



Sri Chaitanya IIT Academy.,India.

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A right Choice for the Real Aspirant
ICON Central Office - Madhapur - Hyderabad

SEC: Sr.Super60_STERLING BT

JEE-MAIN

Date: 30-08-2025

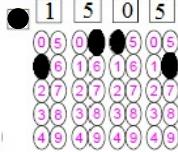
Time: 09:00AM to 12:00PM

RPTM-04

Max. Marks: 300

IMPORTANT INSTRUCTION:

1. Immediately fill in the Admission number on this page of the Test Booklet with **Blue/Black Ball Point Pen** only.
2. The candidates should not write their Admission Number anywhere (except in the specified space) on the Test Booklet/ Answer Sheet.
3. The test is of **3 hours** duration.%
4. The Test Booklet consists of **75 Questions**. The maximum marks are **300**.
5. 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.

6. Use **Blue / Black Point Pen only** for writing particulars / marking responses on the Answer Sheet. **Use of pencil is strictly prohibited.**
7. 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.
8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
9. 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.
10. **Do not fold or make any stray marks on the Answer Sheet**

Name of the Candidate (in Capital): _____

Admission Number:

Candidate's Signature: _____

Invigilator's Signature: _____

**30-08-25_Sr.Super60_STERLING BT_Jee-Main_RPTM-04_Test Syllabus****MATHEMATICS** : Indefinite Integration**PHYSICS**

: Wave Optics: Wave nature of light: Huygen's principle, interference limited to Young's double slit experiment. Diffraction due to a single slit. Polarization of light, plane polarized light, Brewster's law, Polaroids. Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers.

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

CHEMISTRY

: Alkyl halides & aryl halides: rearrangement reactions of alkyl carbocation, Grignard reactions, nucleophilic substitution reactions, Haloarenes :Fittig, Wurtz-Fittig, nucleophilic aromatic substitution in haloarenes and substituted haloarenes (excluding Benzyne mechanism and Cine substitution). Alcohols, Phenols, Ethers

Alcohols: Physical properties, Reactions: esterification, dehydration (formation of alkenes and ethers), Reactions with: sodium, phosphorus halides, ZnCl₂/concentrated HCl, thionyl chloride, Conversion of alcohols into aldehydes, ketones and carboxylic acids Phenols: Physical properties, Preparation, Electrophilic substitution reactions of phenol (halogenation, nitration, sulphonation), Reimer-Tiemann reaction, Kolbe reaction, Esterification, Etherification, Aspirin synthesis, Oxidation and reduction reactions of phenol. Ethers: Preparation, Properties & Reactions
(In Phy & Che Each Out of 25Qs, 10 Qs From NCERT is Mandatory)

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CUT-OFF RANK 2023
6th-12th Class
**300
300
MARKS**

**RANK
1**

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6th-12th Class
**341
360
MARKS**

**RANK
1**

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6th-12th Class
**720
720
MARKS**

**RANK
1**

**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.

1. Let $I(x) = \int \frac{dx}{(x-11)^{\frac{11}{13}}(x+15)^{\frac{15}{13}}}$. If $I(37) - I(24) = \frac{1}{4} \left(\frac{1}{b^{\frac{1}{13}}} - \frac{1}{c^{\frac{1}{13}}} \right)$, where $b, c \in N$, then $3(b+c)$ is equal to
 1) 22 2) 39 3) 40 4) 26
2. $I = \int \frac{1}{x^{\frac{16}{25}} + x^{\frac{9}{25}}} dx =$
 1) $\frac{25}{41} \tan^{-1} \left(x^{\frac{9}{25}} \right) + C$ 2) $\frac{25}{9} \tan^{-1} \left(x^{\frac{9}{25}} \right) + C$
 3) $\frac{25}{16} \tan^{-1} \left(x^{\frac{16}{25}} \right) + C$ 4) $\frac{9}{25} \tan^{-1} \left(x^{\frac{16}{25}} \right) + C$
3. If $\int e^x \left(\frac{x \sin^{-1} x}{\sqrt{1-x^2}} + \frac{\sin^{-1} x}{(1-x^2)^{3/2}} + \frac{x}{1-x^2} \right) dx = g(x) + C$, where C is the constant of integration, then $g\left(\frac{1}{2}\right)$ equals:
 1) $\frac{\pi}{4} \sqrt{\frac{e}{3}}$ 2) $\frac{\pi}{6} \sqrt{\frac{e}{3}}$ 3) $\frac{\pi}{4} \sqrt{\frac{e}{2}}$ 4) $\frac{\pi}{6} \sqrt{\frac{e}{2}}$
4. If $\int \frac{\left(\sqrt{1+x^2} + x \right)^{10}}{\left(\sqrt{1+x^2} - x \right)^9} dx = \frac{1}{m} \left(\left(\sqrt{1+x^2} + x \right)^n \left(n\sqrt{1+x^2} - x \right) \right) + C$ where C is the constant of integration and $m, n \in N$, then $m+n$ is equal to
 1) 47 2) 379 3) 26 4) 37

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5. Let $f(x) = \int x^3 \sqrt{3-x^2} dx$. if $5f(\sqrt{2}) = -4$, then $f(1)$ is equal to
 1) $-\frac{2\sqrt{2}}{5}$ 2) $-\frac{8\sqrt{2}}{5}$ 3) $-\frac{4\sqrt{2}}{5}$ 4) $-\frac{6\sqrt{2}}{5}$
6. $\int \frac{2x^2}{2x \cos 2x + (x^2 - 1) \sin 2x} dx = \ln \left| \tan \left(\frac{\pi}{4} + \frac{f(x)}{2} \right) \right| + C$. Then $f(1) =$
 1) 0 2) 2 3) 3 4) 4
7. LET $\int \frac{(1+x^4)dx}{(1-x^4)^{\frac{3}{2}}} = f(x) + C_1$ where $f(0)=0$ and $\int f(x)dx = g(x) + C_2$ with $g(0)=0$. If $g\left(\frac{1}{\sqrt{2}}\right) = \frac{\pi}{k}$,
- Then the value of k is _____ (C_1 & C_2 are constants)
 1) 6 2) 4 3) 8 4) 12
8. Statement-I: $\int \left(\frac{x^2-1}{x^2} \right) e^{\frac{x^2+1}{x}} dx = e^{\frac{x^2+1}{x}} + c$
 Statement-II: $\int f'(x) e^{f(x)} dx = e^{f(x)} + c$
 1) Only statement-I is true 2) Only statement-II is true
 3) Both Statements are true 4) Both Statements are false
9. If $\int (e^{2x} + 2e^x - e^{-x} - 1) e^{(e^x + e^{-x})} dx = g(x) e^{(e^x + e^{-x})} + c$, where 'c' is a constant of integration then $g(0)$ is
 1) 1 2) 0 3) 2 4) 3
10. If $\int e^x (\tan x - x - 2 \tan x \sec^2 x) dx = e^x f(x) + C$ where $f(0)=0$, then the value of $f\left(\frac{\pi}{4}\right)$ equals (where C is the constant of integration)
 1) $\left(\frac{\pi}{4}\right)$ 2) $1 - \left(\frac{\pi}{4}\right)$ 3) $I(0) = 0$, then $I\left(\frac{\pi}{4}\right)$ is equal to 4) $\frac{\pi}{2}$

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11. Let $f(x)$ be a polynomial of degree less than or equal to 3 with leading coefficient unity,

$f(0)=4$ and $f(2)=0$, if $\int \frac{f(x)dx}{x(x+1)^2(x-2)^3}$ is a logarithmic functions then

- 1) $f(2)=1$ 2) $f'(2)=4$ 3) $f'(3)=9$ 4) $f(3)=4$

12. If $\int \frac{e^{(n+1)x}dx}{1+e^x+\frac{e^{2x}}{2!}+\dots+\frac{e^{nx}}{n!}} = \lambda_n(e^x - \ln(x)) + C$ where $f_n(0) = 1 + \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{n!}$ and

C is constant of integration and $g(x) = \lim_{n \rightarrow \infty} \ln(f_n(x))$, then the numbers of real solutions of the equation $g(x) = 4x^2$.

