P17-17

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ADVANCED PATTERN CUMULATIVE TEST-3 (ACT-3)

TARGET : JEE (MAIN+ADVANCED) 2018

PAPER-1

COURSE : VIJAY (01JR)

Date : 31-12-2017 **Time: 3 Hours** **Maximum Marks : 171**

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

GENERAL :

1. The sealed booklet is your Question Paper. Do not break the seal till you are instructed to do so.
2. The question paper CODE is printed on the right hand top corner of this sheet and the right hand top corner of the back cover of this booklet.
3. Use the Optical Response Sheet (ORS) provided separately for answering the question.
4. Blank spaces are provided within this booklet for rough work.
5. Write your Name and Roll Number in the space provided on the below cover.
6. After the open booklet, verify that the booklet contains all the **54** questions along with the options are legible.

QUESTION PAPER FORMAT AND MARKING SCHEME :

7. The question paper has three parts : **Mathematics, Physics and Chemistry**. Each part has three sections.
8. Each section as detailed in the following table :

Section	Question Type	Number of Questions	Category-wise Marks for Each Question				Maximum Marks of the Section
			Full Marks	Partial Marks	Zero Marks	Negative Marks	
1	Comprehension (SCQ)	8	+3 If only the bubbles corresponding to the correct answer is darkened	–	0 if not attempted	–1 In all other cases	24
2	Single digit Integer (0-9)	7	+3 If only the bubbles corresponding to the correct answer is darkened	–	0 if not attempted	–1 In all other cases	21
3	Matching Type (MCQ)	3	+4 If only the bubble(s) corresponding to all the correct option(s) is(are) darkened	+1 For darkening a bubble corresponding to each correct option, provided NO incorrect option is darkened	0 If none of the bubbles is darkened	–2 In all other cases	12

OPTICAL RESPONSE SHEET :

9. Darken the appropriate bubbles on the original by applying sufficient pressure.
10. The original is machine-gradable and will be collected by the invigilator at the end of the examination.
11. Do not tamper with or mutilate the ORS.
12. Write your name, roll number and the name of the examination centre and sign with pen in the space provided for this purpose on the original. **Do not write any of these details anywhere else**. Darken the appropriate bubble under each digit of your roll number.

DARKENING THE BUBBLES ON THE ORS :

13. Use a **BLACK BALL POINT** to darken the bubbles in the upper sheet.
14. Darken the bubble **COMPLETELY.**
15. Darken the bubble **ONLY** if you are sure of the answer.
16. The correct way of darkening a bubble is as shown here : ●
17. There is **NO** way to erase or "un-darkened bubble.
18. The marking scheme given at the beginning of each section gives details of how darkened and **not darkened** bubbles are evaluated.

NAME OF THE CANDIDATE : ……

ROLL NO. : ……

I have read all the instructions and shall abide by them

I have verified the identity, name and roll number of the candidate.

- -
Signature of the Candidate

- -
Signature of the Invigilator

DO NOT BREAK THE SEALS WITHOUT BEING INSTRUCTED TO DO SO BY THE INVIGILATOR

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PART : I MATHEMATICS

SECTION – 1 : (Maximum Marks : 24)

- This section contains **FOUR** paragraphs
- Based on each paragraph, there will be **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four option is correct
- For each question, darken the bubble corresponding to the correct option in the ORS
- Marking scheme :

  +3 If only the bubble corresponding to the correct option is darkened

  0 If none of the bubble is darkened

  –1 In all other cases

Paragraph for Question Nos. 01 to 02

A multiple choice question has n options, of which only one is correct. If a student does home work, then it is sure to identify the correct answer; otherwise, answer is choosen at random. Let E be the event that student does home work with P(E) = p and F be the event that student answers question correctly.

1. If n = 5, p = 0.75 the value of P(E/F) equals

(A) $\frac{8}{16}$ (B) $\frac{10}{16}$ (C) $\frac{12}{16}$ (D) $\frac{15}{16}$

2. Largest set of values of p for which relation $P(E/F) \geq P(E)$ holds is

(A) [0,1] (B) R (C) $\left[0, \frac{1}{2}\right]$ (D) $\left[\frac{1}{2}, 1\right]$

Space for Rough Work

Paragraph for Question Nos. 03 to 04

Let $f(x) = x^4 + x^2$, $g(x) = x^2 + x$

3. If $f(\cos x) = g(\sin y) = \tan^2 z + \cot^2 z$ then

(A) $x = n\pi, n \in I, y = \frac{\pi}{2} + 2n\pi, n \in I, z = n\pi \pm \frac{\pi}{4}, n \in I$

