

FIITJEE COMMON TEST (PHASE - IV)

PHYSICS, CHEMISTRY & MATHEMATICS

CPT1 - 2

CODE:

SET: A

PAPER - 2

Time Allotted: 3 Hours

Maximum Marks: 201

- 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 & B**.
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 - 06)** contains 6 multiple choice questions which have only one correct answer. Each question carries **+3 marks** for correct answer and **-1 mark** for wrong answer.
Part-A (07 - 09) contains 3 Assertion-Reasoning questions (MCQs) which have only one correct answer. Each question carries **+3 marks** for correct answer and **-1 mark** for wrong answer.
Part-A (10 - 15) contains 2 Paragraphs. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has only one correct answer and carries **+4 marks** for the correct answer and **-1 mark** for wrong answer.
- (ii) **Part-B (01 - 02)** contains 2 Matrix Match Type questions which have statements given in 2 columns. Statements in the first column have to be matched with statements in the second column. There may be one or more than one correct choices. Each question carries **+8 marks** for all correct answer however for each correct row **+2 marks** will be awarded. No marks will be given for any wrong match in any question. There is no negative marking.

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	: $e = 1.6 \times 10^{-19} \text{ C}$	$\text{K}^{-1} \text{ mol}^{-1}$	
Mass of electron	: $m_e = 9.1 \times 10^{-31} \text{ kg}$		$= 1.987 \approx 2 \text{ Cal}$
Permittivity of free space	: $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{N-m}^2$	$\text{K}^{-1} \text{ mol}^{-1}$	
Density of water	: $\rho_{\text{water}} = 10^3 \text{ kg/m}^3$	Avogadro's Number N_a	$= 6.023 \times 10^{23}$
Atmospheric pressure	: $P_a = 10^5 \text{ N/m}^2$	Planck's constant h	$= 6.625 \times 10^{-34} \text{ J.s}$
Gas constant	: $R = 8.314 \text{ J}$		$= 6.625 \times 10^{-27} \text{ erg.s}$
	$\text{K}^{-1} \text{ mol}^{-1}$	1 Faraday	$= 96500 \text{ coulomb}$
		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

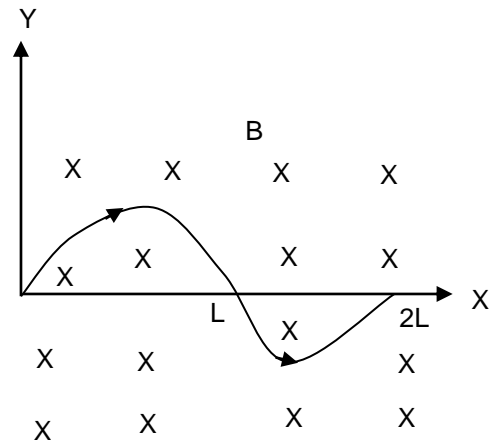
(Single Correct Answer Type)

This part contain **6 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. A wire carrying current I is placed in a uniform magnetic field B in the form of a curve $y = a \sin\left(\frac{\pi x}{L}\right)$, $0 \leq x \leq 2L$

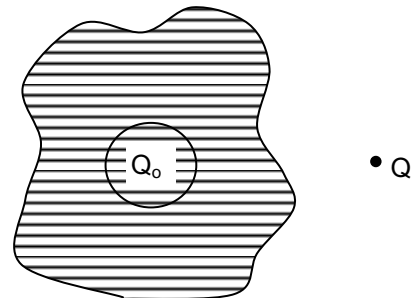
as shown below. The force upon the wire is

- (A) $2\pi ILB$
- (B) $\frac{\pi L^2}{4} BI$
- (C) $2IBL$
- (D) zero



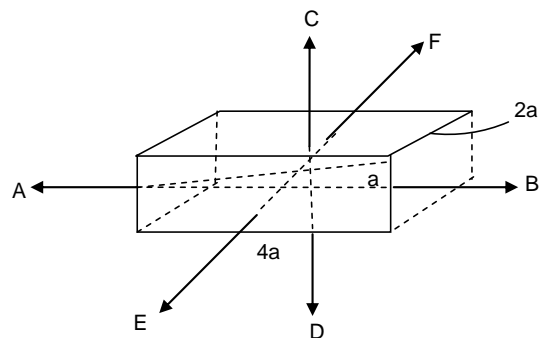
2. A charge Q_0 is placed at the centre of spherical cavity of a conductor and another charge Q is placed outside the conductor. The correct statement is

- (A) Force on Q_0 and Q are equal and opposite
- (B) Force on Q_0 is zero and force on Q is non zero
- (C) Force on Q and Q_0 is zero
- (D) Force on Q_0 is non zero and force on Q is zero.