- 1) 1 2) 2 3) 3 4) 0

13. $\int \frac{\csc^2 x - 2011}{(\cos x)^{2011}} dx$ is equal to

- 1) $-\frac{\cot x}{(\cos x)^{2011}} + C$ 2) $-\frac{\cot x}{(\cos x)^{2010}} + C$ 3) $-\frac{\tan x}{(\cos x)^{2011}} + C$ 4) $-\frac{\cot x}{(\sin x)^{2011}} + C$

14. Match the following

Column I		Column II	
i	$let(x) = \int x^{\sin x} \cdot (1 + \cos x \log x + \sin x) dx$ and $f\left(\frac{\pi}{2}\right) = \frac{\pi^2}{4}$, then the value of $f\left(\frac{\pi}{4}\right)$ is	p	rational
ii	$let g(x) = \int \frac{1+2\cos x}{(\cos x+2)^2} dx$ and $g(0)=0$, then the value of $g\left(\frac{\pi}{2}\right)$ is	q	irrational
iii	If real numbers x and y satisfy $(x+5)^2 + (y-12)^2 = (14)^2$. Then the minimum value of $\sqrt{x^2 + y^2}$ is	r	integer
iv	Let $k(x) = \int \frac{(x^2+1)}{\sqrt[3]{x^2+3x+6}} dx$ and $k(-1) = \frac{1}{\sqrt[3]{2}}$, then the value of $k(-2)$ is	s	prime

- 1) i-q ; ii-p ; iii-p,r ; iv-p,r,s 2) i-p ; ii-q ; iii-r ; iv-s
3) i-r,s ; ii-p ; iii-r ; iv-s 4) i-r ; ii-q ; iii-s,p ; iv-p

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15. If $\int \frac{2x^2 + 5x + 9}{\sqrt{x^2 + x + 1}} dx = x\sqrt{x^2 + x + 1} + \alpha\sqrt{x^2 + x + 1} + \beta \log_e \left| x + \frac{1}{2} + \sqrt{x^2 + x + 1} \right| + C$, where

C is the constant of integration, then $\alpha + 2\beta$ is equal to

- 1) 17 2) 15 3) 14 4) 16

16. Let $n \geq 2$ be a natural number and $0 < \theta < \frac{\pi}{2}$ then $\int \frac{(\sin^n \theta - \sin \theta)^{\frac{1}{n}} \cos \theta}{\sin^{n+1} \theta} d\theta$ is equal to :

1) $\frac{n}{n^2 - 1} \left(1 - \frac{1}{\sin^{n-1} \theta} \right)^{\frac{n+1}{n}} + C$ 2) $\frac{n}{n^2 + 1} \left(1 - \frac{1}{\sin^{n-1} \theta} \right)^{\frac{n+1}{n}} + C$

3) $\frac{n}{n^2 - 1} \left(1 + \frac{1}{\sin^{n-1} \theta} \right)^{\frac{n+1}{n}} + C$ 4) $\frac{n}{n^2 + 1} \left(1 + \frac{1}{\sin^{n-1} \theta} \right)^{\frac{n+1}{n}} + C$

(Where C is a constant of integration)

17. Let $I(x) = \int \left(\frac{x^2(x \sec^2 x + \tan x)}{(x \tan x + 1)^2} \right) dx$. if $I(0)$, Then $I\left(\frac{\pi}{4}\right)$ is equal to

1) $\log_e \frac{(\pi + 4)^2}{16} + \frac{\pi^2}{4(\pi + 4)}$ 2) $\log_e \frac{(\pi + 4)^2}{16} - \frac{\pi^2}{4(\pi + 4)}$

3) $\log_e \frac{(\pi + 4)^2}{32} - \frac{\pi^2}{4(\pi + 4)}$ 4) $\log_e \frac{(\pi + 4)^2}{32} + \frac{\pi^2}{4(\pi + 4)}$

18. If $\int \frac{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x}{\sqrt{\sin^3 x \cos^3 x \sin(x - \theta)}} dx = A\sqrt{\cos \theta \tan x - \sin \theta} + B\sqrt{\cos \theta - \sin \theta \cot x} + C$ where

C is the integration constant, the AB is equal to

- 1) $4 \cosec(2\theta)$ 2) $4 \sec \theta$ 3) $2 \sec \theta$ 4) $8 \cosec(2\theta)$

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19. If $\int \cosec^5 x dx = \alpha \cot x \cosec x \left(\cosec^2 x + \frac{3}{2} \right) + \beta \log_e \left| \tan \frac{x}{2} \right| + C$ where $\alpha, \beta \in R$ and C is the constant of integration , then the value of $8(\alpha+\beta)$ equals _____
 1) 3 2) 5 3) 0 4) 1
20. If $\int \frac{3e^x - 5e^{-x}}{4e^x + 5e^{-x}} dx = ax + b \log \left| 4e^x + 5e^{-x} \right| + c$ then
 1) $a = \frac{-1}{8}, b = \frac{7}{8}$ 2) $a = \frac{1}{8}, b = \frac{7}{8}$ 3) $a = -\frac{1}{8}, b = \frac{-7}{8}$ 4) $a = \frac{1}{8}, b = \frac{-7}{8}$

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 $g(x) = \int \frac{1+2 \cos x}{(\cos x+2)^2} dx$ and $g(0)=0$, then the value of $8g\left(\frac{\pi}{2}\right) =$
22. $\int \frac{\sin x}{\sin^3 x + \cos^3 x} dx = \alpha \log_e |1 + \tan x| + \beta \log |1 - \tan x + \tan^2 x| + \gamma \tan^{-1} \left(\frac{2 \tan x - 1}{\sqrt{3}} \right) + c$,
 then $18(\alpha + \beta + \gamma^2) =$
23. $\int (x^{50} + x^{20} + x^{10}) (2x^{40} + 5x^{10} + 10)^{\frac{1}{10}} dx = \frac{1}{a} (2x^{50} + 5x^{20} + 10x^{10})^{\frac{1}{10}}$, then $\frac{a+b}{11} =$
24. If $f(x) = \lim_{n \rightarrow \infty} \sum_{r=0}^n \frac{\tan\left(\frac{x}{2^{r+1}}\right) + \tan^3\left(\frac{x}{2^{r+1}}\right)}{\left(1 - \tan^2\left(\frac{x}{2^{r+1}}\right)\right)}$ then
 $I(x) = \int \frac{1 - (f(x))^{-2008}}{f(x) + (f(x))^{-2009}} dx = \lambda^{-1} \left(\log_e |(\sin x)^\lambda + (\cos x)^\lambda| \right) + C$ and
 $I(0) = 0$. Then sum of square of the digits of λ is
25. If $\int \frac{dx}{x^3 + 1} = \beta \log \left| \frac{x+1}{\sqrt{x^2 - x + 1}} \right| + \alpha \tan^{-1} \left(\frac{2x-1}{\sqrt{3}} \right) + C$, then the value of $\frac{1}{\beta}$ is

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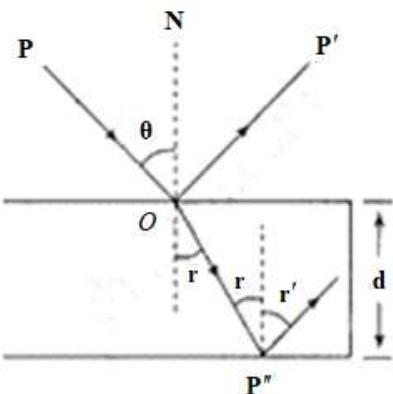
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**PHYSICS****Max Marks: 100****SECTION-I (SINGLE CORRECT ANSWER TYPE)**

