



Sri Chaitanya IIT Academy.,India.

A.P. T.S. KARNATAKA TAMILNADU MAHARASTRA DELHI RANCHI

A right Choice for the Real Aspirant

ICON Central Office - Madhapur - Hyderabad

SEC: Sr.Super60_STERLING BT

JEE-MAIN

Date: 07-09-2025

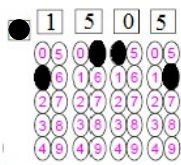
Time: 02:00PM to 05:00PM

CTM-02

Max. Marks: 300

IMPORTANT INSTRUCTION:

- Immediately fill in the Admission number on this page of the Test Booklet with **Blue/Black Ball Point Pen** only.
- The candidates should not write their Admission Number anywhere (except in the specified space) on the Test Booklet/ Answer Sheet.
- The test is of **3 hours** duration.!
- The Test Booklet consists of **75 Questions**. The maximum marks are **300**.
- There are **three** parts in the question paper 1,2,3 consisting of **Mathematics, Physics and Chemistry** having **25 Questions** in each subject and subject having **two sections**.
(I) Section –I contains **20 Multiple Choice Questions** with only one correct option.
Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.
(II) Section-II contains **05 Numerical Value Type Questions**.
■ The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).
To cancel any attempted question bubble on the question number box.
For example: To cancel attempted Question 21. Bubble on 21 as shown below



Question Answered for Marking Question Cancelled for Marking

Marking scheme: +4 for correct answer, 0 if **not attempt** and -1 in all other cases.

- Use **Blue / Black Point Pen** only for writing particulars / marking responses on the Answer Sheet. **Use of pencil is strictly prohibited.**
- No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electron device etc, except the Identity Card inside the examination hall.
- Rough work is to be done on the space provided for this purpose in the Test Booklet only.
- On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Hall. **However, the candidate are allowed to take away this Test Booklet with them.**
- Do not fold or make any stray marks on the Answer Sheet**

Name of the Candidate (in Capital): _____

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Invigilator's Signature: _____



07-09-25_Sr.Super60_STERLING BT_Jee-Main_CTM-02_Test Syllabus

MATHEMATICS : Functions and Inverse Trigonometric Function , LCD , AOD , Indefinite Integration , Definite Integration

PHYSICS : Thermal physics , Experiments , Ray Optics , Heat Transfer , Geometrical Optics , Wave Optics , Gravitation , Electrostatics

(In Phy & Che Each Out of 25Qs, 10 Qs From NCERT is Mandatory)

CHEMISTRY : Nomenclature, Isomerism , GOC , Alkanes , Alkene & Alkyne , Benzene , Alkyl halides & aryl halides , Alcohols , Phenols , Ethers , Aldehydes & Ketones

(In Phy & Che Each Out of 25Qs, 10 Qs From NCERT is Mandatory)



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**MATHEMATICS****Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which **ONLY ONE** option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

- Let $f(x) + 2f\left(\frac{1}{x}\right) = x^2 + 5$ and $2g(x) - 3g\left(\frac{1}{2}\right) = x, x > 0$ if $\alpha = \int_1^2 f(x) dx$ and $\beta = \int_1^2 g(x) dx$ then $18\alpha + 2\beta =$
 1) 2 2) 0 3) 20 4) 22
- If the range of the function $f(x) = \sqrt{3-x} + \sqrt{2+x}$ is $[\sqrt{a}, \sqrt{b}]$, then $a + b =$
 1) 10 2) 5 3) 15 4) 20
- Let $f(x) = 3x^2 - 7x + c$ where 'c' is a variable co-efficient and $x > \frac{7}{6}$. The value of 'c' such that $f(x)$ touches $f^{-1}(x)$ is
 1) 6 2) 7 3) $\frac{16}{3}$ 4) $\frac{4}{3}$
- If $\sum_{i=1}^{20} \sin^{-1} x_i = 10\pi$ then $\frac{\left(\sum_{i=1}^{20} x_i\right)}{10}$ is equal to
 1) 3 2) 4 3) 1 4) 2
- Let $f(x) = \frac{4 + e^x}{1 + e^x} + 2 \frac{\sin x}{|x|}$ then $\lim_{x \rightarrow 0} f(x) =$
 1) 2 2) 3 3) 4 4) 5
- If $\lim_{x \rightarrow 0} \left(3 - 2 \cos x \sqrt{\cos 2x}\right)^{\left(\frac{x+3}{x^2}\right)} = e^a$ then $a =$
 1) 8 2) 9 3) 10 4) 11
- The number of points at which the function $f(x) = |2x+1| - 3|x+2| + |x^2+x-2|, x \in R$ not differentiable is
 1) 4 2) 3 3) 2 4) 1

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8. Let $f: [-1, 3] \rightarrow R$ be defined as $f(x) = \begin{cases} |x| + [x] & ; -1 \leq x < 1 \\ x + |x| & ; 1 \leq x < 2 \\ x + [x] & ; 2 \leq x \leq 3 \end{cases}$ where $[t]$ denotes the greatest integer less than or equal to 't' then f is discontinuous at
- 1) Only one point
 - 2) Only two points
 - 3) Four or more points
 - 4) Only three points
9. Let $f(x) = 3\sin^4 x + 10\sin^3 x + 6\sin^2 x - 3$, $x \in \left[-\frac{\pi}{6}, \frac{\pi}{2}\right]$ then ' f ' is
- 1) Increasing in $\left(-\frac{\pi}{6}, \frac{\pi}{2}\right)$
 - 2) Decreasing in $\left(0, \frac{\pi}{2}\right)$
 - 3) Increasing in $\left(-\frac{\pi}{6}, 0\right)$
 - 4) Decreasing in $\left(-\frac{\pi}{6}, 0\right)$
10. Let $f(x) = \begin{cases} x^3 - x^2 + 10x - 7; & x \leq 1 \\ -2x + \log_2(b^2 - 4); & x > 1 \end{cases}$ then the set of all values of b , for which $f(x)$ has maximum value at $x = 1$ is
- 1) $(-6, -2)$
 - 2) $(2, 6)$
 - 3) $[-6, -2) \cup (2, 6]$
 - 4) $[-\sqrt{6}, -2) \cup (2, \sqrt{6}]$
11. If the surface area of a cube is increasing at a rate of $3.6 \text{ cm}^2 / \text{sec}$ retaining its shape then the rate of change of its volume (in cm^3 / sec) when the length of a side of the cube is 10 cm , is :
- 1) 9
 - 2) 18
 - 3) 10
 - 4) 20
12. $\int \frac{x^2 - 1}{(x^2 + 1)\sqrt{x^4 + 1}} dx =$
- 1) $\sec^{-1}\left(\frac{x^2 + 1}{\sqrt{2}x}\right) + c$
 - 2) $\frac{1}{\sqrt{2}} \sec^{-1}\left(\frac{x^2 + 1}{\sqrt{2}x}\right) + c$
 - 3) $\frac{1}{\sqrt{2}} \sec^{-1}\left(\frac{x^2 + 1}{\sqrt{2}}\right) + c$
 - 4) $\sec^{-1}\left(\frac{x^2 - 1}{\sqrt{2}x}\right) + c$