3. A conductor with rectangular cross section has dimensions $(a \times 2a \times 4a)$ as shown. Resistances across AB, CD & EF are x, y & z .

- (A) $x = y = z$
- (B) $x > y > z$
- (C) $y > x > z$
- (D) $x > z > y$



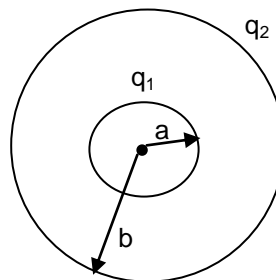
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4. A battery of 10 volt is connected to a resistance of 20Ω through a variable resistance R. The amount of charge which has passed in the circuit in 4 minutes, if the variable resistance R is increased at the rate of $5 \Omega / \text{min}$ is

- (A) 120 C (B) $120 \ln 2$ C
 (C) $\frac{120}{\ln 2}$ C (D) $\frac{60}{\ln 2}$ C

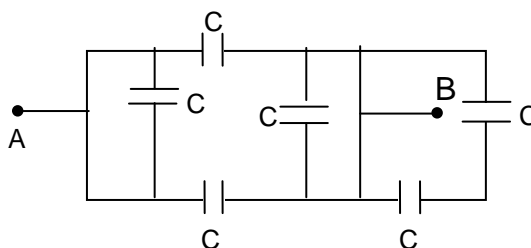
5. Two concentric conducting spherical shells having radii a and b are charged to q_1 & q_2 respectively. The potential difference between 1 & 2 will be

- (A) $\frac{q_1}{4\pi\epsilon_0 a} - \frac{q_2}{4\pi\epsilon_0 b}$ (B) $\frac{q_2}{4\pi\epsilon_0} \left(\frac{1}{a} - \frac{1}{b} \right)$
 (C) $\frac{q_1}{4\pi\epsilon_0} \left(\frac{1}{a} - \frac{1}{b} \right)$ (D) None of these



6. The equivalent capacitance between point A and B of a combination shown in the figure is

- (A) C
 (B) 2 C
 (C) C/2
 (D) None of these



PART – A
(Assertion Reason Type)

This part contains **3 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
 (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
 (C) If **assertion** is true but **reason** is false.
 (D) If **assertion** is false but **reason** is true.

7. **Assertion:** For practical purpose, the earth is used as a reference at zero potential in electrical circuit.
Reason: The electrical potential of a sphere of radius R with charge Q uniformly distributed on the surface is given by $\frac{Q}{4\pi\epsilon_0 R}$.

Space for rough work

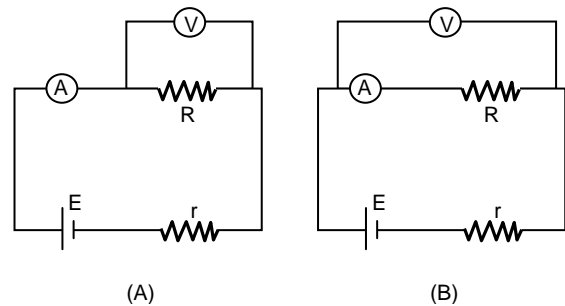
8. **Assertion:** When a particle with charge 'q' and mass 'm' enters into a uniform magnetic field at an angle ' θ ' with the direction of magnetic field. It moves on a helical path.
Reason: The component $v\cos\theta$ is responsible for circular and $v\sin\theta$ is responsible for straight line path.
9. **Assertion:** To make a voltmeter a high resistance is added to Galvanometer to increase its resistance.
Reason: The voltmeter is connected in parallel to resistance about which potential difference has to be measured.

PART – A
(Paragraph Type)

This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

Resistance value of an unknown resistor is calculated using the formula $R = V/I$, where V and I be the reading of the voltmeter and the ammeter, respectively. Consider the circuits below. The internal resistance of the voltmeter and the ammeter (R_V and R_G respectively) are finite and non zero