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. In a Young's double slit experiment, the source is white light. One of the holes is covered by a red filter and another by a blue filter. In this case
- 1) There shall be alternate interference patterns of red and blue.
 - 2) There shall be an interference pattern for red distinct from that for blue.
 - 3) There shall be no interference fringes
 - 4) There shall be an interference pattern for red mixing with one for blue.
27. STATEMENT-1: On viewing the clear blue portion of the sky through a calcite crystal, the intensity of transmitted light varies as the crystal is rotated
 STATEMENT-2: The light coming from the sky is polarized due to scattering of sun light by partials in the atmosphere. The scattering is largest for blue light.
- 1) Statement-1 is false, Statement-2 is true
 - 2) Statement-1 is true, Statement-2 is false
 - 3) Statement-1 is true, Statement-2 is true, Statement-2 is the correct explanation of statement-1
 - 4) Statement-1 is true, Statement-2 is true, Statement-2 is not correct explanation of statement-1
28. Consider a ray of light incident from air onto a slab of glass (refractive index n) of width d , at an angle θ . The phase difference between the ray reflected by the top surface of the glass and the bottom surface is (consider other side of glass slab surrounded by air)



$$1) \frac{4\pi d}{\lambda} \left(1 - \frac{1}{n^2} \sin^2 \theta \right)^{1/2} + \pi$$

$$2) \frac{4\pi d}{\lambda} \left(1 - \frac{1}{n^2} \sin^2 \theta \right)^{1/2}$$

$$3) \frac{4\pi d}{\lambda} \left(1 - \frac{1}{n^2} \sin^2 \theta \right)^{1/2} + \frac{\pi}{2}$$

$$4) \frac{4\pi d}{\lambda} \left(1 - \frac{1}{n^2} \sin^2 \theta \right)^{1/2} + 2\pi$$

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**300
300**
MARKS

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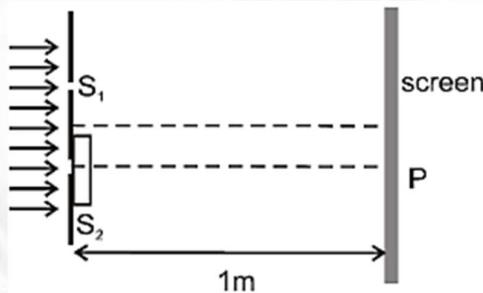
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**341
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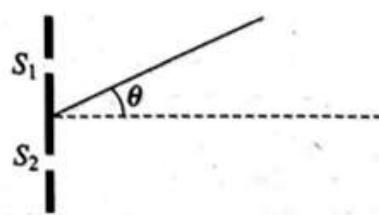
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29. Two beams of light having intensities I and $4I$, interfere to produce a fringe pattern on a screen. The phase difference between the beams is $\pi/2$, at a point A and π , at a point B. the difference between the resultant intensities at A and B is
- 1) $2I$ 2) $4I$ 3) $5I$ 4) $7I$
30. In standard Young's double-slit experiment, visible light $\lambda \in (350\text{nm} \text{ to } 750\text{nm})$ is used in both the slits. Distance between the slits is 2 mm, and the distance of the screen from the slits is 1m. A thin glass slab ($\mu = 1.5$) of thickness $6\mu\text{m}$ is placed in front of slit S_2 . Which among the following wavelength is missing at point P, which is directly in front of slit S_2 ? (Neglect dispersion of light)



- 1) 400 nm 2) 500 nm 3) 600 nm 4) 700 nm
31. Figure shows two coherent sources S_1 and S_2 emitting wavelength λ . The separation $S_1S_2=1.5\lambda$ and S_1 is ahead in phase by $\pi/2$ relative to S_2 . Then the maxima occur in direction θ given by \sin^{-1} of
- i. 0 ii. $1/2$ iii. $-1/6$ iv. $-5/6$
- correct options are



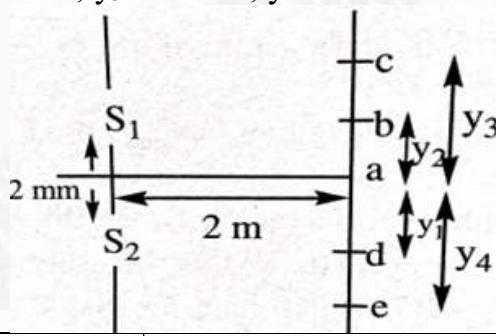
- 1) (ii), (iii), and (iv) 2) (i), (ii), and (iii) 3) (i), (iii), and (iv) 4) (i), (ii), and (iv)

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32. Two Nicol's are oriented with their principal planes making an angle of 60^0 .the percentage of incident Unpolarised light which passes through the system is
 1)50% 2)100% 3)12.5% 4)37.5%
33. A double -slit experiment is immersed in a liquid of refractive index 1.33. It has slit separation of 1 mm and distance between the plane of slit and screen is 1.33 m. The slits are illuminated by a parallel beam of light whose wavelength in air is 6830 \AA^0 . Then the fringe width is
 a) $6.83 \times 10^{-4} \text{ m}$ b) $8.3 \times 10^{-4} \text{ m}$ c) $6.83 \times 10^{-2} \text{ m}$ d) $6.83 \times 10^{-5} \text{ m}$
34. In young's double slit experiment set-up with light of wavelength $\lambda=6000\text{\AA}^0$. Distance between the two slits is 2 mm and distance between the plane of slits and the screen is 2m . each slit produces an intencity I_0 on the screen $\sin 18^\circ = 0.309$
 $Y_1=0.075 \text{ mm}$, $y_2=0.15 \text{ mm}$, $y_3=0.2 \text{ mm}$, $y_4=0.36 \text{ mm}$



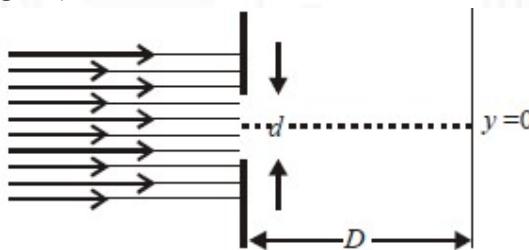
Column-I		Column-II	
A	b	p	$2I_0$
B	c	q	$0.38I_0$
C	d	r	$3.414I_0$
D	e	s	I_0

- 1) A-s,B-q,C-r,D-p 2) A-p,B-s,C-r,D-q 3) A-r,B-p,C-s,D-q 4) A-p,B-r,C-s,D-q
35. The path difference between two interfering waves at a point on the screen is $\lambda/6$.The ratio of intensity at this point and that at the central bright fringe will be (assume that intensity due to each slit is same)
 1) 0.853 2) 8.53 3) 0.75 4) 7.5
36. If the distance between the first maxima and fifth minima of a double-slit pattern is 7 mm and the slits are separated by 0.15 mm with the screen 50 cm from the slits, then wavelength of the light used is
 1) 600 nm 2) 525 nm 3) 467 nm 4) 420 nm





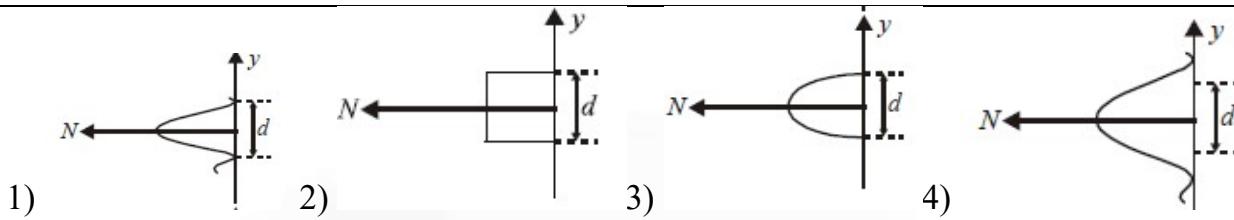
37. In a single slit diffraction experiment first minimum for red light (660 nm) coincides with first maximum of some other wavelength λ' . The value of λ' is
- 1) 4400 \AA^0
 - 2) 6600 \AA^0
 - 3) 2000 \AA^0
 - 4) 3500 \AA^0
38. What will be the Angular width of central maxima in the Fraunhofer diffraction. When light of wavelength 6000 \AA^0 is used and slit width is 12×10^{-5} cm
- 1) 2 rad
 - 2) 3 rad
 - 3) 1 rad
 - 4) 8 rad
39. Unpolarized light falls on two polarizing sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the final transmitted light is one-third the maximum intensity of the first transmitted beam
- 1) 75^0
 - 2) 55^0
 - 3) 35^0
 - 4) 15^0
40. A silicon solar cell ($\mu=3.5$) is coated with a thin film of silicon monoxide SiO ($\mu=1.45$) to minimize reflective losses from the surface. Determine the minimum thickness of SiO that produces the least reflection at a wavelength of 580 nm near the centre of the visible spectrum. Assume approx. normal incidence.
- 1) 70 nm
 - 2) 53.4 nm
 - 3) 94.8 nm
 - 4) 100 nm
41. A double-slit arrangement produces interference fringes for sodium light ($\lambda = 589$ nm) that have an angular separation of 3.50×10^{-3} rad. For what wavelength would the angular separation be 10% greater?
- 1) 527 nm
 - 2) 648 nm
 - 3) 722 nm
 - 4) 449 nm
42. In an experiment, electrons are made to pass through a narrow slit of width ‘d’ comparable to their de Broglie wave length. They are detected on a screen at a distance ‘D’ from the slit (see figure).