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13. $\int \frac{\sin \frac{5x}{2}}{\sin \frac{x}{2}} dx =$
- 1) $x + 2 \sin x + \sin 2x + c$ 2) $2x + \sin x + \sin 2x + c$
 3) $x + 2 \sin x + 2 \sin 2x + c$ 4) $2x + \sin x + 2 \sin 2x + c$
14. The integral $\int x \cos^{-1} \left(\frac{1-x^2}{1+x^2} \right) dx (x > 0)$ is equal to
- 1) $x - (1+x^2) \tan^{-1} x + c$ 2) $-x + (1+x^2) \cot^{-1} x + c$
 3) $x - (1+x^2) \cot^{-1} x + c$ 4) $-x + (1+x^2) \tan^{-1} x + c$
15. The integral $80 \int_0^{\frac{\pi}{4}} \left(\frac{\sin \theta + \cos \theta}{9 + 16 \sin 2\theta} \right) d\theta$ is equal to
- 1) $3 \log_e 4$ 2) $4 \log_e 3$ 3) $6 \log_e 4$ 4) $2 \log_e 3$
16. Let $f(x)$ be a function satisfying $f(x) + f(\pi - x) = \pi^2 \forall x \in R$ then $\int_0^{\pi} f(x) \sin x dx =$
- 1) $\frac{\pi^2}{4}$ 2) $2\pi^2$ 3) π^2 4) $\frac{\pi^2}{2}$
17. The value of the definite integral $\int_{-\frac{3\pi}{4}}^{\frac{5\pi}{4}} \frac{\cos x + \sin x}{1 + e^{x - \frac{\pi}{4}}} dx$ equals to
- 1) 0 2) 1 3) 3 4) 4
18. $g(n) = \int_0^{n^2+n+1} e^{\frac{x}{2} - \left[\frac{x}{2} \right]} \left(\frac{x}{2} - \left[\frac{x}{2} \right] \right) d(x - [x]); n \in N$ then $g(n)$ (where $[.]$ denotes greatest integer function)
- 1) Has minimum value as $\frac{1}{4} + \sqrt{e}$ 2) Has minimum value as $3 - \sqrt{e}$
 3) Has minimum value as $\frac{3}{4} - \sqrt{\frac{e}{4}}$ 4) Has minimum value as $12 - 6\sqrt{e}$

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19. A spherical balloon is being inflated at the rate of $35cc / \text{min}$. The rate of increase in the surface area ($\text{in } cm^2 / \text{min}$) of the balloon when its diameter is $14cm$ is

1) 10 2) $\sqrt{10}$ 3) 100 4) $10\sqrt{10}$

20. Define $F(x)$ as the product of two real functions $f_1(x) = x$, $x \in R$ and

$$f_2(x) = \begin{cases} \sin \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases} \text{ as follows } F(x) = \begin{cases} f_1(x) f_2(x) & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

Statement I :- $F(x)$ is continuous on R

Statement II :- $f_1(x)$ and $f_2(x)$ are continuous on R

- 1) Statement 1 is true, statement 2 is true
2) Statement 1 is true, statement 2 is false
3) statement 1 is false, statement 2 is false
4) statement 1 is false, statement 2 is true

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.

21. Let $f: R \rightarrow R$ be a function defined as $f(x) = a \sin\left(\frac{\pi[x]}{2}\right) + [2-x]$, $a \in R$ where $[b]$ is the greatest integer less than or equal to ' b '.

If $\lim_{x \rightarrow -1} f(x)$ exists then the value of $\int_0^4 f(x) dx = k$ then $|k| =$

22. For $x < -1$, $\sin^{-1}\left(\frac{2x}{1+x^2}\right) = k\pi - 2\tan^{-1}x$ then $3 - k =$

23. Let $f(x) = \max\{|x+1|, |x+2|, |x+3|, |x+4|, |x+5|\}$ then $\int_{-6}^0 f(x) dx =$

24. If $f(x+y) = f(x)f(y) \forall x, y \in R$ $f(0) \neq 0$ and $f(5) = 2$, $f'(0) = 3$ then $f'(5) =$

25. Let X be a set with exactly 5 elements and Y be a set with exactly 7 elements.

If α is the number of one - one functions from $X \rightarrow Y$ and β is the number of onto functions from $X \rightarrow Y$ then $\alpha - \beta =$



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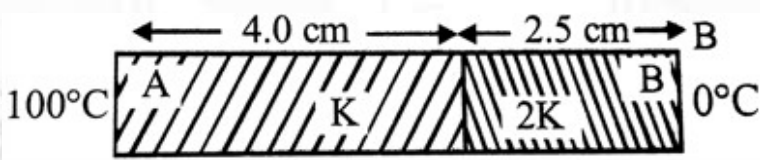
PHYSICS