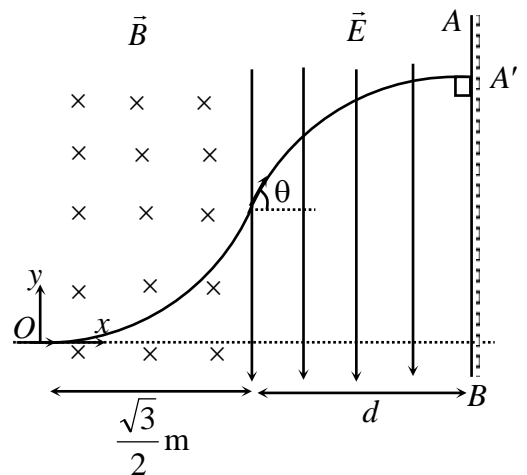
Let R_A and R_B be the calculated values of resistance R in the two cases A and B respectively

10. The relation between R_A and the actual value of R is
 (A) $R > R_A$ (B) $R < R_A$
 (C) $R = R_A$ (D) dependent upon E and r
11. The relation between R_B and the actual value of R is
 (A) $R > R_B$ (B) $R < R_B$
 (C) $R = R_B$ (D) dependent upon E and r
12. If the resistance of voltmeter $R_V = 1 \text{ k}\Omega$ and that of ammeter $R_G = 1\Omega$, then the magnitude of the percentage error in the measurement of R (the actual value of R is 10Ω) is
 (A) zero in both cases (B) non zero but equal in both cases
 (C) more in circuit A (D) more in circuit B

Space for rough work

Paragraph for Questions Nos. 13 to 15

A charge particle of charge 1C and mass 10gm is moving with velocity $10\hat{i}\text{ m/s}$ in horizontal plane consisting of magnetic field $-0.1\hat{k}\text{ T}$ of width $\frac{\sqrt{3}}{2}\text{ m}$ and electric field $-0.1\hat{j}\text{ N/C}$ of width d . Particle enters the magnetic field at $t = 0$ perpendicularly and follows the path as shown in the figure and strikes the wall AB perpendicularly at A' (neglect gravity)



13. The time t after which it strikes the wall
 (A) 1.2 s (B) 0.97 s
 (C) 1.07 s (D) 1.98 s

14. Taking O as origin y -coordinate of A' will be
 (A) 3.75 m (B) 0.50 m
 (C) 4.25 m (D) 3.25 m

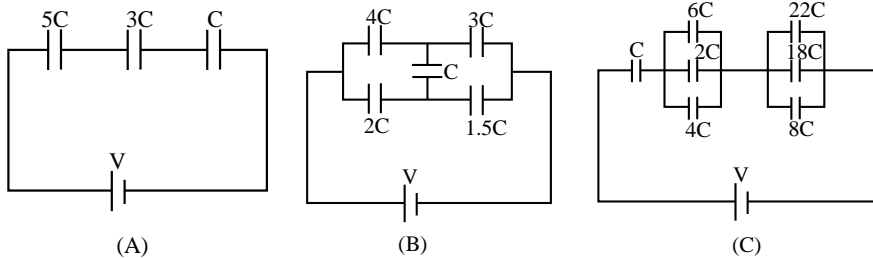
15. The kinetic energy of particle at A' will be
 (A) 0.125 J (B) 0.500 J
 (C) 1.000 J (D) None

Space for rough work

PART – B
(Matrix Match Type)

This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1. Referring to fig. match List I with List II:



Column I		Column II	
(A)	Capacitor 5C in fig A	(p)	Potential difference across no other capacitor in the given figure is more than the potential difference across this capacitor
(B)	Capacitor 1.5 C in fig B	(q)	Potential difference across no other capacitor in the given fig. is less than the potential difference across this capacitor
(C)	Capacitor 8C in fig C	(r)	No other capacitor in the given figure stores an amount of charge smaller than the stored in this capacitor
(D)	Capacitor 2C in fig C	(s)	Charge in this capacitor is more than the charge in any other capacitor in the given fig.

2. Column I specifies a point P at distance r from the center/axis of a symmetrical distribution of charge. Column II gives the variation of electric intensity at P as a function of r (>0). Match the entries of Column I with possible entries of Column II.