Which of the following graphs can be expected to represent the number of electrons ‘N’ detected as a function of the detector position ‘y’ ($y=0$ corresponds to the middle of the slit)

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43. This question has a paragraph followed by two statements, assertion and reason. Of the given four alternatives after the statement, choose the one that describes the statements. A thin air film is formed by putting the convex surface of a plane-convex lens over a plane glass plate. With monochromatic light, this film gives an interference pattern due to light reflected from the top (convex) surface and the bottom (glass plate) surface of the film.
- Assertion: The centre of the interference pattern is dark
- Reason: When light reflects from the air-glass plate interface, the reflected wave suffers a phase change of π .

- 1) Assertion is true, Reason is true, Reason is the correct explanation of Assertion.
- 2) Assertion is true, Reason is true, Reason is not the correct explanation of Assertion.
- 3) Assertion is false; Reason is true.
- 4) Assertion is true; Reason is false.

44. The beams, A and B, of plane polarized light with mutually perpendicular planes of polarization are seen through a polaroid. From the position when the beam A has maximum intensity (and beam B has zero intensity), a rotation of polaroid through 30° makes the two beams appear equally bright. If the initial intensities of the two beams are I_A and I_B respectively, then $\frac{I_A}{I_B}$ equals:

- 1) 3
- 2) $\frac{3}{2}$
- 3) 1
- 4) $\frac{1}{3}$

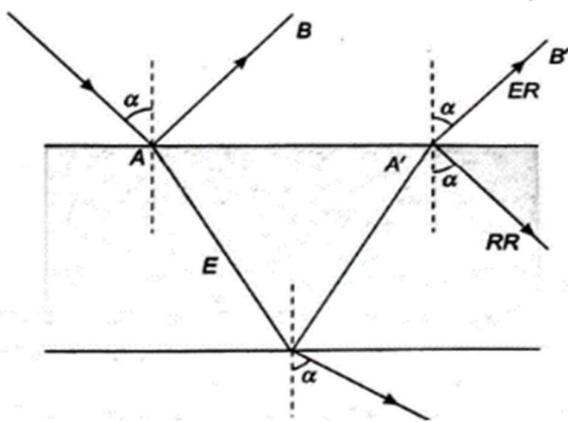
45. In Young's double-slit experiment, the slit separation is 0.5 mm and the screen is 0.5 m away from the slit. For a monochromatic light of wavelength 500nm, the distance of 3rd maxima from the 2nd minima on the other side of central maxima is
- 1) 2.75 mm
 - 2) 2.5 mm
 - 3) 22.5 mm
 - 4) 2.25 mm

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**).

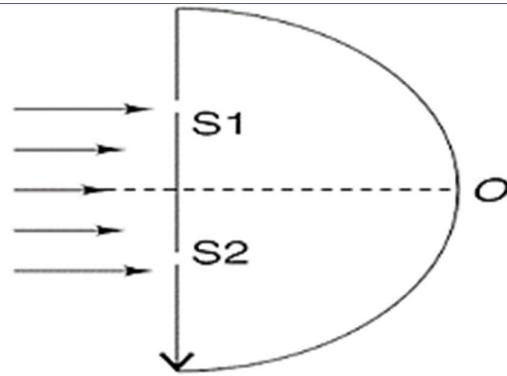
Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

46. The human eye has an approximate angular resolution of $\phi = 5.8 \times 10^{-4}$ rad and a typical photo printer prints a minimum of 302 dpi (dots per inch, 1 inch=2.54 cm). At what minimal distance z should a printer page be held so that one does not see the individual dots is _____ mm
47. For the same objective, the ratio of the least separation between two points to be distinguished by a microscope for light of 5000 \AA^0 and electrons accelerated through 100 V used as the illuminating substance is $x \times 10^{-y}$ then $x+y=$
48. A ray of light of intensity I is incident on a parallel glass – slab at a point as shown in the figure . It undergoes partial reflection and refraction. At each reflection 20% of incident energy is reflected. The rays AB and A'B' undergo interference. The ratio I_{\max} / I_{\min} is

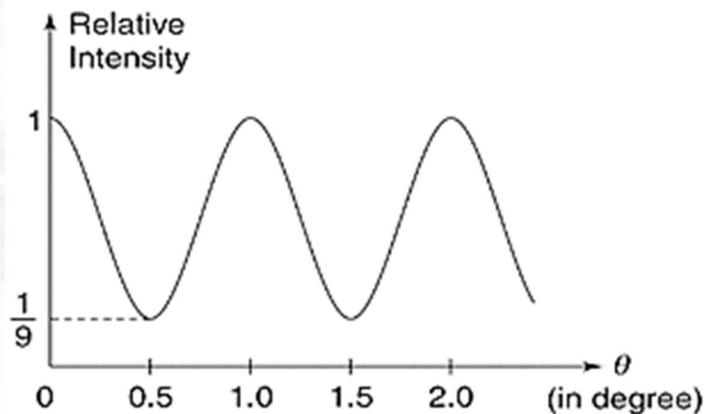


49. Coherent light of wavelength $\lambda = 250 \text{ nm}$ is sent through two narrow parallel slits in a large vertical wall. The two slits are $5 \mu\text{m}$ apart. In front of the wall there is a semi cylindrical screen with its horizontal axis at the line running on the wall parallel to the slits and midway between them. Radius of the cylindrical screen is $R=2.0 \text{ m}$. Find the vertical height of the second order interference maxima from the centre (0) of the screen is _____ cm

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50. In a young's double slit experiment relative intensity at a point on the screen may be defined as ratio of intensity at that point to the maximum intensity on the screen. Light of wavelength 7500 Å^0 passing through a double slit, produces interference pattern of relative intensity variation as shown in Fig. θ on horizontal axis represents the angular position of a point on the screen.



separation d between the slits is _____ μm

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RANK
1RANK
1RANK
1

**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. ASSERTION: phenol gives 2-nitrophenol and 4-nitrophenol as major products on nitration with conc HNO_3 and H_2SO_4 mixture .

REASON: -OH group in phenol is o – and p- directing group

- 1) Both Assertion and Reason Are Correct and Reason Is Correct Explanation of Assertion
- 2) Both Assertion and Reason Are Correct and Reason Is Not Correct Explanation of Assertion
- 3) Assertion Is Correct but Reason Is Wrong
- 4) Assertion Is Wrong but Reason Is Correct

52. ASSERTION: Presence of a nitro group at ortho (or) para position increases the reactivity of halo benzene towards nucleophilic substitution

REASON: Nitro group, being an electron withdrawing group decreases the electron density over the benzene ring

- 1) Both assertion and reason are correct
- 2) Both assertion and reason are wrong
- 3) assertion is correct but reason is wrong
- 4) assertion is wrong but reason is correct

53.