(B) $x = 2n\pi, n \in I, y = \frac{\pi}{4} + n\pi, n \in I, z = n\pi + \frac{\pi}{2}; n \in I$

(C) $x = 2n\pi, n \in I, y = \frac{\pi}{3} + n\pi, n \in I, z = n\pi - \frac{\pi}{6}; n \in I$

(D) $x = n\pi, n \in I, y = \frac{\pi}{6} + 2n\pi, n \in I, z = n\pi \pm \frac{\pi}{4}, n \in I$

4. If $g(\sin x) = 1$ then the value of $f(\cos x)$ is

(A) 0 (B) 1

(C) 2 (D) 4

Space for Rough Work

Paragraph for Question Nos. 05 to 06

Let $x^2 + y^2 \pm 4x + 3 = 0$ be two fixed circles. A triangle ABC has vertices A(0, 2), B(2, $2 + 2\sqrt{3}$), C(–2, $2 + 2\sqrt{3}$) ΔABC slides in negative direction of y-axis and stops when its sides touches circles. Side A'B' touching at P_1 and side A'C' touching at P_2. Point A slides to become A', point B slides to become B'. Point C slides to become C'

5. The ratio in which P_1 divides A'B' is

(A) $\sqrt{3} - 1$

(B) $\frac{4 - \sqrt{3}}{\sqrt{3}}$

(C) $\frac{\sqrt{3} - 1}{\sqrt{3}}$

(D) $\frac{2 + \sqrt{3}}{\sqrt{3}}$

6. The ordinate of the vertex A' of triangle A'B'C' is

(A) $2 - \sqrt{3}$

(B) $2 - 2\sqrt{3}$

(C) $2\sqrt{3} - 2$

(D) $1 - 2\sqrt{3}$

Space for Rough Work

Paragraph for Question Nos. 07 to 08

Let f(x) is a cubic polynomial which is having local maximum at (1, 2) and f ′(x) has local extremum at x = 0. If f(0) = 1 then answer the following

7. If g(x) + f(x) = 0 then complete interval of increasing of the function g(x)

(A) R – (–1 , 1)

(B) $[-1,\infty)$

(C) $[1,\infty)$

(D) $[0,1]$

8. Number of real roots of the equation $f(x)-f(-x)=6x-10$ is

(A) 1

(B) 2

(C) 3

(D) 0

Space for Rough Work

SECTION – 2 : (Maximum Marks : 21)

- This section contains **SEVEN** questions
- The answer to each question is a **SINGLE DIGIT INTEGER** ranging from 0 to 9, both inclusive
- For each question, darken the bubble corresponding to the correct integer in the ORS
- Marking scheme :

  +3 If the bubble corresponding to the answer is darkened

  0 If none of the bubbles is darkened

  –1 In all other cases

9. If α is number of solutions of $|x| = 1 + \ln\{x\}$ (where $\{x\}$ is fractional part function) then shortest distance between $(0, -\alpha)$ and a variable point on the curve $y = 2 + x^2 + 2x^4 + 4x^6 + 6x^8 + 8x^{10} + 10x^{12}$ is

10. A ray of light travelling along the line $x + y = 1$ is incident on the x-axis and after refraction its enters the other side of x-axis in 4^{th} quadrant by turning $\pi/6$ away from the x-axis. The equation of the line along which the refracted ray travels is $x + \left(p - \sqrt{q}\right)y = 1$, then p + q

11. Let n(A) = 3, n(B) = 5, $f : A \to B$ be a mapping such that $f(i) \le f(j)$, $i < j$; $i, j \in A$. If number of such mappings are N, then sum of digits in N is equal to

Space for Rough Work

12. If $\int_0^{\pi} xf(\cos^2 x + \tan^4 x)dx = \pi k \int_0^{\frac{\pi}{2}} f(\cos^2 x + \tan^4 x)dx$, then value of k is

13. Number of real solution of equation $(x^2 + 6x + 7)^2 + 6x^2 + 35x + 49 = 0$ are equal to

14. If $(k + 1)x^2 + y^2 = 1$, $k \in N$ and $t^2 - 2(4k - 1)t + 15k^2 - 2k - 7 > 0$, $\forall\ t \in R$ then maximum value of $12x^2 - 3y^2 + 16xy$ is

15. If $\int (x^{7n} + x^{2n} + x^n)(2x^{6n} + 7x^n + 14)^{1/n} dx = \frac{(2x^{7n} + 7x^{2n} + 14x^n)^{\left(\frac{n+1}{n}\right)}}{k(n+1)}$ + C, where C is arbitrary constant and $n \in N$, then $\frac{k}{2}$ is equal to