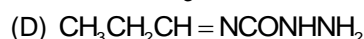
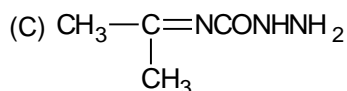
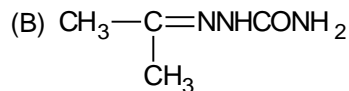
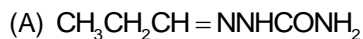
Column I		Column II	
(A)	P lies outside a long cylinder having uniform volume charge density	(p)	$E \propto \frac{1}{r^2}$
(B)	P lies inside a spherical charged conductor	(q)	$E \propto \frac{1}{r}$
(C)	P lies inside a spherical body having uniform volume charge density	(r)	$E \propto r$
(D)	P lies outside of a non-conducting solid sphere of radius R and its volume charge density varies as $\rho = \frac{\rho_0 x^2}{R^2}$, where x is distance from centre of the sphere	(s)	$E \propto r^0$

Space for rough work

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

This part contain **6 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. Compound A (molecular Formula C_3H_6O) is treated with PCC to form a product B ($MF = C_3H_6O$). B forms a shining silver mirror on warming with ammonical $AgNO_3$. B when treated with an aqueous solution of $H_2NCONHNH_2 \cdot HCl$ and sodium acetate gives a product C. Identify the structure of C.



2. Among cellulose, poly vinyl chloride, nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest is

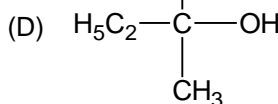
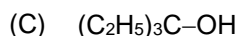
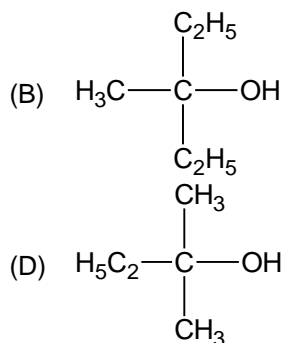
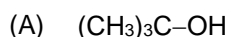
(A) Nylon

(B) Poly (vinyl chloride)

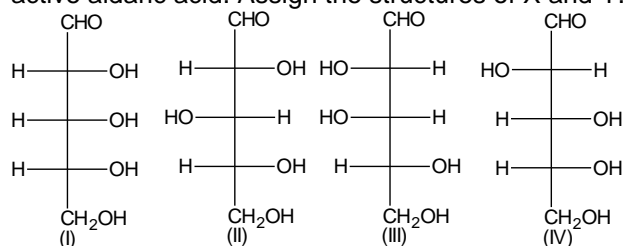
(C) Cellulose

(D) Natural rubber.

3. $C_2H_5COOC_2H_5 \xrightarrow[\text{Hydrolysis}]{CH_3MgBr(\text{excess})} P$. The product P will be

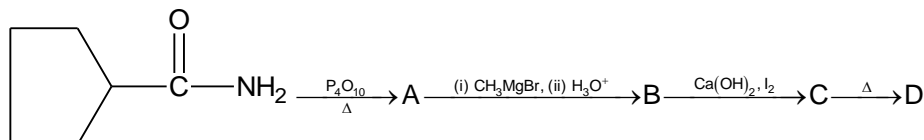
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4. Two aldopentoses X and Y give the same osazone derivative. X is oxidized to an optically active aldaric acid by dilute nitric acid. Ruff degradation of Y give a tetrose which was similarly oxidized to an optically active aldaric acid. Assign the structures of X and Y.



- (A) X = (I) and Y = (IV) (B) X = (IV) and Y = (I)
 (C) X = (III) and Y = (II) (D) X = (II) and Y = (III)

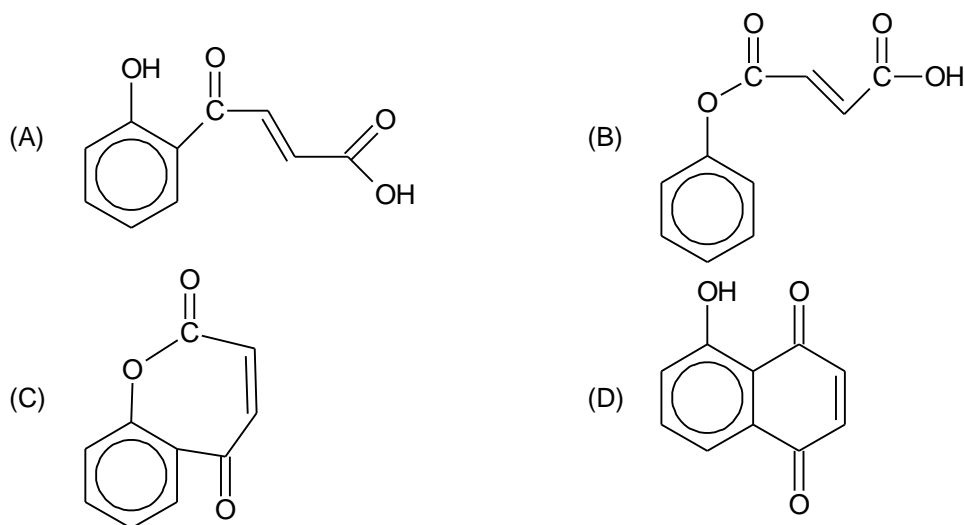
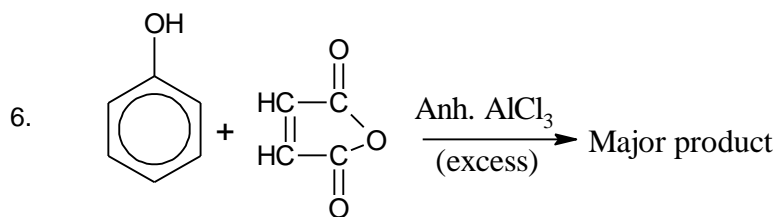
5.