COLUMN (I)		COLUMN (II)	
i		a	Nucleophilic substitution
ii	$\text{CH}_3-\text{CH}=\text{CH}_2 + \text{HBr} \rightarrow \begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_3 \\ \\ \text{Br} \end{array}$	b	Electrophilic aromatic substitution

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**JEE MAIN
2023**

 SINGARAJU
 VENKAT KOUNDRINA
 APPN NO 2023000000000000
 CLASS 12th 2023
**300
300**
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RANK
**JEE Advanced
2023**

 VAVILALA
 CHIVILAS REDDY
 APPN NO 2023000000000000
 CLASS 12th 2023
**341
360**
 MARKS

RANK
**NEET
2023**

 BORA VARUN
 CHAKRAVARTHI
 APPN NO 2023000000000000
 CLASS 12th 2023
**720
720**
 MARKS

RANK




iii	 Toluene reacts with $-OH$ to form Phenol.	c	Saytzeff elimination
iv	 1-bromo-3-methylbutane reacts with $alc\ KOH$ to form 2-methylpropene.	d	Electrophilic addition

- 1) i -b; ii-d; iii-a; iv-c
 2) i-b; ii-c; iii-a; iv-d
 3) i-a; ii-d; iii-b; iv-c
 4) i-a; ii-c; iii-b; iv-d

54. STATEMENT -I -Addition of water to but-1-ene in acid medium yields Butan-1-ol

STATEMENT-II- Addition of water to alkene in acid medium proceeds through the formation of stable carbocation

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

55. Statement -I Sodium ethoxide reacts with t-butyl chloride and form t- butyl ethyl ether
 Statement-II In Williamson's synthesis alkyl halide react with sodium alkoxide to form ether

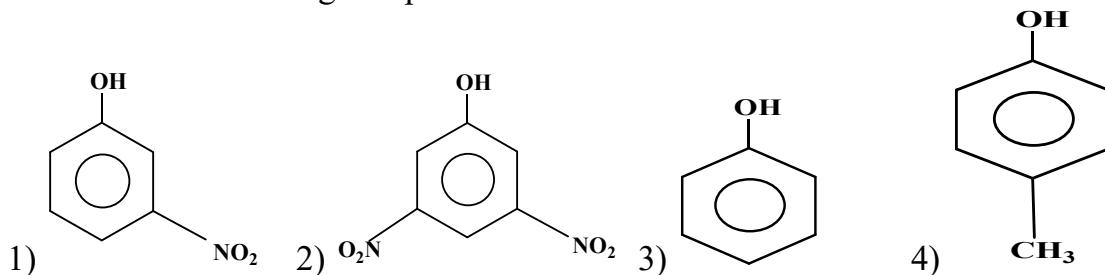
- 1) Both statement -I and statement -II are correct
 2) Both statement -I and statement -II are incorrect
 3) Statement -I is correct and statement -II is incorrect
 4) Statement -I is incorrect and statement -II is correct

56. Arrange the following compounds in the increasing order of their boiling points

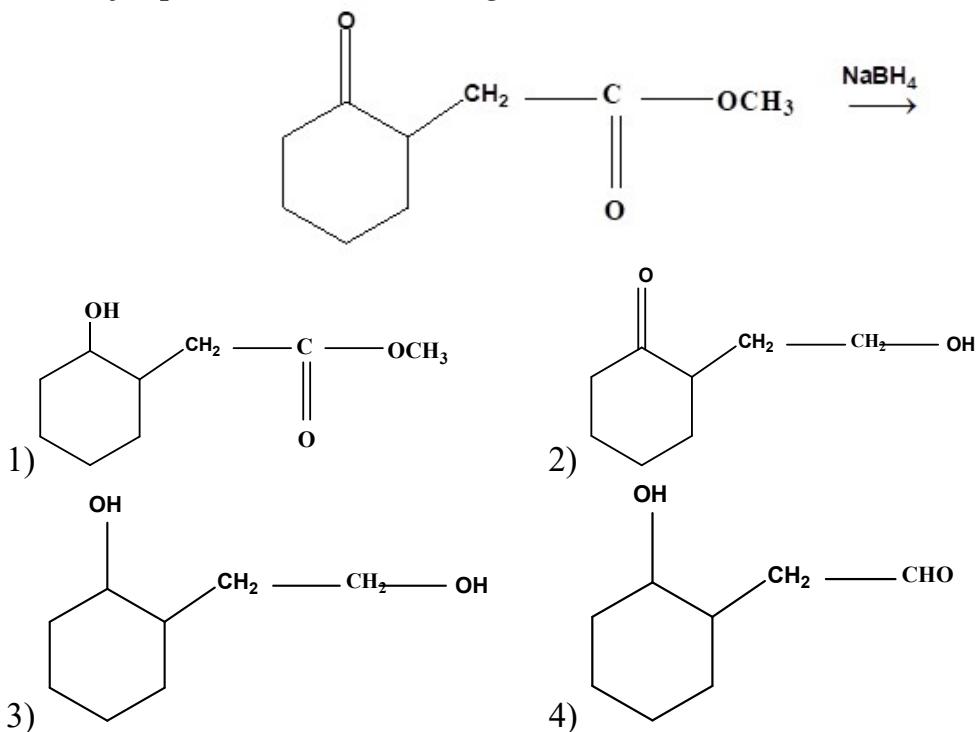
- a) pentan-1-ol b) ethoxy ethane c) 1-butanol d) n-butane

- 1) a < c < b < d 2) d < b < c < a 3) d < c < b < a 4) a < b < c < d

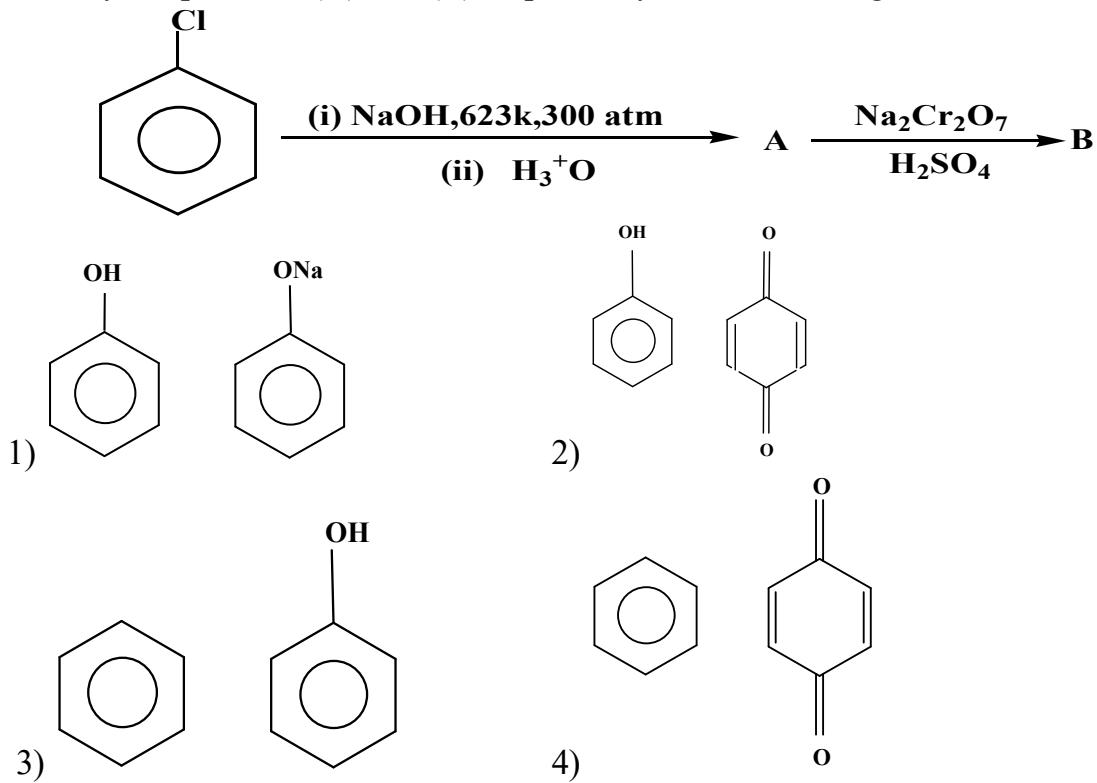
57. Which of the following compound is more acidic?