Space for Rough Work

SECTION – 3 : (Maximum Marks : 12)

- õ This section contains **THREE** questions of matching type.
- õ This section contains **ONE** table having 3 columns and 4 rows
- õ Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- õ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- õ For each question, marks will be awarded in one of the following categories :

Full Marks	:	+4	If only the bubble(s) corresponding to all the correct option(s) is(are) darkened.
Partial Marks	:	+1	For darkening a bubble corresponding to **each correct option,** provided NO incorrect option is darkened.
Zero Marks	:	0	If none of the bubbles is darkened.
Negative Marks	:	–2	In all other cases.

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

Answer Q.16, Q.17 and Q.18 by appropriately matching the information given in the three columns of the following table

Let ℓ_a be the length of tangent to circle $x^2 + y^2 – 6x – 4y – 11 = 0$

drawn from point P(1, a) for items in column-1

Let f(x) = maximum {sin x, cos x, 1– cos x}, $x \in (0, b\pi)$ for items in column-2

Let S_n be the number of triangles that can be formed using the vertices of a 'n' sided polygon such that no side of polygon is side of triangle.

Space for Rough Work

Column-1		Column-2		Column-3	
I	$\ell_a = 4$	(i)	f(x) is not differentiable at 3 points	(P)	$S_n = 2$
II	$\ell_a = \sqrt{5}$	(ii)	$\lim\limits_{x \to \frac{\pi^-}{2b}} \dfrac{f(x)-1}{x-\frac{\pi}{2b}} = 0$	(Q)	$S_n = 7$
III	$\ell_a = 5$	(iii)	$\int\limits_{\frac{\pi}{2}}^{b\frac{\pi}{2}} f(x)\,dx = \pi + 2$	(R)	$S_n = 50$
IV	$\ell_a = 1$	(iv)	f(x) is not continuous at 2 points	(S)	$S_n = 70$

16. If a = 8, b = 3, n = 7 then which of the following is/are incorrect ?

(A) (I) (ii) (Q) (B) (III) (iii) (P) (C) (I) (iii) (Q) (D) (I) (i) (Q)

17. If a = 7, b = 2, n = 6 then which of the following is/are incorrect ?

(A) (II) (i) (R) (B) (II) (iii) (P) (C) (IV) (ii) (P) (D) (II) (iv) (P)

18. If a = – 4, b = 1 n = 10 then which of the following is/are incorrect ?

(A) (II) (iv) (S) (B) (I) (ii) (R) (C) (I) (i) (R) (D) (III) (iii) (R)

Space for Rough Work

PART : II PHYSICS

SECTION – 1 : (Maximum Marks : 24)

- This section contains **FOUR** paragraphs
- Based on each paragraph, there will be **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four option is correct
- For each question, darken the bubble corresponding to the correct option in the ORS
- Marking scheme :

  +3 If only the bubble corresponding to the correct option is darkened

  0 If none of the bubble is darkened

  –1 In all other cases

Paragraph for Questions 19 and 20

A certain constant force starts acting on a body moving with a constant velocity '$\vec{V}$' from t = 0. After a time interval Δt, the speed of the body is reduced by half and after the same time interval the speed is again reduced by half. Answer the following two questions.

19. Speed of the body after a time interval $3\Delta t$ from the moment when constant force starts acting will be :

(A) $\frac{V}{8}$ (B) $\frac{\sqrt{7}}{4}V$ (C) $\frac{2V}{9}$ (D) $\frac{\sqrt{5}}{4}V$

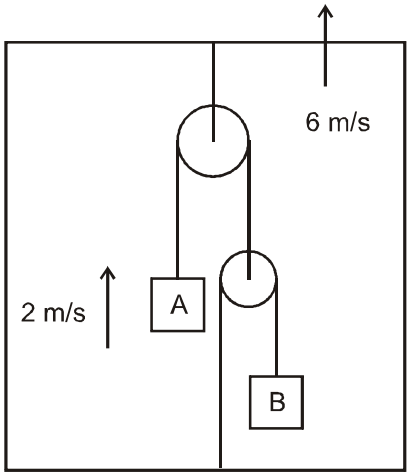
20. Radius of curvature of the path of the particle just after constant force start acting on it, will be

(A) $\frac{64V\Delta t}{\sqrt{63}}$ (B) $\frac{32V\Delta t}{\sqrt{33}}$ (C) $\frac{16V\Delta t}{\sqrt{15}}$ (D) $\frac{4V\Delta t}{\sqrt{3}}$

Space for Rough Work

Paragraph for Questions 21 and 22

Consider the given system shown in figure. At certain instant velocity of lift (w.r.t. ground), velocity of A (relative to lift) is shown. Velocity of lift is constant.



