x) g(x) dx$  (B)  $-\int_{\alpha}^{\beta} f'(x) g(x) dx$
- (C)  $\frac{1}{2} \int_{\alpha}^{\beta} (f(x) g'(x) - f'(x) g(x)) dx$  (D)  $\frac{1}{2} \int_{\alpha}^{\beta} (f(x) g'(x) + f'(x) g(x)) dx$

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**Space for rough work**

5. The function  $f$  is continuous and has the property  $f(f(x)) = 1 - x \forall x \in [0, 1]$  and  $J = \int_0^1 f(x) dx$  then
- (A)  $f\left(\frac{1}{4}\right) + f\left(\frac{3}{4}\right) = 1$  (B) the value of  $J = \frac{1}{2}$
- (C)  $f\left(\frac{1}{3}\right) + f\left(\frac{2}{3}\right) = 2$  (D)  $\int_0^{\pi/2} \frac{\sin x dx}{(\sin x + \cos x)^3} = J$
6. The function  $f(x) = \begin{cases} \frac{x^2 - 2}{x + 1}, & x \leq 0 \\ (1 - \sin x) \sin \pi x; & 0 < x \leq 1 \\ \frac{(x - 1)}{1 - e^{x(1-x)}}, & x > 1 \end{cases}$  is discontinuous at
- (A)  $x = 0$  (B)  $x = 2$   
 (C)  $x = 1$  (D)  $x = 3$
7. For  $U_n = \int_0^1 x^n (2 - x)^n dx$ ;  $V_n = \int_0^1 x^n (1 - x)^n dx$   $n \in \mathbb{N}$ , which of the following statement (s) is/are true?
- (A)  $U_n = 2^n V_n$  (B)  $U_n = 2^{-n} V_n$   
 (C)  $U_n = 2^{2n} V_n$  (D)  $U_n = 2^{-2n} V_n$
8. If  $f(x) = (x^2 - 1)^{(n+1)} (x^2 + x + 1)$ ,  $n \in \mathbb{N}$  and  $f(x)$  has a local extremum at  $x = 1$ , then  $n$  is equal to
- (A) 2 (B) 3  
 (C) 4 (D) 5
9. The points of extrema of  $f(x) = \int_0^{x^2} \left( \frac{t^2 - 5t + 4}{2 + e^t} \right) dt$  are
- (A)  $x = -2$  (B)  $x = 1$   
 (C)  $x = 0$  (D)  $x = -1$

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**Space for rough work**

10. The value of  $\int_0^{\pi} x f(\sin x) dx$  is equal to
- (A)  $\pi \int_0^{\frac{\pi}{2}} f(\cos x) dx$  (B)  $\frac{\pi}{2} \int_0^{\pi} f(\sin x) dx$
- (C)  $\frac{\pi}{2}$  (D)  $\pi \int_0^{\frac{\pi}{2}} f(\sin x) dx$

**PART – C**  
**Integer Answer Type**

This part contains **10 questions**. The answer to each of the questions is a **single-digit integer**, ranging from 0 to 9.

1.  $f(x + 1) = (-1)^{x+1} x - 2f(x)$  for  $x \in \mathbb{N}$  and  $f(1) = f(1986)$ . Compute the sum of digit of numbers  $(f(1) + f(2) + \dots + f(1985))$ .
2. Let the function  $f$  be defined by  $f(x) = |x - 1| - 1/2$ ,  $0 \leq x \leq 2$  and satisfies  $f(x + 2) = f(x) \forall x \in \mathbb{R}$ . Then find the value of definite integral  $\int_0^{100} f(x) dx$ .
3. If  $F(x) = \frac{1}{x^2} \int_4^x 4t^2 - 2F'(t) dt$ , then  $[F'(4)]$  is equal to (where  $[x]$  denotes greatest integer function).
4. The largest value of  $f(x) = 2x^3 - 3x^2 - 12x + 5$  for  $-2 \leq x \leq 4$  occurs at  $x = x_1$  then  $x_1$  is equal to
5. The value of  $\int_{\frac{1}{e}}^{\tan x} \frac{tdt}{(1+t^2)} + \int_{\frac{1}{e}}^{\cot x} \frac{dt}{t(1+t^2)}$  is equal to