Max Marks: 100

SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

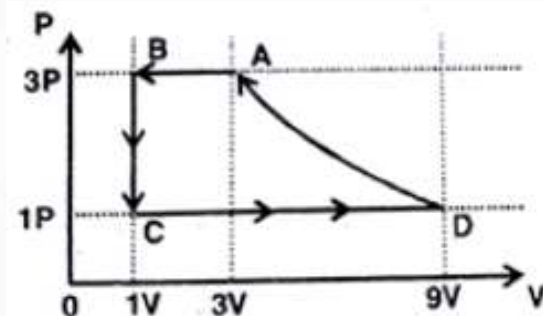
26. When the temperature of a metal wire is increased from 0°C to 10°C , its length increased by 0.02%. The percentage change in its mass density will be closes to :
- 1) 0.06 2) 2.3 3) 0.008 4) 0.8
27. The earth receives at its surface radiation from the sun at the rate of $1400 \text{ W} / \text{m}^{-2}$. The distance of the centre of the sun from the surface of the earth is $1.5 \times 10^{11} \text{ m}$ and the radius of the sun is $7 \times 10^8 \text{ m}$. Treating the sun as a black body, it follows from the above data that its surface temperature is..... K .
- 1) 10000 K 2) 3085 K 3) 8503 K 4) 5803 K
28. As per the given figure, two plates A and B of thermal conductivity K and $2K$ are joined together to form a compound plate. The thickness of plates are 4.0 cm and 2.5 cm respectively and the area of cross-section is 120 cm^2 for each plate. The equivalent thermal conductivity of the compound plate is $\left(1 + \frac{5}{\alpha}\right) K$, then the value of α will be
- _____
- 
- 1) 12 2) 21 3) 16 4) 32
29. During the melting of a slab of ice at $273K$ at atmospheric pressure :
- 1) Internal energy of ice water system remains unchanged.
- 2) Positive work is done by the ice water system on the atmosphere.
- 3) Internal energy of the ice water system decreases.
- 4) Negative work is done on the ice water system by the atmosphere.

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Page 7



30. A heat engine is involved with exchange of heat of $1915 J$, $-40 J + 125 J$ and $-Q J$, during one cycle achieving an efficiency of 50.0% . The value of Q is :
- 1) $640 J$ 2) $40 J$ 3) $980 J$ 4) $400 J$
31. One mole of a monatomic gas is taken through a cycle ABCDA as shown in the P-V diagram. Column II give the characteristics involved in the cycle. Match them with each of the processes given in Column I.



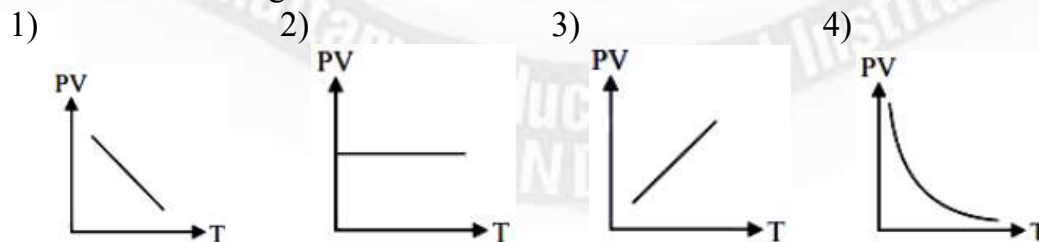
Column-I

Column-II

- | | |
|-----------------|-------------------------------|
| (A) Process A→B | (p) Internal energy decreases |
| (B) Process B→C | (q) Internal energy increases |
| (C) Process C→D | (r) Heat is lost |
| (D) Process D→A | (s) Heat is gained |
| | (t) Work is done on the gas |

- 1) $A \rightarrow r, t; B \rightarrow p, r; C \rightarrow q, r; D \rightarrow p, r, t$
 2) $A \rightarrow r, t; B \rightarrow q, s; C \rightarrow p, r; D \rightarrow p, r, t$
 3) $A \rightarrow p, r, t; B \rightarrow p, r; C \rightarrow q, s; D \rightarrow r, t$
 4) $A \rightarrow q, r; B \rightarrow p, r; C \rightarrow p, r, t; D \rightarrow q, r$

32. Which of the following graphs represent the behavior of an ideal gas? Symbols have their usual meaning.

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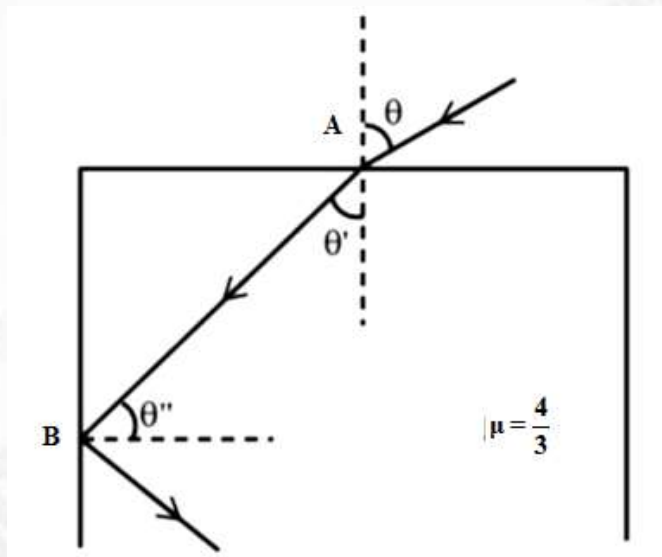
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33. A concave mirror produces an image of an object such that the distance between the object and image is 20 cm . If the magnification of the image is -3 , then the magnitude of the radius of curvature of the mirror is :

1) 3.75 cm 2) 30 cm 3) 7.5 cm 4) 15 cm

34. A ray of light entering from air into a denser medium of refractive index $\frac{4}{3}$, as shown in figure. The light ray suffers total internal reflection at the adjacent surface as shown. The maximum value of angle θ should be equal to :



1) $\sin^{-1} \frac{\sqrt{7}}{3}$ 2) $\sin^{-1} \frac{\sqrt{5}}{4}$ 3) $\sin^{-1} \frac{\sqrt{7}}{4}$ 4) $\sin^{-1} \frac{\sqrt{5}}{3}$