D is

- | | |
|-------------|-------------|
| <p>(A) </p> | <p>(B) </p> |
| <p>(C) </p> | <p>(D) </p> |

Space for rough work



PART – A
(Assertion Reason Type)

This part contains **3 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
 (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
 (C) If **assertion** is true but **reason** is false.
 (D) If **assertion** is false but **reason** is true.
7. Assertion: Phenol is less acidic than 4-methyl phenol.
Reason: The presence of an electron releasing group in phenol makes it less acidic.
8. Assertion: The Cannizzaro reaction of C_6H_5CHO and $HCHO$ gives C_6H_5COOH and CH_3OH .
Reason: In the crossed Cannizzaro reaction of $HCHO$ with aldehydes without α -hydrogen, $HCHO$ is oxidized and the other group is reduced.
9. Assertion: In cyclohexane, the boat form conformation is less stable than chair form.
Reason: The instability of the boat form (in cyclohexane) relative to the chair form may be ascribed to relatively unfavourable interaction between the 'H' atoms around the ring.

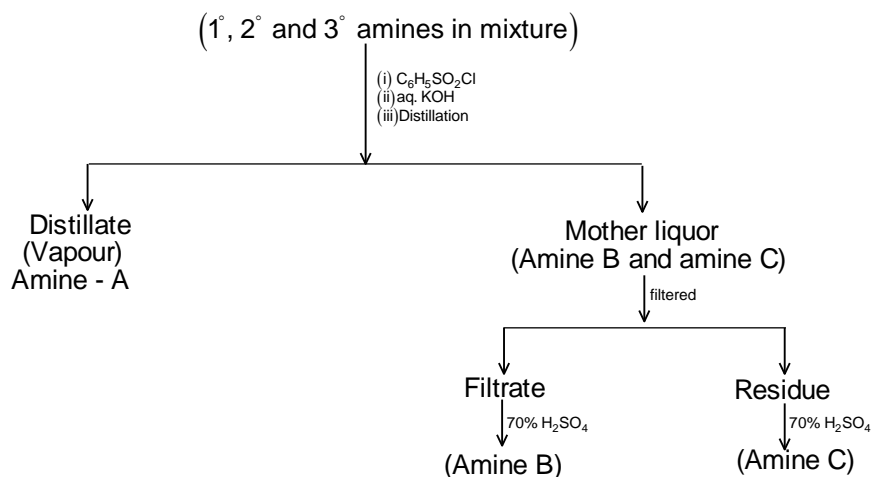
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PART – A
(Paragraph Type)

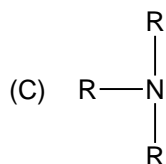
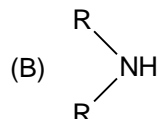
This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

Benzene sulphonyl chloride ($C_6H_5SO_2Cl$) is called Hinsberg's reagent. It is used for the distinction between primary, secondary and tertiary amines. It is also used for separation of primary, secondary and tertiary amines from their mixture.



10. Which of the following amines does not react with benzene sulphonyl chloride?



(D) Both (A) and (B)

11. Which of the following is primary amine $R-NH_2$?

(A) A
(C) C

(B) B
(D) cannot be predicted

12. The residue insoluble in KOH obtained in the Hinsberg's test, corresponds to

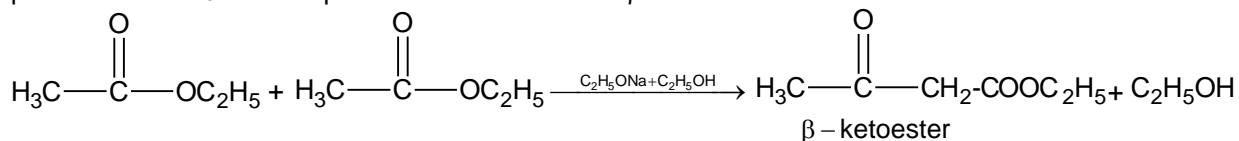
(A) primary amine
(C) tertiary amine

(B) secondary amine
(D) aromatic primary amine

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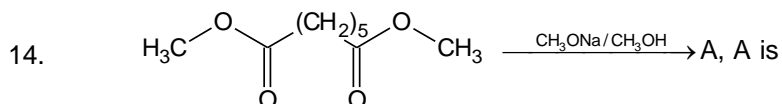
Paragraph for Questions Nos. 13 to 15