21. Choose the correct option.
(A) Velocity of A relative to ground is 6 m/s upward
(B) Velocity of B relative to ground is 2 m/s upward
(C) Velocity of B relative to ground is 4 m/s downward
(D) Velocity of A relative to ground is 4 m/s upward

22. If $m_A = m_B = m$, choose the correct option.

(A) acceleration of A is $\frac{g}{3}$ downward

(B) acceleration of A is $\frac{g}{5}$ upward

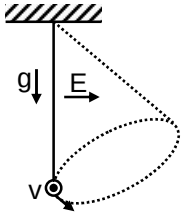
(C) force on the ceiling of lift by string is $\frac{6mg}{5}$

(D) acceleration of B is $\frac{g}{5}$ downward

Space for Rough Work

Paragraph for Questions 23 and 24

A positively charged particle of charge q and mass m is suspended from a point by a straight of length ℓ. In the space a uniform horizontal electric field E exists. The particle is drawn aside so that the string becomes vertical and then it is projected horizontally with velocity v such that the particle starts to move along a circle with same constant speed v. Answer the following two questions. (Given that qE = mg)



23. Speed v is :

(A) $2\sqrt{\ell g}$ (B) $\sqrt{\ell g}$ (C) $\sqrt{2\ell g}$ (D) $\sqrt{\sqrt{2}\ell g}$

24. Time period of the motion is:

(A) $2\pi\sqrt{\frac{\ell}{2g}}$ (B) $2\pi\sqrt{\frac{\ell}{g}}$ (C) $2\pi\sqrt{\frac{\ell}{\sqrt{2}g}}$ (D) $2\pi\sqrt{\frac{\sqrt{2}\ell}{g}}$

Space for Rough Work

Paragraph for Questions 25 and 26

The minimum and maximum distances of a satellite from the centre of the earth are 2R and 4R respectively, where R is the radius of earth and M is the mass of the earth. Answer the following two questions. (Given that total mechanical energy of satellite plus earth system in elliptical orbit is given by $-\frac{GMm}{2a}$, where M is mass of earth, m is mass of satellite and a is semi major axis of elliptical orbit.)

25. Radius of curvature of the path of the particle at apogee is:

(A) 2R/3 (B) 4R/3 (C) 6R/3 (D) 8R/3

26. Radius of curvature of the path of the particle at perigee is:

(A) 2R/3 (B) 4R/3 (C) 6R/3 (D) 8R/3

Space for Rough Work

SECTION – 2 : (Maximum Marks : 21)

- This section contains **SEVEN** questions
- The answer to each question is a **SINGLE DIGIT INTEGER** ranging from 0 to 9, both inclusive
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- Marking scheme :

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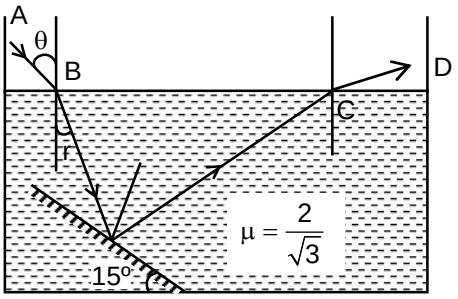
  0 If none of the bubbles is darkened

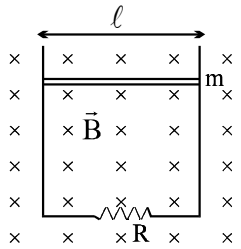
  –1 In all other cases

27. An inclined plane mirror lies at the bottom of a large tank containing a liquid as shown in figure. A narrow monochromatic beam falls on surface of water at angle of incidence θ. Beam comes out of the liquid at C. If maximum angle of incidence θ for which light comes out liquid is $\sin^{-1}\left(\frac{\sqrt{3}}{K}\right)$ then find value of K.



Space for Rough Work

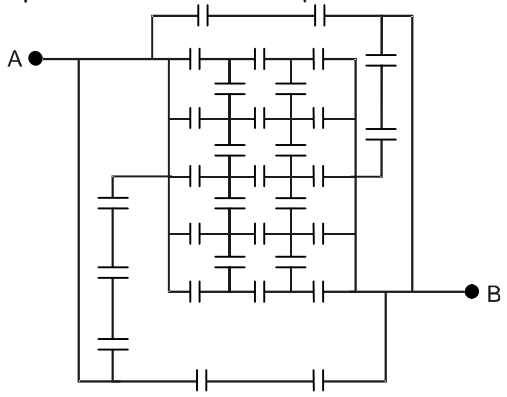
28. A horizontal wire is free to slide on the vertical rails of a conducting frame as shown in figure. The wire has a mass m and length ℓ and the resistance of the circuit is R. If a uniform magnetic field B is directed perpendicular to the frame, terminal speed of the wire as it falls under the force of gravity. is $\frac{\alpha mgR}{B^2\ell^2}$. Find α.