35. A photograph of a landscape is captured by a drone camera at a height of 18 km . The size of the camera film is $2\text{ cm} \times 2\text{ cm}$ and the area of the landscape photographed is 400 km^2 . The focal length of the lens in the drone camera is

1) 1.8 cm 2) 2.8 cm 3) 2.5 cm 4) 0.9 cm

36. The graph between $\frac{1}{u}$ and $\frac{1}{v}$ for a thin convex lens in order to determine its focal length is plotted as shown in the figure. The refractive index of lens is 1.5 and its both the surfaces have same radius of curvature R . The value of R will be _____ cm .
(where u = object distance, v = image distance)



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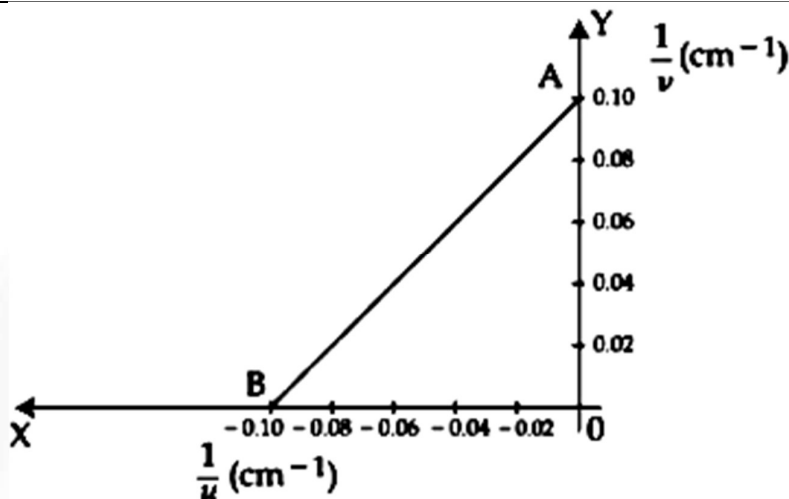
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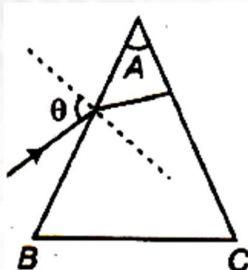
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- 1) 40 2) 5 3) 10 4) 20

37. Monochromatic light is incident on a glass prism of angle A . If the refractive index of the material of the prism is μ , a ray, incident at an angle θ , on the face AB would get transmitted through the face AC of the prism provided :



- 1) $\theta > \cos^{-1} \left[\mu \sin \left(A + \sin^{-1} \left(\frac{1}{\mu} \right) \right) \right]$ 2) $\theta < \cos^{-1} \left[\mu \sin \left(A + \sin^{-1} \left(\frac{1}{\mu} \right) \right) \right]$
 3) $\theta > \sin^{-1} \left[\mu \sin \left(A - \sin^{-1} \left(\frac{1}{\mu} \right) \right) \right]$ 4) $\theta < \sin^{-1} \left[\mu \sin \left(A - \sin^{-1} \left(\frac{1}{\mu} \right) \right) \right]$

38. Two coherent monochromatic light beams of intensities 4I and 9I are superimposed. The difference between the maximum and minimum intensities in the resulting interference pattern is xI . The value of x is _____.

- 1) 8 2) 16 3) 4 4) 24



39. Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): In Young's double slit experiment, the fringes produced by red light are closer as compared to those produced by blue light.

Reason (R) : The fringe width is directly proportional to the wavelength of light.

In the light of above statements, choose the correct answer from the options given below:

- 1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- 2) (A) is false but (R) is true
- 3) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- 4) (A) is true but (R) is false

40. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion A : For a simple microscope, the angular size of the object equals the angular size of the image.

Reason R : Magnification is achieved as the small object can be kept much closer to the eye than 25 cm and hence it subtends a large angle.

In the light of the above statements, choose the most appropriate answer from the options given below :

- 1) A is false but R is true
- 2) A is true but R is false
- 3) Both A and R are true but R is not the correct explanation of A
- 4) Both A and R are true and R is the correct explanation of A

41. A straight rod of length L extends from $x = a$ to $x = L + a$. The gravitational force it exerts on point mass ' m ' at $x = 0$, if the mass per unit length of the rod is $A + Bx^2$, is given by:

- 1) $Gm \left[A \left(\frac{1}{a+L} - \frac{1}{a} \right) - BL \right]$
- 2) $Gm \left[A \left(\frac{1}{a} - \frac{1}{a+L} \right) - BL \right]$
- 3) $Gm \left[A \left(\frac{1}{a+L} - \frac{1}{a} \right) + BL \right]$
- 4) $Gm \left[A \left(\frac{1}{a} - \frac{1}{a+L} \right) + BL \right]$



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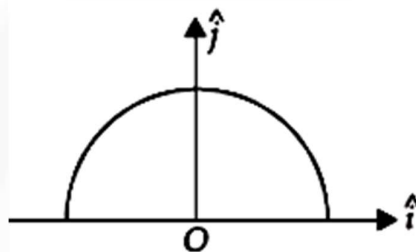


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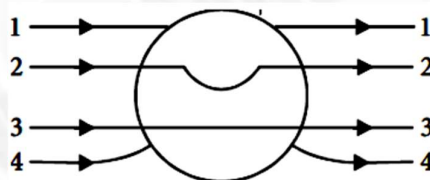
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42. A thin semi-circular ring of radius r has a positive charge q distributed uniformly over it. The net field \vec{E} at the centre O is



- 1) $\frac{q}{4\pi^2\epsilon_0 r^2} \hat{j}$ 2) $-\frac{q}{4\pi^2\epsilon_0 r^2} \hat{j}$ 3) $-\frac{q}{2\pi^2\epsilon_0 r^2} \hat{j}$ 4) $\frac{q}{2\pi^2\epsilon_0 r^2} \hat{j}$
43. A metallic solid sphere is placed in a uniform electric field. The lines of force follow the path (s) shown in Figure as



- 1) 1 2) 2 3) 3 4) 4
44. A solid ball of radius R has a charge density ρ given by $\rho = \rho_0 \left(1 - \frac{r}{R}\right)$ for $0 \leq r \leq R$.