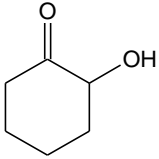
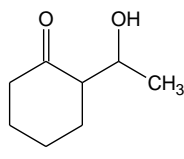
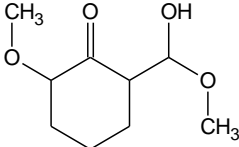
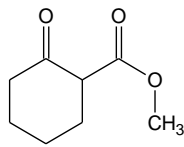
The reaction takes place between two molecules of esters (same or different). One ester should have at least one α -hydrogen atom which behaves as a reagent. The reaction is catalysed by strong base like $C_2H_5O^-Na^+$ in presence of C_2H_5OH . The product of this reaction is β -keto ester.



13. Which of the following esters will undergo Claisen condensation to form acetoacetic ester?

- (A) $CH_3COOC_2H_5$ (B) $C_6H_5COOCH_3$
 (C) $HCOOC_2H_5$ (D) None of these



- (A) 
- (B) 
- (C) 
- (D) 

15. Which among the following is the most reactive towards Claisen condensation?

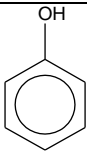
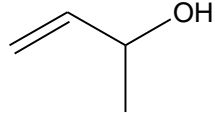
- (A) $HCOOC_2H_5$ (B) $CH_3COOC_2H_5$
 (C) $C_2H_5COOC_2H_5$ (D) $HCOOCH_3$

Space for rough work

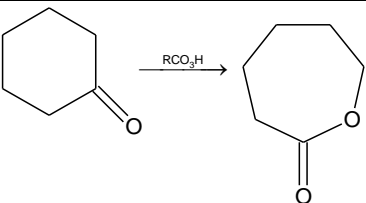
PART – B
(Matrix Match Type)

This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1. Match the following:

Column I		Column II	
(A)	$\text{CH}_3\text{-CH}_2\text{-OH}$	(p)	Gives red colour in ceric ammonium nitrate test
(B)		(q)	Iodoform test
(C)	HCHO	(r)	FeCl_3 Test
(D)		(s)	Tollen's test
		(t)	Br_2 water test

2. Match the following:

Column I		Column II	
(A)	$2\text{CH}_3\text{CHO} \xrightarrow{\text{OH}^-} \text{CH}_3\underset{\text{OH}}{\text{CH}}\text{-CH}_2\text{-CHO}$	(p)	Bayer Villiger rearrangement
(B)	$2\text{CH}_3\text{COOC}_2\text{H}_5 \xrightarrow{\text{O}^-\text{Et}} \text{CH}_3\text{COCH}_2\text{COOEt}$	(q)	Intramolecular Cannizzaro's reaction
(C)	$\text{C}_6\text{H}_5\text{COCHO} \xrightarrow{\text{O}^-\text{H}} \text{C}_6\text{H}_5\text{CH}(\text{OH})\text{COONa}$	(r)	Aldol condensation
(D)		(s)	Claisen condensation
		(t)	Perkin condensation