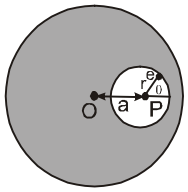
29. A uniform solid sphere of mass M and radius R is rotating with respect to its diameter, with a constant angular velocity ω in free space (i.e. there is no one to exert any force on sphere). Consider an hemispherical part of the sphere (Such that axis of rotation lies in the plane dividing the sphere in two hemispheres), net force on this hemisphere due to another hemisphere is $\frac{nM\omega^2R}{16}$. Here n is an integer. Find n.

Space for Rough Work

30. 32 capacitors are connected in a circuit as shown in the figure. The capacitance of each capacitor is 3μF. Find equivalent capacitance across AB in μF.



31. A cavity of radius r is present inside a solid dielectric sphere of radius R, having a volume charge density of ρ. The distance between the centres of the sphere and the cavity is a. An electron e is kept inside the cavity at an angle $\theta = 45^0$ as shown. The electron (mass m and charge –e) touches the sphere again after time $\left(\frac{P\sqrt{2}\, mr\, \varepsilon_0}{e a \rho}\right)^{1/2}$? Find the value of P. Neglect gravity.



Space for Rough Work

32. Three identical uniform rods, each of length, are joined to form a rigid equilateral triangle. Its radius of gyration about an axis passing through a corner and perpendicular to the plane of the triangle is $\frac{\ell}{\sqrt{n}}$ where n is :

33. An α particle is moving along a circle of radius R with a constant angular velocity ω. Point A lies in the same plane at a distance 2R from the centre. Point A records magnetic field produced by α particle. If the minimum time interval between two successive times at which A records zero magnetic field is 't', the angular speed ω, in terms of t is $\frac{\alpha\pi}{3t}$. Find α.

Space for Rough Work

SECTION – 3 : (Maximum Marks : 12)

- This section contains **THREE** questions of matching type.
- This section contains **ONE** table having 3 columns and 4 rows
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- For each question, marks will be awarded in one of the following categories :

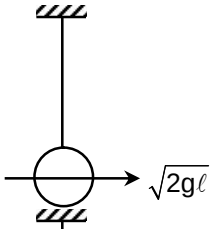
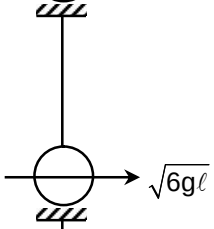
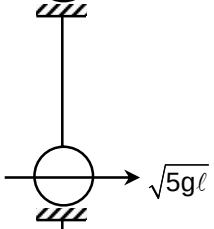
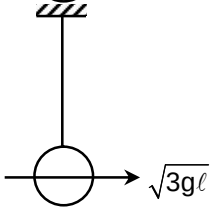
Full Marks	:	+4	If only the bubble(s) corresponding to all the correct option(s) is(are) darkened.
Partial Marks	:	+1	For darkening a bubble corresponding to **each correct option,** provided NO incorrect option is darkened.
Zero Marks	:	0	If none of the bubbles is darkened.
Negative Marks	:	–2	In all other cases.

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

Space for Rough Work

Answer Q.34. Q35 and Q.36 by appropriately matching the information given in the three columns of the following table.

Column-1 shows the bob of mass m tied to string of length ℓ and initial velocity (at lowest point) as shown in the figure. Column-2 shows the angle made by string with downward vertical and column-3 shows speed of bob at angle θ.