The electric field outside the ball is:

- 1) $\frac{\rho_0 R^3}{\epsilon_0 r^2}$ 2) $\frac{4\rho_0 R^3}{3\epsilon_0 r^2}$ 3) $\frac{3\rho_0 R^3}{4\epsilon_0 r^2}$ 4) $\frac{\rho_0 R^3}{12\epsilon_0 r^2}$
45. Two charges of $-4\mu C$ and $+4\mu C$ are placed at the points $A(1,0,4)m$ and $B(2,-1,5)m$ located in an electric field $\vec{E} = 0.20\hat{i} V/cm$. The magnitude of the torque acting on the dipole is $8\sqrt{\alpha} \times 10^{-5} Nm$, where $\alpha =$ _____.
- 1) 5 2) 3 3) 2 4) 6

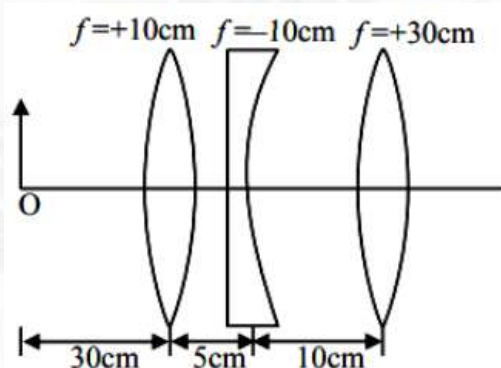


**SECTION-II (NUMERICAL VALUE TYPE)**

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

46. If the electric potential at any point $(x, y, z)m$ in space is given by $V = 3x^2$ volt. The electric field at the point $(1, 0, 3)m$ will be : _____ V/m in magnitude
47. A body is released from a height equal to the radius (R) of the earth. The velocity of the body when it strikes the surface of the earth will be : \sqrt{kgr} then k is _____
(Give g = acceleration due to gravity on the earth.)
48. Find the distance of the image from object O , formed by the combination of lenses in the figure : (in cm)



49. In a double-slit experiment, green light (5303 \AA) falls on a double slit having a separation of $19.44 \mu m$ and a width of $4.05 \mu m$. The number of bright fringes between the first and the second diffraction minima is :
50. In Young's double slit experiment, one of the slit is wider than other, so that amplitude of the light from one slit is double of that other slit. If I_m be the maximum intensity the resultant intensity I when they interfere at phase difference ϕ is given by :

$$\frac{I_{\max}}{P} \left(1 + Q \cos^2 \frac{\phi}{2} \right). \text{ Then } P \times Q \text{ is}$$

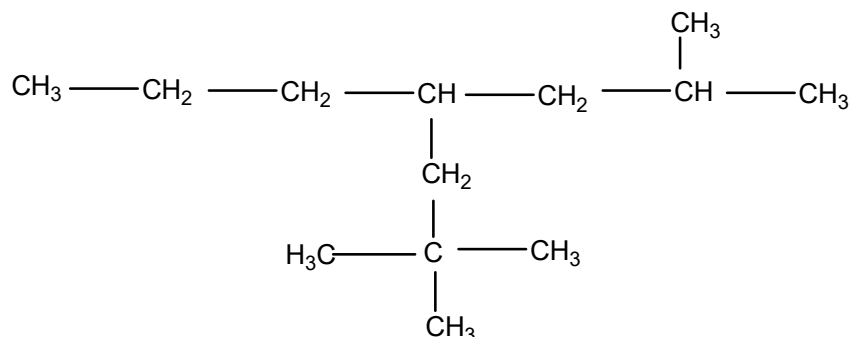


CHEMISTRY**Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

This section contains **20 Multiple Choice Questions**. Each question has 4 options (1), (2), (3) and (4) for its answer, out of which **ONLY ONE** option can be correct.

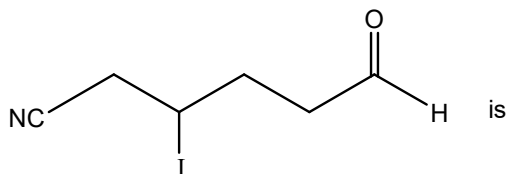
Marking scheme: +4 for correct answer, 0 if not attempted and -1 in all other cases.

51. The correct IUPAC name of the following compound



- 1) 2-methyl-4-(2,2-dimethyl propyl) heptane 2) 2,2-dimethyl-4-(2-methyl propyl) heptane
 3) 4-propyl-2,6,6-trimethyl heptane 4) 2,2,6-trimethyl-4-propyl heptane

52. The number of electrophilic centres in the following structure



- 1) 1 2) 2 3) 3 4) 4

53. Match the following

| | (List-I) | | (List-II) |
|------|---|----|--------------------|
| I) | Isopentane & Neopentane | A) | Metamers |
| II) | o-cresol & m-cresol | B) | Functional Isomer |
| III) | Methoxypropane & Ethoxy ethane | C) | Chain Isomers |
| IV) | N-Methyl ethanamine & N, N-dimethyl methanamine | D) | Positional Isomers |

- 1) I-B, II-C, III-A, IV-D 2) I-C, II-D, III-A, IV-B
 3) I-B, II-A, III-D, IV-C 4) I-C, II-D, III-B, IV-A

54. Hyper conjugation can't explain the stability of

- 1) Carbocations 2) Alkenes 3) Alkyl arenes 4) Carbanions

55. Which of the following method can be used for preparation of methane?

- 1) Decarboxylation 2) Kolbe's electrolysis
 3) Wurtz reaction 4) Catalytic hydrogenation of alkenes and alkynes

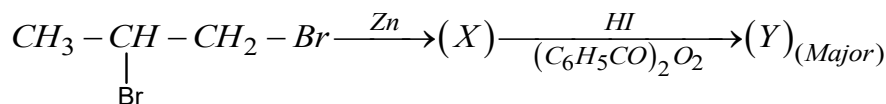


56. Statement-I: Staggered form of n-butane is more stable than eclipsed form
Statement-II: Staggered form has maximum torsional strain and eclipsed form has least torsional strain