Space for rough work

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

This part contain **6 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. Suppose for every integer n , $\int_n^{n+1} f(x) dx = n^2$, the value of $\int_{-2}^4 f(x) dx$ is
 (A) 16 (B) 14
 (C) 19 (D) None of these
2. The points of contact of tangents drawn from the origin to the curve $y = \sin x$ will lie on the curve
 (A) $x^2 - y^2 = xy$ (B) $x^2 + y^2 = xy$
 (C) $x^2 - y^2 = x^2y^2$ (D) $x^2 + y^2 = x^2y^2$
3. Let $u = \int_0^1 \frac{\ln(x+1)}{x^2+1} dx$ and $v = \int_0^{\pi/2} \ln(\sin 2x) dx$ then
 (A) $u = 4v$ (B) $4u + v = 0$
 (C) $u + 4v = 0$ (D) $2u + v = 0$
4. The value of $\int x^m (x^{2m} + x^m + 1)(2x^{2m} + 3x^m + 6)^{\frac{1}{m}} dx$ is equal to
 (A) $\frac{1}{6(m+1)} (2x^{3m} + 3x^{2m} + 6x^m)^{\frac{(m+1)}{m}}$ (B) $\frac{x^{m+1}}{(m+1)} (2x^{2m} + 3x^m + 6)^{\frac{(m+1)}{m}}$
 (C) $\frac{x^{m+1}}{(m+1)} (2x^{2m} + 3x^m + 6)^{\frac{m}{m+1}}$ (D) $\frac{1}{6(m+1)} (2x^{3m} + 3x^{2m} + 6x^m)^{\frac{m}{m+1}}$
5. $\lim_{x \rightarrow 0} \frac{1+x+x^2 - e^x}{x^2}$ is equal to
 (A) 1 (B) 0
 (C) $\frac{1}{2}$ (D) $\frac{3}{2}$

Space for rough work

6. Let $f(x) = \sin x - \tan x \forall x \in \left(0, \frac{\pi}{2}\right)$, then the tangent drawn to the curve $y = f(x)$ at any point will
- (A) lie above the curve
(B) lie below the curve
(C) nothing can be said
(D) be parallel to a fixed line

PART – A
(Assertion Reason Type)

This part contains **3 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
(B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
(C) If **assertion** is true but **reason** is false.
(D) If **assertion** is false but **reason** is true.

7. **Assertion:** $\int_{\pi/2}^{3\pi/2} [2 \sin x] dx = 0$, where $[.]$ denotes the greatest integer function.

Reason: $2 \sin x$ decreasing function in $\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$.

8. **Assertion:** If $f(x) = x - x^2 + 1$ and $g(x) = \max \{f(t) : 0 \leq t \leq x\}$, then $\int_0^1 g(x) dx = \frac{29}{24}$.

Reason: $f(x)$ is increasing in $\left(0, \frac{1}{2}\right)$ and decreasing in $\left(\frac{1}{2}, 1\right)$

9. **Assertion:** If $F(x) = f(x) + f\left(\frac{1}{x}\right)$, where $f(x) = \int_1^x \frac{\log t}{1+t} dt$, then $F(e) = \frac{1}{2}$.

Reason: Let $I = \int_0^1 \frac{e^x dx}{x+1}$, then the value of $\int_0^1 \frac{xe^{x^2}}{x^2+1} dx = \frac{1}{2}I$.

Space for rough work

PART – A
(Paragraph Type)

This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

Let f and g be two real-value differentiable functions on \mathbb{R} satisfying

$$\int_0^x g(t) dt = 3x + \int_x^0 \cos^2 t g(t) dt \text{ and } f(x) = \lim_{\alpha \rightarrow 0} \frac{1}{\alpha^4} \int_0^\alpha \frac{(e^{x+t} - e^x) \ln^2(1+t)}{2t^3 + 3} dt$$

10. $f(\ln 2)$ is
- (A) 0 (B) $\frac{1}{6}$
(C) $\frac{3}{20}$ (D) $\frac{4}{25}$
11. Range of $g(x)$ is equal to
- (A) $\left[\frac{3}{2}, 3\right]$ (B) $\left[\frac{1}{2}, 3\right]$
(C) $\left[\frac{3}{2}, \infty\right)$ (D) $[-3, 3]$
12. The value of definite integral $\int_0^{\frac{\pi}{2}} g(x) dx$ lies in the interval
- (A) $\left(\frac{2\pi}{3}, \frac{4\pi}{5}\right)$ (B) $\left(\frac{\pi}{3}, \frac{5\pi}{6}\right)$
(C) $\left(\frac{3\pi}{3}, \frac{6\pi}{5}\right)$ (D) None of these

Paragraph for Questions Nos. 13 to 15

$f(x) = x^3 - 9x^2 + 24x + c$ has three real and distinct roots α , β and γ .