Column-1		Column-2		Column-3	
(I)		(i)	$\theta = 90°$	(P)	$V = \sqrt{3g\ell}$
(II)		(ii)	$\theta = 180°$	(Q)	$V = \sqrt{6g\ell}$
(III)		(iii)	$\theta = 60°$	(R)	$V = 0$
(IV)		(iv)	$\theta = 0°$	(S)	$V = \frac{\sqrt{g\ell}}{3\sqrt{3}}$

34. Which of the following correctly represent the combination at highest point of trajectory.
(A) (I) (i) (R) (B) (II) (i) (R) (C) (IV) (iii) (S) (D) (III) (ii) (S)

35. Which of the following correctly represent the combination of situation with speed and angle.
(A) (I) (i) (S) (B) (II) (ii) (S) (C) (III) (iii) (Q) (D) (III) (i) (P)

36. Which of the following correctly represent the combination for maximum tension in the string during the motion.
(A) (I) (iv) (Q) (B) (II) (iv) (Q) (C) (II) (ii) (R) (D) (III) (iv) (P)

Space for Rough Work

PART - III : CHEMISTRY

Atomic masses : [H = 1, D = 2, Li = 7, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Al = 27, Si = 28, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Cu = 63.5, Zn = 65, As = 75, Br = 80, Ag = 108, I = 127, Ba = 137, Hg = 200, Pb = 207]

SECTION – 1 : (Maximum Marks : 24)

- This section contains **FOUR** paragraphs
- Based on each paragraph, there will be **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four option is correct
- For each question, darken the bubble corresponding to the correct option in the ORS
- Marking scheme :

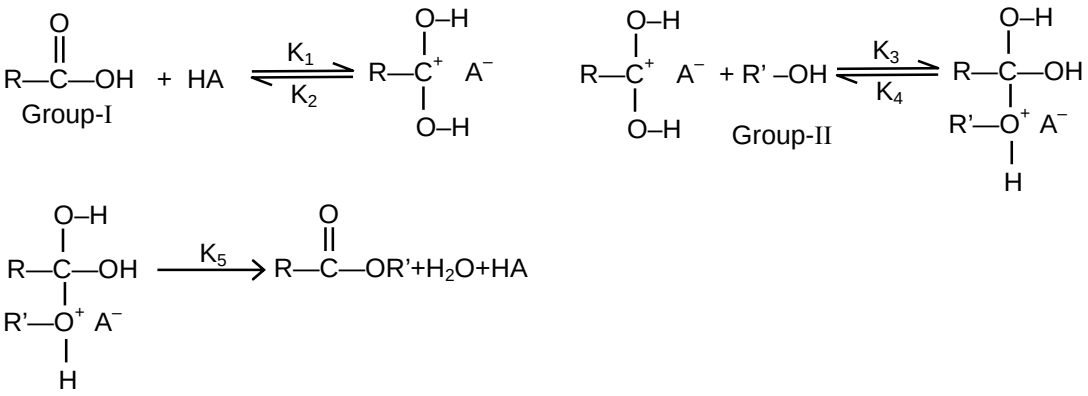
  +3 If only the bubble corresponding to the correct option is darkened

  0 If none of the bubble is darkened

  –1 In all other cases

Paragraph for Question Nos. 37 to 38

These are reaction steps in a certain polymerization process, which may occur by either an uncatalysed or an acid-catalysed pathway.



Space for Rough Work

37. Given data are for the acid-catalysed reaction. Select incorrect statement :

[RCOOH], M	[R'OH], M	[HA], M	Initial Rate, M min^{-1}
0.35	0.35	0.50	4.60
0.62	0.35	0.50	8.14
0.35	0.81	0.50	10.6
0.35	0.50	0.75	9.84

(A) Order wrt RCOOH is first order
(B) Order wrt R'OH is first order
(C) Order wrt HA is first order
(D) Order wrt HA is second order

38. Using given data find the value of K:
(A) 75 M^{-2} min^{-1}
(B) 3755 M^{-2} min^{-1}
(C) 15 M^{-1} min^{-1}
(D) 75 M^{-1} min^{-1}

Paragraph for Question Nos. 39 to 40

Consider reaction in which reactant 'R' is converted into product 'P' : $R \rightarrow P$.
When the initial concentration of R is 0.5 M, the half life of the reaction is 20 minute. When the initial concentration is increased to 1.3 M, the half life decreases to 7.69 minute.

39. What is the order of the reaction?
(A) 0 (B) 1 (C) 2 (D) 3

40. What is the rate constant of the reaction?
(A) 0.1 $M^{-1}min^{-1}$ (B) 0.6 $M^{-1}min^{-1}$ (C) 0.3 $M^{-1}min^{-1}$ (D) 1.0 $M^{-1}min^{-1}$