Choose the correct statement

- 1) Both Statement-I and Statement-II are correct
- 2) Statement-I is incorrect and Statement-II is correct
- 3) Statement-I and Statement-II both are incorrect
- 4) Statement-I is correct and statement-II is incorrect

57. Consider the following reaction sequence,



(X) and (Y) are

- 1) $\text{X} = \text{CH}_3 - \text{CH} = \text{CH}_2$, $\text{Y} = \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{I}$

- 2) $\text{X} = \text{CH}_3 - \text{CH} = \text{CH} - \text{Br}$; $\text{Y} = \text{CH}_3 - \underset{\text{I}}{\text{CH}} - \text{CH}_3$

- 3) $\text{X} = \text{CH}_3 - \text{CH} = \text{CH}_2$; $\text{Y} = \text{CH}_3 - \underset{\text{I}}{\text{CH}} - \text{CH}_3$

- 4) $\text{X} = \text{CH}_3 - \text{C} \equiv \text{CH}$; $\text{Y} = \text{CH}_3 - \text{CH}_2 - \text{CHI}_2$

58. Number of moles of oxygen required for complete combustion of two moles of Benzene are

- 1) 7.5
- 2) 15
- 3) 6
- 4) 8

59. Which of the following reaction is incorrect?

- 1) $\text{R} - \text{X} + \text{KCN} \rightarrow \text{R} - \text{CN} + \text{KX}$
- 2) $\text{R} - \text{X} + \text{KNO}_2 \rightarrow \text{R} - \text{NO}_2 + \text{KX}$
- 3) $\text{R} - \text{X} + \text{NaOC}_2\text{H}_5 \rightarrow \text{R} - \text{OC}_2\text{H}_5 + \text{NaX}$
- 4) $\text{R} - \text{X} + \text{AgNO}_2 \rightarrow \text{R} - \text{NO}_2 + \text{AgX}$

60. Statement-I: Alcohols reacts as electrophiles during O-H bond cleavage reaction
Statement-II : During C-O bond cleavage reactions, alcohols acts as nucleophiles

Choose the correct options

- 1) Both statement-I and Statement-II are correct
- 2) Both statement-I and Statement-II are incorrect
- 3) Statement-I is correct but statement-II is incorrect
- 4) Statement-I is incorrect but statement-II is correct



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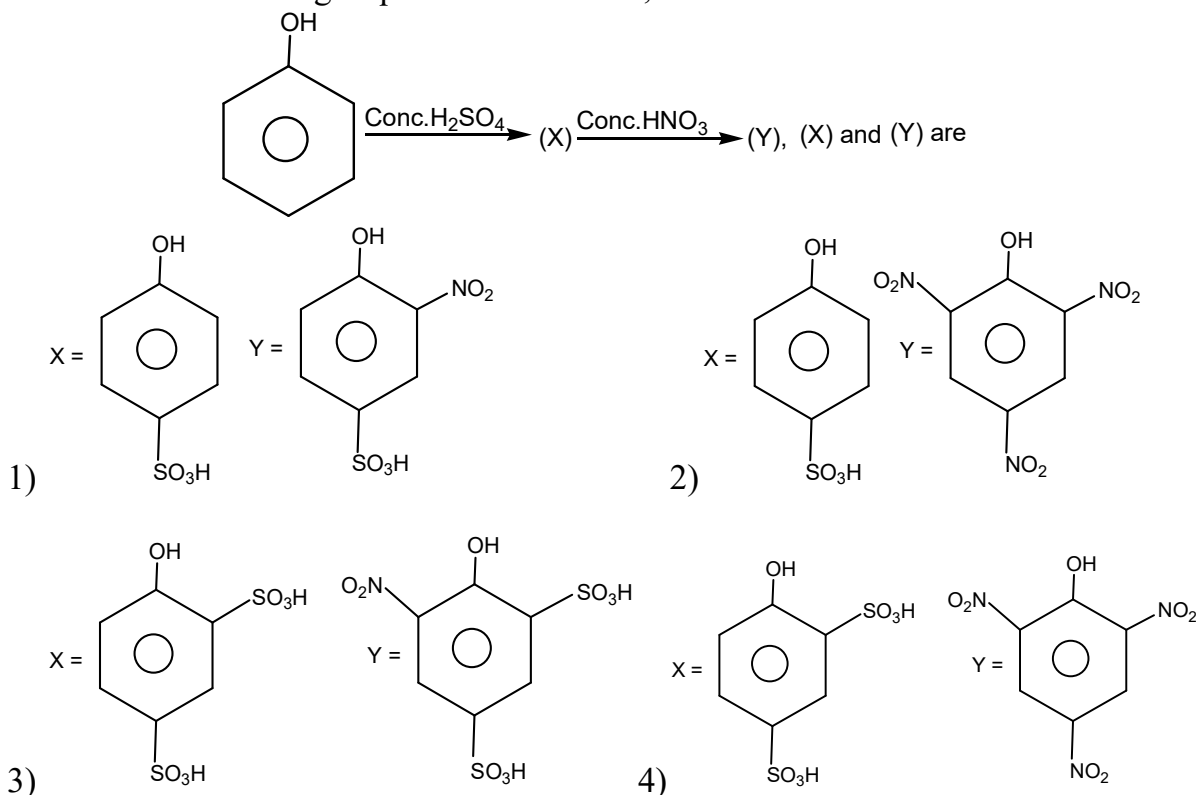


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61. Consider the following sequence of reactions,



62. Assertion(A): In the preparation of methyl tertiary butyl ether, use of methyl bromide and sodium tertiary butoxide gives better yield than t-butyl bromide and sodium methoxide
 Reason (R): In Williamson synthesis, tertiary halides undergo elimination reaction.
 Choose the correct option

- 1) Both Assertion(A) and Reason (R) are correct and reason is the correct explanation for Assertion
- 2) Both Assertion and Reason are correct but reason is not the correct explanation for assertion
- 3) Assertion is correct but reason is incorrect
- 4) Assertion is incorrect but reason is correct