13. Possible values of c are:
- (A) $(-20, -16)$ (B) $(-20, -18)$
(C) $(-18, -16)$ (D) None of these

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14. If $[\alpha] + [\beta] + [\gamma] = 8$, then the value of c , where $[]$ represents the greatest integer function, are:
 (A) $(-20, -16)$ (B) $(-20, -18)$
 (C) $(-18, -16)$ (D) None of these
15. If $[\alpha] + [\beta] + [\gamma] = 7$, then the value of c , where $[]$ represents the greatest integer function, are:
 (A) $(-20, -16)$ (B) $(-20, -18)$
 (C) $(-18, -16)$ (D) None of these

PART – B
(Matrix Match Type)

This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1. Match the following:

Column I		Column II	
(A)	Let f be a real valued differentiable function on \mathbb{R} such that $f'(1) = 6$ and $f'(2) = 2$. Then $\lim_{h \rightarrow 0} \frac{f(3\cosh + 4\sinh - 2) - f(1)}{f(3e^h - 5\operatorname{sech} + 4) - f(2)}$ is equal to	(p)	4
(B)	For $a > 0$, let $f : [-4a, 4a] \rightarrow \mathbb{R}$ be an even function such that $f(x) = f(4a - x) \forall x \in [2a, 4a]$ and $\lim_{h \rightarrow 0^+} \frac{f(2a + h) - f(2a)}{h} = 4$, then $\lim_{h \rightarrow 0^+} \frac{f(h - 2a) - f(-2a)}{2h}$ is equal to	(q)	5
(C)	Suppose f is a differentiable function of \mathbb{R} . Let $F(x) = f(e^x)$ and $G(x) = e^{f(x)}$. If $f'(1) = e^3$ and $f(0) = f'(0) = 3$, then $\frac{G'(0)}{F'(0)}$ is equal to	(r)	3
(D)	Let $f(x) = \operatorname{Max}. (\cos x, x, 2x - 1)$ where $x \geq 0$. Then number of points of non-differentiability of $f(x)$, is equal to	(s)	2

Space for rough work

2. Match the following:

Column I		Column II	
(A)	If $f(x)$ is an integrable function for $x \in \left[\frac{\pi}{6}, \frac{\pi}{3}\right]$ and $I_1 = \int_{\pi/6}^{\pi/3} \sec^2 \theta f(2 \sin 2\theta) d\theta$ and $I_2 = \int_{\pi/6}^{\pi/3} \operatorname{cosec}^2 \theta f(2 \sin 2\theta) d\theta$, then I_1/I_2	(p)	3
(B)	If $f(x+1) = f(3+x)$ for $\forall x$, and the value of $\int_a^{a+b} f(x) dx$ is independent of a then the value of b can be	(q)	1
(C)	The value of greatest integer of $\int_1^4 \frac{\tan^{-1}[x^2]}{\tan^{-1}[x^2] + \tan^{-1}[25 + x^2 - 10x]} dx$ (where $[.]$ denotes the greatest integer function) is	(r)	2
(D)	If $I = \int_0^2 \sqrt{x + \sqrt{x + \sqrt{x + \dots \infty}}} dx$ (where $x > 0$), then $[I]$ is equal to (where $[.]$ denotes the greatest integer function)	(s)	4

Space for rough work

FIITJEE COMMON TEST

TWO YEAR CRP (CTY - 1719)

BATCHES: CDE - LOT

PCM (PAPER – II)

PHASE - IV

PAPER CODE: XXXX.X

DATE: DD.MM.YYYY

ANSWER KEYS [SET – A]

PHYSICS

PART – A

- | | | | |
|-------|-------|-------|-------|
| 1. C | 2. B | 3. D | 4. B |
| 5. C | 6. B | 7. B | 8. C |
| 9. D | 10. A | 11. B | 12. D |
| 13. B | 14. C | 15. A | |

PART – B

- (A) – (q, r); (B) – (p, r); (C) – (q, r); (D) – (r)
- (A) – (q); (B) – (s); (C) – (r); (D) – (p)

CHEMISTRY

PART – A

- | | | | |
|-------|-------|-------|-------|
| 1. A | 2. D | 3. D | 4. C |
| 5. C | 6. D | 7. D | 8. D |
| 9. A | 10. C | 11. B | 12. B |
| 13. A | 14. D | 15. B | |

PART – B

- (A) - (p, q); (B) - (r, t); (C) - (s); (D) - (p, q, t)
- (A) - (r); (B) - (s); (C) - (q); (D) - (p)

MATHEMATICS

PART – A

- | | | | |
|-------|-------|-------|-------|
| 1. C | 2. C | 3. B | 4. A |
| 5. C | 6. A | 7. D | 8. A |
| 9. B | 10. B | 11. A | 12. C |
| 13. A | 14. B | 15. C | |

PART – B

- (A) – (p); (B) – (s); (C) – (r); (D) – (s)
- (A) – (q); (B) – (r, s); (C) – (q); (D) – (p)