58. The major product in the following reaction is

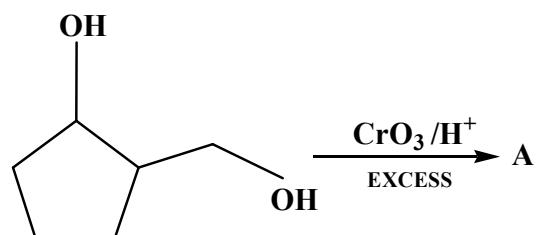


59. Identify the products (A) and (B) respectively in the following reaction





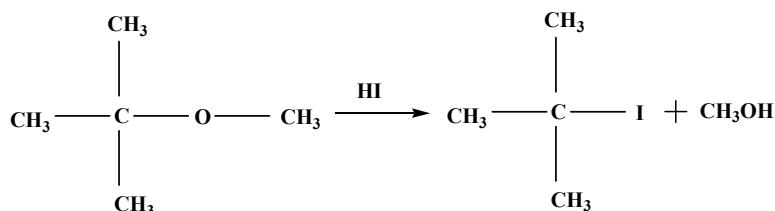
60.



the compound 'A' is _____

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

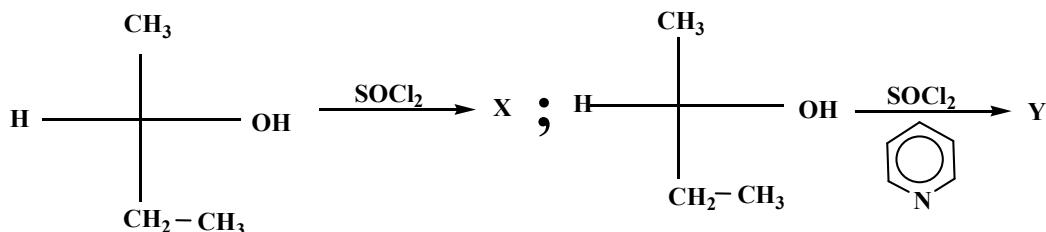
61.



the above reaction follows _____ mechanism

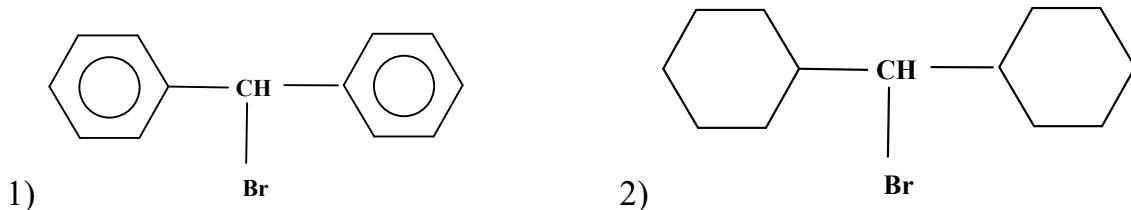
- 1) S_N^1 2) S_N^2 3) S_N^i 4) E_{1cb}

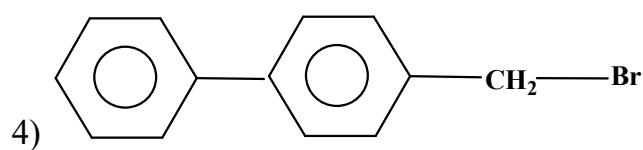
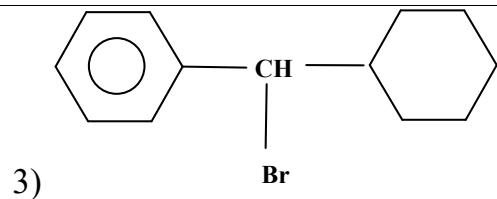
62.



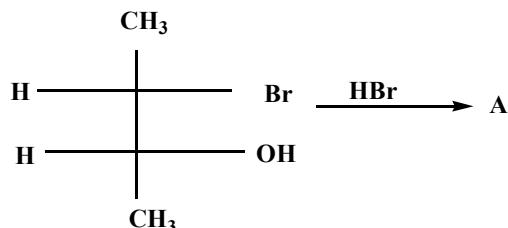
Both 'X' and 'Y' are

- 1) identical 2) diastereomers 3) enantiomers 4) functional isomers

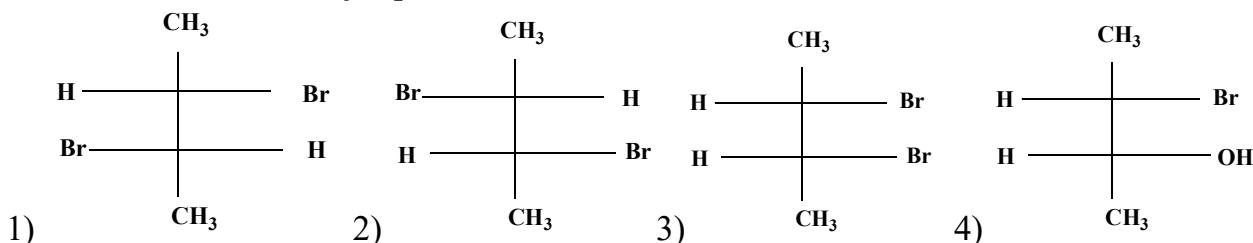
63. The rate of S_N^1 reaction is faster in



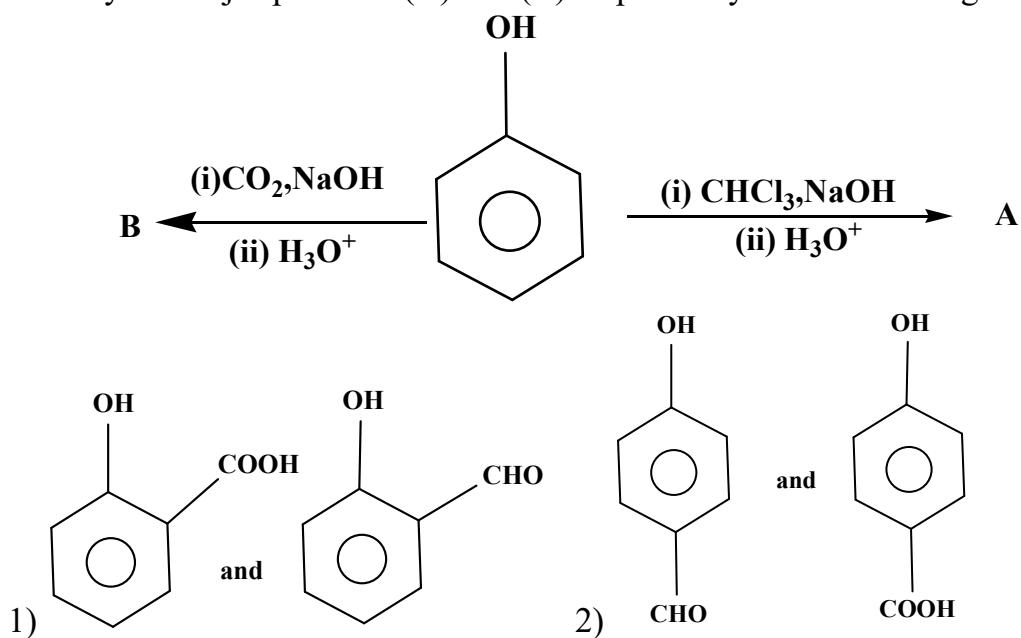
64.

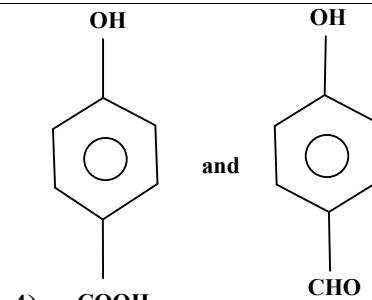
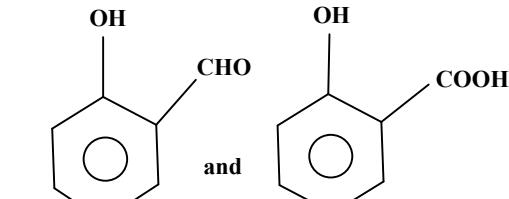