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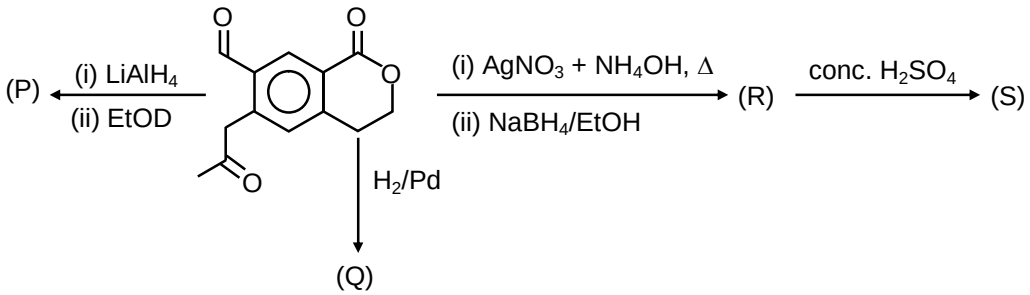
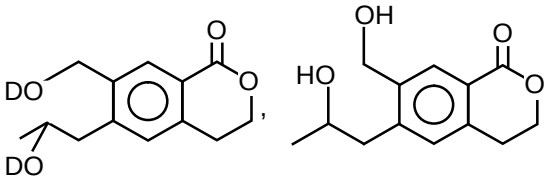
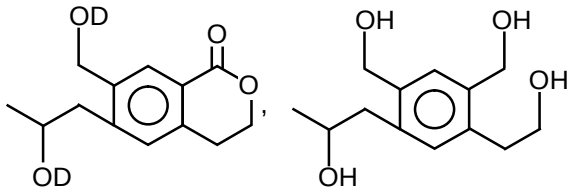
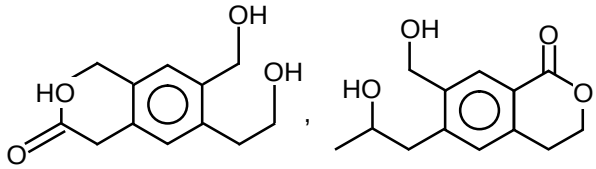
Paragraph for Question Nos. 41 to 42

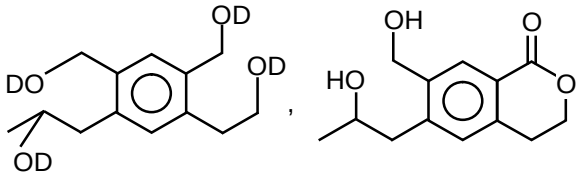


41. (P) and (Q) are respectively :

(A) 

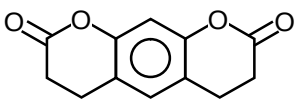
(B) 

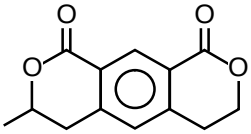
(C) 

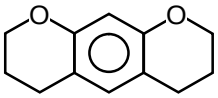
(D) 

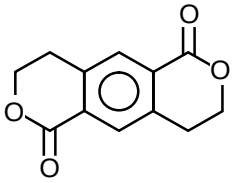
Space for Rough Work

42. (S) may be

(A) 

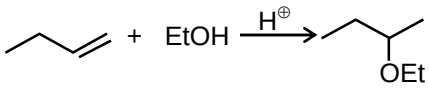
(B) 

(C) 

(D) 

Paragraph for Question Nos. 43 to 44

Observe the following reaction :



43. The electrophile in first step is

(A) $CH_3\overset{\oplus}{C}H_2$

(B) $H^{\oplus}$

(C) $CH_3-CH_2-\overset{\oplus}{C}H-CH_3$

(D) $CH_3CH_2CH_2\overset{\oplus}{C}H_2$

44. The electrophile in second step is

(A) $CH_3\overset{\oplus}{C}H_2$

(B) $H^{\oplus}$

(C) $CH_3\overset{\oplus}{C}HCH_2CH_3$

(D) $CH_3CH_2CH_2\overset{\oplus}{C}H_2$

Space for Rough Work

SECTION – 2 : (Maximum Marks : 21)

- This section contains **SEVEN** questions
- The answer to each question is a **SINGLE DIGIT INTEGER** ranging from 0 to 9, both inclusive
- For each question, darken the bubble corresponding to the correct integer in the ORS
- Marking scheme :

  +3 If the bubble corresponding to the answer is darkened

  0 If none of the bubbles is darkened

  –1 In all other cases

45. How many of the following ores are oxide ore?

Bauxite, Carnallite, Sylvine, Galena, Argentite, Cuprite, Cassiterite

46. Number of sp^3 hybridized boron atom(s) present in borax is :

47. In a gaseous reaction $A_{2(g)} \longrightarrow B_{(g)} + \frac{1}{2}C_{(g)}$,there is increase in pressure from 100 mm Hg to 120 mm Hg in 5 minutes. Rate of disappearance of A_2 in mm min^{-1} is :