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**Space for rough work**

6. Let  $f(x)$  be a real valued function such that  $f\left(\frac{x+y}{2}\right) = \frac{f(x)+f(y)}{2}$ ,  $\forall x, y \in \mathbb{R}$ . If  $f'(0)$  exists and equals  $-1$  and  $f(0) = 1$ , then  $f(-2)$  is equal to \_\_\_\_\_
7. If  $\int \frac{\sqrt{\cot x}}{\sin x \cos x} dx = (A-3)\sqrt{\cot x} + B$ , then  $A$  is equal to \_\_\_\_\_
8. If  $\int \frac{(x^2-1)}{(x^4+3x^2+1)\tan^{-1}\left(\frac{x^2+1}{x}\right)} dx = k \ln \left| \tan^{-1} \frac{x^2+1}{x} \right| + c$ , then  $k$  is equal to \_\_\_\_\_
9. Let  $f: (0, \infty) \rightarrow \mathbb{R}$  and  $F(x^2) = \int_0^{x^2} f(t) dt$ . If  $F(x^2) = x^2(1+x)$ , then  $f(4)$  is equal to \_\_\_\_\_
10. If period of  $\sin^{2m}(\sqrt{k}x)$ ,  $m \in \mathbb{N}$  is  $\pi$ , then  $\lim_{n \rightarrow \infty} k^n$  is \_\_\_\_\_

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**Space for rough work**



# FIITJEE COMMON TEST

## TWO YEAR CRP (CTY - 1719)

### BATCHES: CDE - LOT

## PCM (PAPER – I)

## PHASE - IV

**PAPER CODE: XXXX.X**

**DATE: DD.MM.YYYY**

### ANSWER KEYS [SET – A]

#### PHYSICS

##### PART – A

- |               |            |            |         |
|---------------|------------|------------|---------|
| 1. A, D       | 2. B, C, D | 3. A, C, D | 4. A, C |
| 5. A, B, C, D | 6. A, B, C | 7. A, B, D | 8. C, D |
| 9. A, B       | 10. A, C   |            |         |

##### PART – C

- |      |       |      |      |
|------|-------|------|------|
| 1. 5 | 2. 1  | 3. 1 | 4. 9 |
| 5. 7 | 6. 6  | 7. 4 | 8. 2 |
| 9. 1 | 10. 1 |      |      |

#### CHEMISTRY

##### PART – A

- |               |             |               |         |
|---------------|-------------|---------------|---------|
| 1. A, B, C, D | 2. B, D     | 3. C, D       | 4. B, C |
| 5. A          | 6. A, B, D  | 7. A, B, C, D | 8. A, D |
| 9. A, D       | 10. A, B, C |               |         |

##### PART – C

- |      |       |      |      |
|------|-------|------|------|
| 1. 2 | 2. 3  | 3. 6 | 4. 2 |
| 5. 6 | 6. 4  | 7. 1 | 8. 5 |
| 9. 2 | 10. 2 |      |      |

#### MATHEMATICS

##### PART – A

- |               |               |               |               |
|---------------|---------------|---------------|---------------|
| 1. A, B, C    | 2. A, B, C, D | 3. A, B, C, D | 4. A, B, C, D |
| 5. A, B, D    | 6. A, C       | 7. C          | 8. B, D       |
| 9. A, B, C, D | 10. A, B, D   |               |               |

##### PART – C

- |      |       |      |      |
|------|-------|------|------|
| 1. 7 | 2. 0  | 3. 3 | 4. 4 |
| 5. 1 | 6. 3  | 7. 1 | 8. 1 |
| 9. 4 | 10. 1 |      |      |