63. Assertion(A): The mild oxidising agents like Tollen's reagent and Fehling's reagent are used to distinguish aldehydes and Ketones
 Reason(R): Ketones are easily oxidised than aldehydes to corresponding carboxylic acids
 Choose the appropriate option given below

- 1) Both Assertion and Reason are correct and Reason is correct explanation for assertion
- 2) Both Assertion and Reason are correct but reason is not the correct explanation for assertion
- 3) Assertion is incorrect but reason is correct
- 4) Assertion is correct but reason is incorrect

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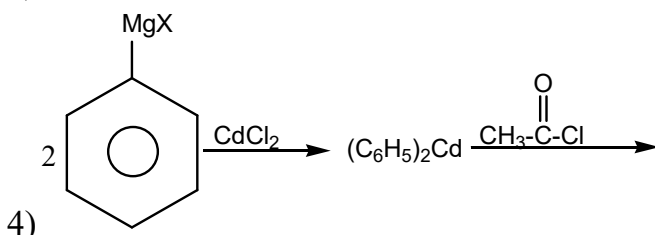
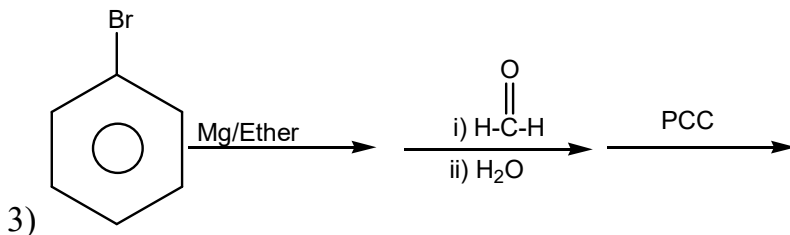
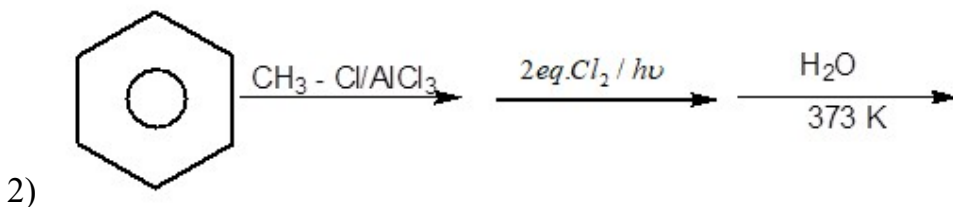
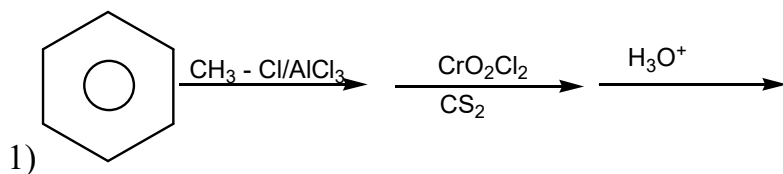
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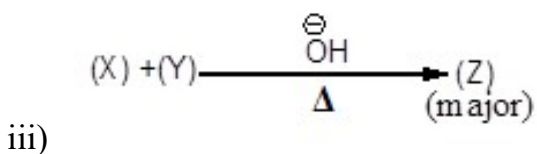
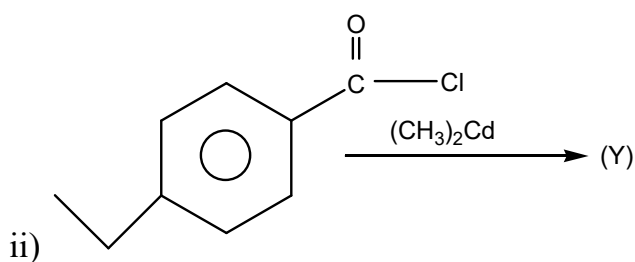
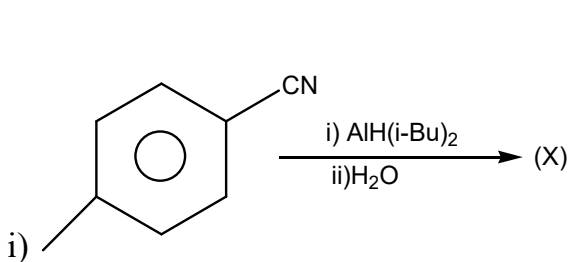
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64. Which of the following reaction does not involve the formation of Benzaldehyde