Space for Rough Work

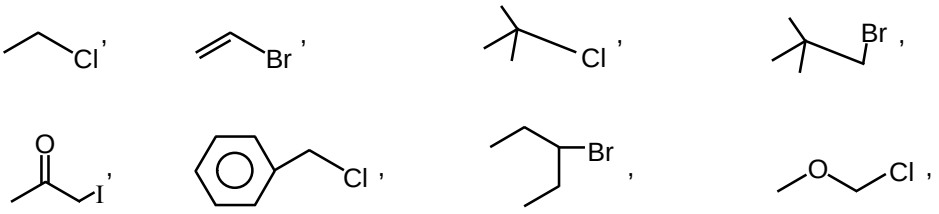
48. How many of the following parameters/properties are greater for diamond as compared to graphite?

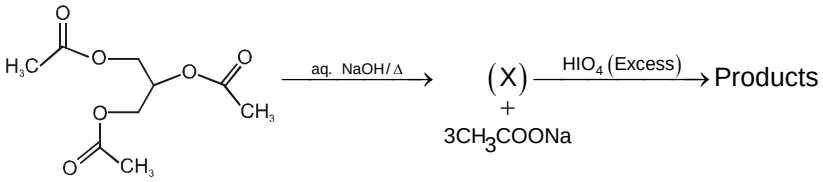
Density, Electrical resistivity, Thermal conductivity, Stability, % s-character for hybridised orbitals, Hardness, Bond angle, C–C (bond length), Standard enthalpy of formation.

49. How many of the following shows the addition reaction without rearrangement with 3-methyl but-1-ene

(i) HBr/peroxide
(ii) ICl
(iii) Cl_2/H_2O
(iv) $Hg(OCOCH_3)_2$; H_2O/ $NaBH_4$
(v) B_2H_6 inTHF / H_2O_2,OH^-
(vi) Cl_2 / CCl_4
(vii) dil. H_2SO_4
(viii) HCl / peroxide

50. How many in following compounds give good yield of S_N^2 reaction.



51. 

Write the number of moles of carboxylic acid present in end products.

Space for Rough Work

SECTION – 3 : (Maximum Marks : 12)

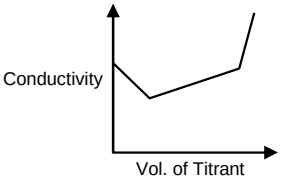
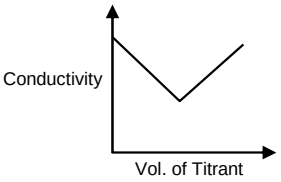
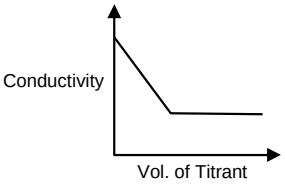
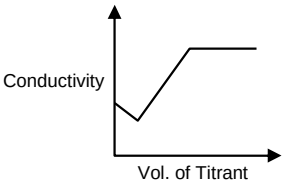
- This section contains **THREE** questions of matching type.
- This section contains **ONE** table having 3 columns and 4 rows
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- For each question, marks will be awarded in one of the following categories :

Full Marks	:	+4	If only the bubble(s) corresponding to all the correct option(s) is(are) darkened.
Partial Marks	:	+1	For darkening a bubble corresponding to **each correct option,** provided NO incorrect option is darkened.
Zero Marks	:	0	If none of the bubbles is darkened.
Negative Marks	:	–2	In all other cases.

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

Space for Rough Work

The curves in Column 1 shows the variation of conductivity during different titrations. The analyte and titrants has been listed in Column 2 & Column 3 respectively.

Column-1		Column-2		Column-3	
(I)		(i)	NH_4OH	(P)	HCl
(II)		(ii)	CH_3COOH	(Q)	NaOH
(III)		(iii)	HCl	(R)	CH_3COOH
(IV		(iv)	NaOH	(S)	NH_4OH

Space for Rough Work

52. Which of the following is/are correct combination of curves in Column 1 ?

(A) (II) (iii) (Q)

(B) (I) (i) (P)

(C) (I) (iii) (S)

(D) (I) (ii) (Q)

53. The correct combination(s) for a titration in which conductance at equivalent point is lower than initial :

(A) (I) (ii) (Q)

(B) (I) (iii) (S)

(C) (III) (iv) (R)

(D) (IV) (ii) (S)

54. Select the incorrect combination(s) :

(A) (I) (iii) (Q)

(B) (IV) (ii) (S)

(C) (I) (iii) (S)

(D) (I) (iv) (R)

Space for Rough Work