In the above reaction major product 'A' is

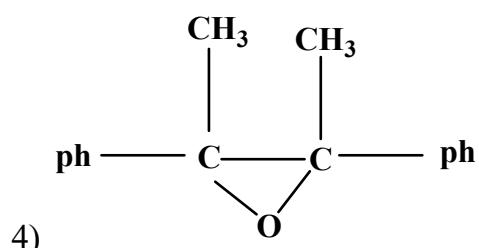
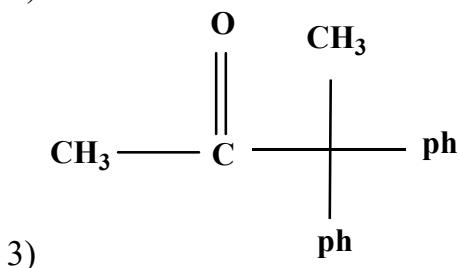
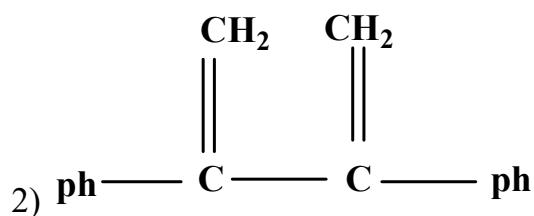
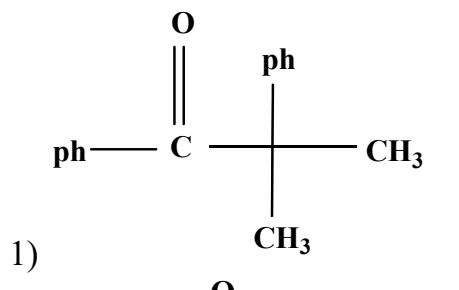
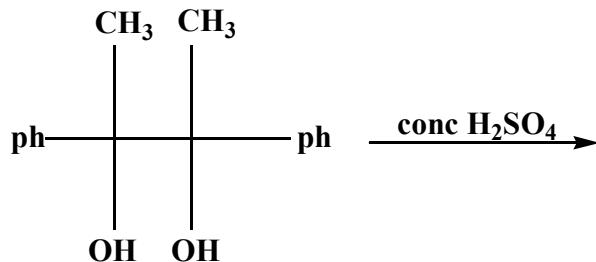


65. Identify the major products (A) and (B) respectively in the following reaction

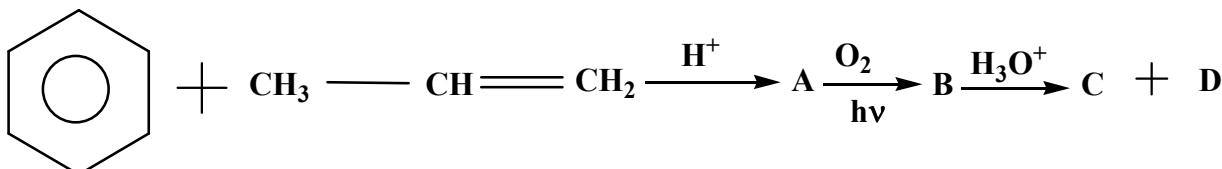




66. Find out the major product of following reaction



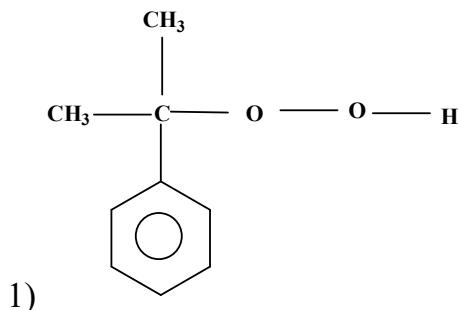
67.



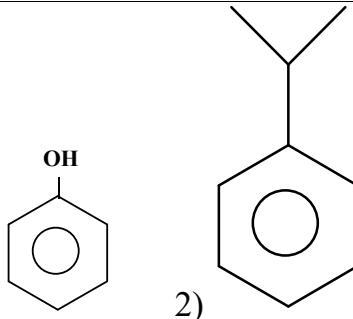
identify (C) and (D) in the above reaction

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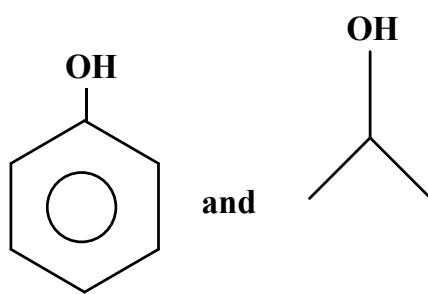
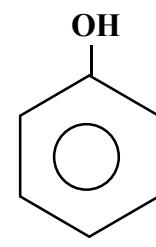




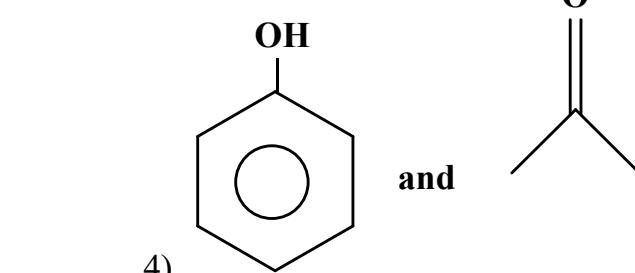
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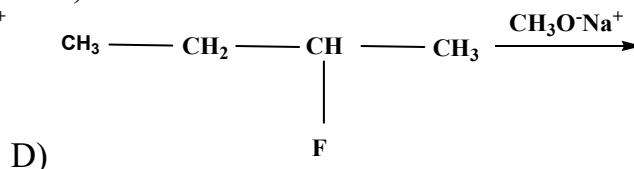
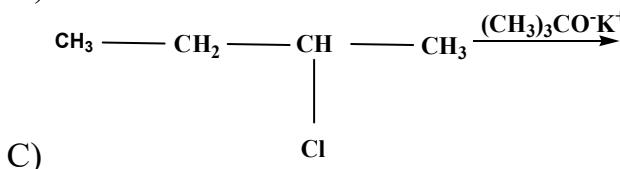
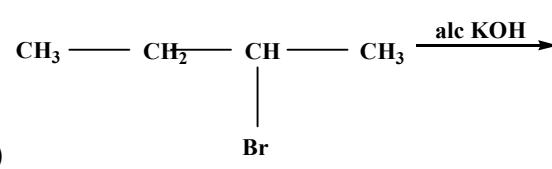
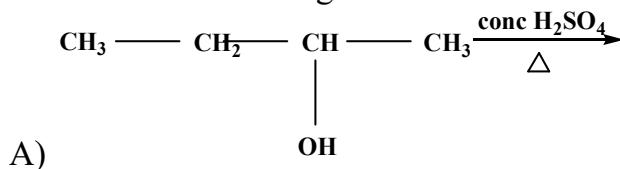


and



and

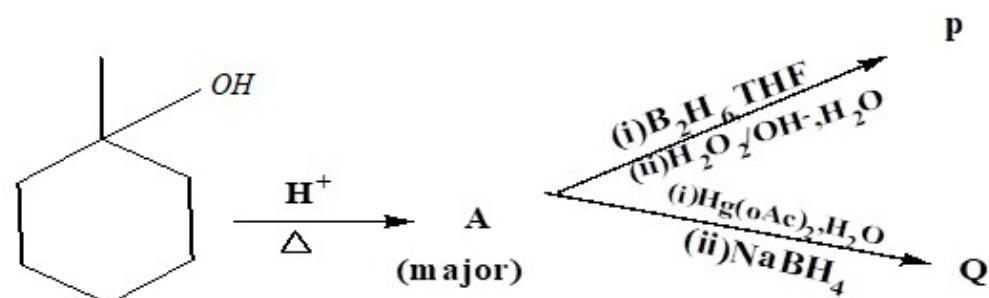
68. Consider the following reactions



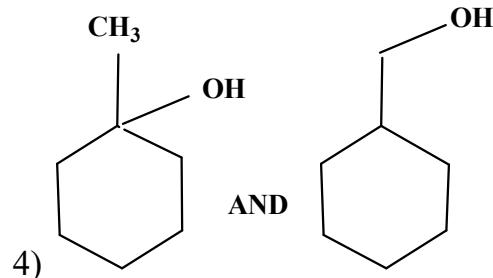
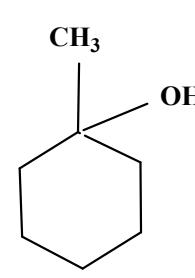
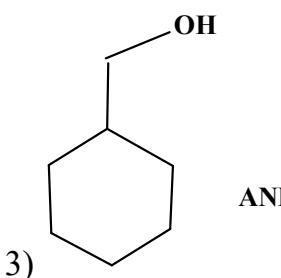
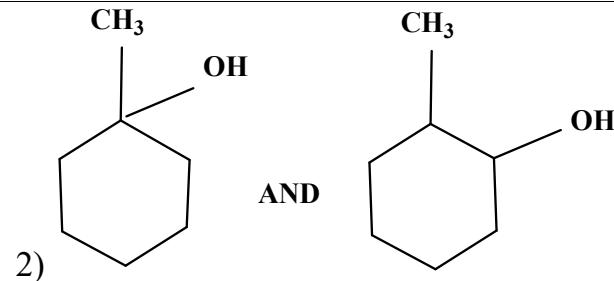
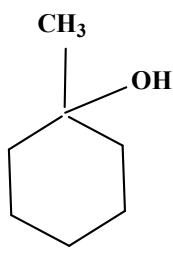
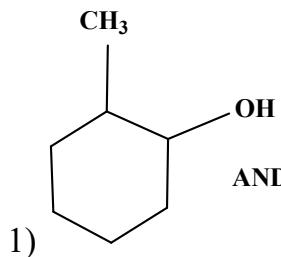
Which of these reaction (S) will not produce Saytzeff's product?