65. Consider the following reactions,



The product Z is

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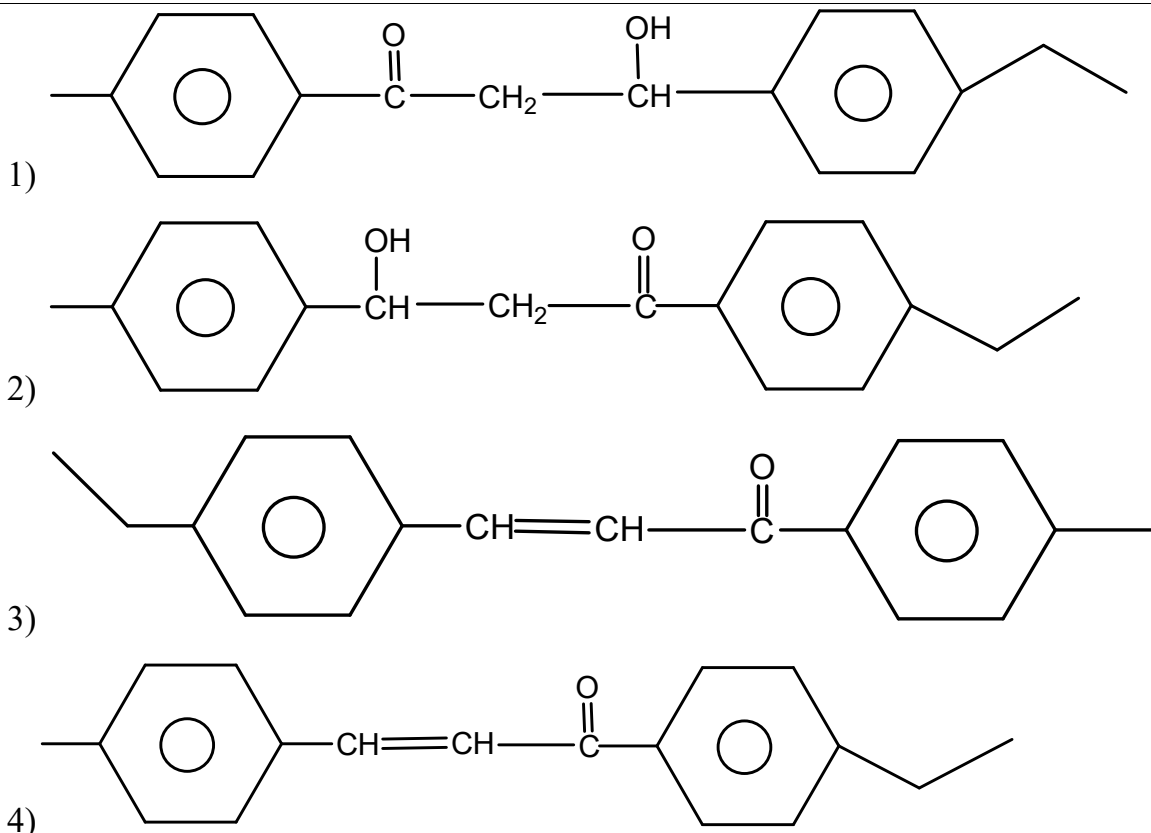
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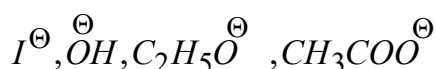
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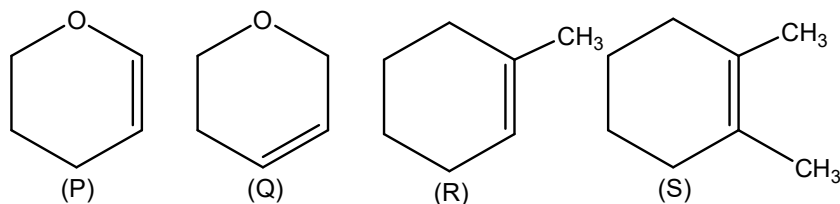
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66. What is the decreasing order of basic strength of the following conjugate bases?



67. The correct decreasing order of reactivity of the following with HBr is

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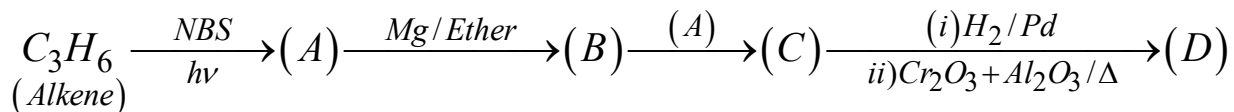
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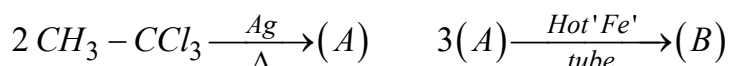
68. Consider the following sequence of reactions



The no. of σ – and π – bonds present in (D) is

- 1) 6, 3 2) 12, 3 3) 15, 3 4) 12, 6

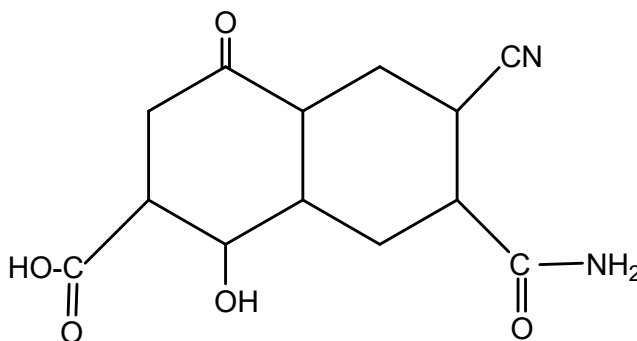
69. Consider the following sequence of reactions,



If x = No. of σ – bonds and y = No. of π -bonds in (B), the value of x/y is

- 1) 8 2) 12 3) 9 4) 10

70. How many no. of moles of Grignard reagent reacts with the following compound



- 1) 5 2) 4 3) 7 4) 6

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions**. The Answer should be within **0 to 9999**. If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i.e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

71. How many isomers (including stereo isomers) are possible for 5th member of alkyne series.



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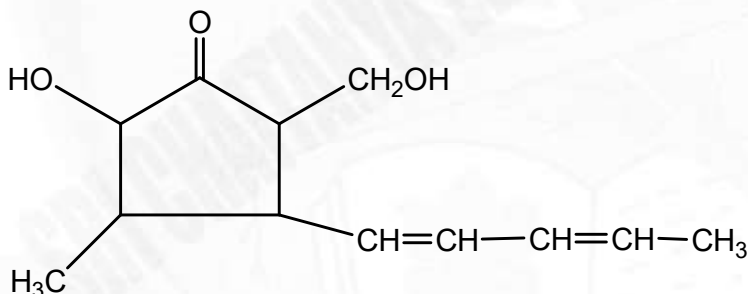


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72. Among the following the number of compounds which will give positive iodoform test is
- a) 2-methyl butan-2-ol b) 3-methyl butan -2-ol
 c) 1-phenylbutan-2-one d) 1-phenylethanol
 e) 3, 3-dimethyl butan-2-one f) 1-phenylpropan-2-ol
 g) Resorcinol h) Benzophenone
73. How much amount of bromine will be required to convert 4g of phenol into 2, 4, 6-tribromophenol? (Given, molar mass in gmol^{-1} of C, O and Br are 12, 16, 80 respectively)
74. Number of compounds from the following, which can undergo Friedel-craft's reaction is
- Toluene, Nitrobenzene, Aniline, Xylene, Benzaldehyde
- (a) (b) (c) (d) (e)
- Anisol, cumene, Chlorobenzene, phenol, Benzonitrile
- (f) (g) (h) (i) (j)
75. The total no.of stereoisomers possible for the following compound

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