- 1) (A) and (B) 2) (D) only 3) (C) only 4) (C) and (D)

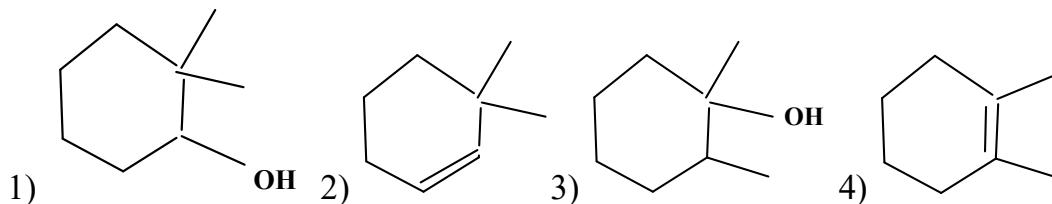
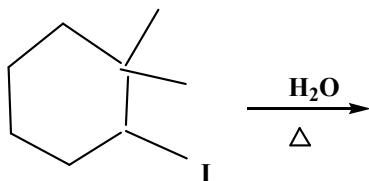
69.



Identify the products 'P' and 'Q' respectively in the above reaction



70. Find the major product of the following reaction

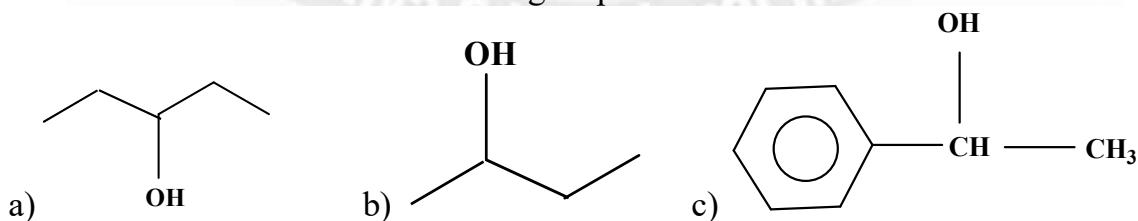


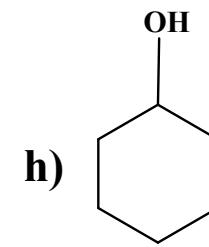
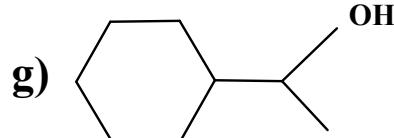
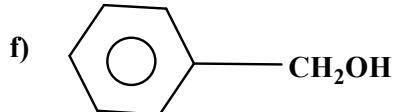
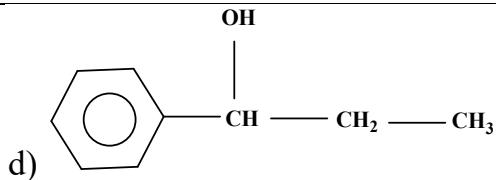
SECTION-II (NUMERICAL VALUE TYPE)

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**).

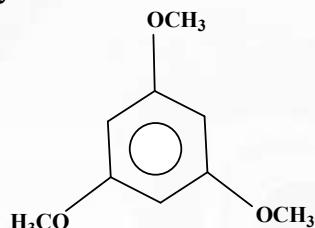
Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

71. Find out number of alcohols that can give positive iodo form test

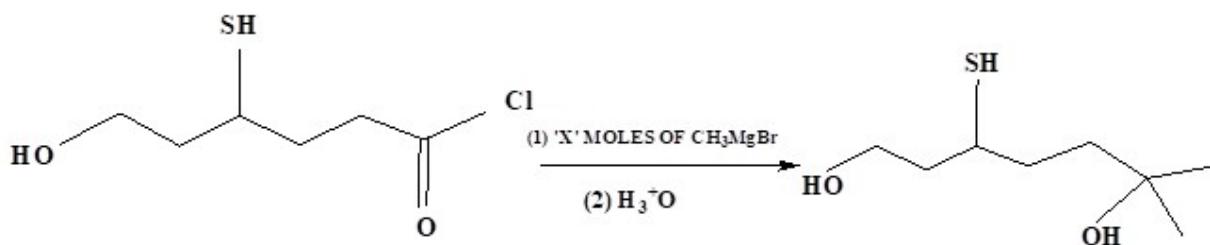




72. How many moles of HI will react with



73.



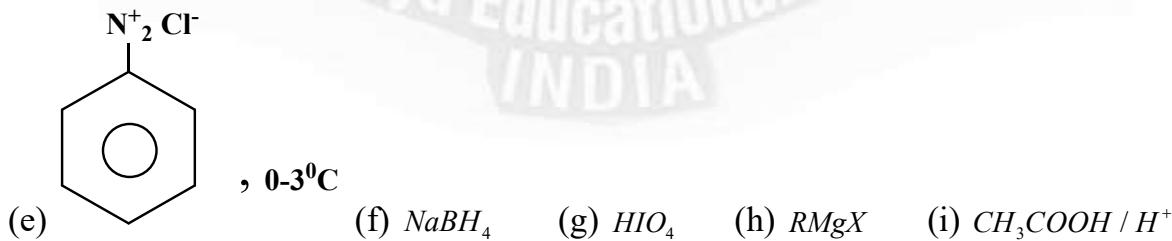
Find out value of 'X'

74. Find out number of reagents that converts 1^0 alcohol into aldehyde

- (A) $\text{KMnO}_4 / \text{H}^+ \Delta$ (B) $\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}^+, \Delta$ (C) Ceric ammonium nitrate
 (D) PCC (E) PDC (F) Cu/300°C (G) Anhydrous CrO_3

75. Find out number of the following reagents can be used to identify the phenol

- (a) $\text{Br}_2 / \text{H}_2\text{O}$ (b) LiAlH_4 (c) neutral FeCl_3 (d) I_2 / NaOH



**THE PERFECT HAT-TRICK WITH ALL- INDIA RANK 1
IN JEE MAIN 2023 JEE ADVANCED 2023 AND NEET 2023**





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JEE MAIN 2025

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BELOW
100
ALL INDIA OPEN
CATEGORY RANKS

31

BELOW
500
ALL INDIA OPEN
CATEGORY RANKS

95

BELOW
10
ALL INDIA CATEGORY
RANKS COUNT

10

BELOW
100
ALL INDIA CATEGORY
RANKS COUNT

98

BELOW
1000
ALL INDIA CATEGORY
RANKS COUNT

579

TOTAL QUALIFIED RANKS
FOR JEE ADVANCED-2025 **22,094**

*DLP/AITS

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RUTVIK SAI
H.T. No. 256055278 (OBC-NCL)

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H.T.No. 251134112*

UJJWAL KESARI
H.T.No. 252016104*

AKSHAT KUMAR CHAURASIA
H.T.No. 254065055*

BELOW
100
ALL INDIA OPEN
CATEGORY RANKS

29

BELOW
500
ALL INDIA OPEN
CATEGORY RANKS

113

BELOW
1000
ALL INDIA OPEN
CATEGORY RANKS

205

BELOW
1000
ALL INDIA CATEGORY
RANKS COUNT

745

NUMBER OF
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4,212

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