

**KEAM 2025**  
**28/04/2025**



SCAN ME

**VIDEO SOLUTION**

**MEMORY BASED  
QUESTIONS**



1. Resistivity of a wire is proportional to
  - A) Relaxation time
  - B) Area
  - C) Length
  - D) Temperature
  - E) Number density of electrons
2. If two waves of equal amplitude and opposite phase interfere, then their resultant amplitude is
3. The work done to move a charge of  $3c$  from A to B is 12J. Find potential difference between A and B
4. Dimensional formula of plank's constant is similar to
  - A) Angular momentum
  - B) Linear momentum
  - C) Force
  - D) Velocity
5. Gyro magnetic ratio is
6. Radius of gyration of a disc about its diameter
7. A farm roller of mass 100kg is given a force of 300N at  $30^\circ$  angle to the ground. Find net force acting on it in vertical direction
8. Total kinetic energy of a satellite at height  $h$  is  $k$ . Then total energy of satellite is
9. A body starts from rest and is moving with a constant acceleration 'a'. The relation between instantaneous displacement and time
10. If the mean kinetic energy of Helium is 5000J at 400K, then kinetic energy of neon at 800K is
11. Ratio of wavelength of first two modes of open pipe
  - A) 2 : 1
  - B) 1 : 2
  - C) 1 : 1



12. Mobility is the ratio of drift velocity and .....  
A) Time                      B) Electric field
13. A wave from a source having power 1 watt incident on surface of area  $200\text{m}^2$ . Intensity is .....
14. Two circular disc of moment of inertia  $I_1$  and  $I_2$  having angular velocity  $\omega_1$  and  $\omega_2$  respectively are made to rotate about the same axis with angular velocity  $\omega$ . Then  
A)  $I_1\omega_1 + I_2\omega_2 = (I_1 + I_2)\omega$   
B)  $I_1\omega_1 - I_2\omega_2 = (I_1 + I_2)\omega$
15. Transverse nature of wave is explained by  
A) Polarisation              B) Diffraction              C) Interference
16. Polarisation shows  
A) Interference              B) Diffraction              C) Dispersion
17. The radiation having wavelength  $\lambda = \frac{36}{5R}$  is obtained in which transition  
A)  $n = 3$  to  $n = 2$               B)  $n = 1$  to  $n = 2$               C)  $n = 5$  to  $n = 4$
18. Velocity of gas in air is directly proportional to  
A)  $\sqrt{T}$                       B)  $\sqrt{\rho}$                       C) Pressure                      D)  $M$
19. A ball of mass 5kg strike a wall with speed 50 m/s. It bounces back with same speed. The force last for  $t = \frac{1}{20}$  s. Find force  
A)  $10^4$                       B)  $10^3$                       C) 500
20. Power required to move a rectangular rod in uniform magnetic field  $t = \frac{1}{20}$  s. with velocity  $v$  is directly proportional to  
A)  $v$                       B)  $v^2$                       C)  $v^3$                       D)  $\sqrt{v}$



21. A body of mass 2kg moving with velocity 10m/s. A force of 50N applied to it for 10s. Find velocity after 10s.
22. The speed of wave on a stretched string is 100 m/s and linear mass density of string is  $7 \times 10^3 \text{ kg/m}$ . The tension is .....
23. A magnetic dipole is placed at an angle  $30^\circ$  to the uniform magnetic field B. Find torque
24. In a right hand thumb rule, Thumb gives the direction of
25. When an insulated system is compressed
- A) Internal energy and temperature increases
- B) Temperature decreases
27. In a graph of angle of incidence versus angle of deviation of prism, angle of incidence at lowest point of graph is
- A) angle of prism
- B) half of angle of prism
- C) angle of emergence
- D) retracted angle at I<sup>st</sup> face
- E) refractive angle at 2<sup>nd</sup> phase
28. Ratio of dimension of energy to planks constant gives dimension of
- A) Time
- B) Length
- C) Frequency
29. If temperature become '9' times, rms velocity becomes .....
30. If  $\alpha = 4 \text{ rad/s}^2$  find displacement in radian after 4s (body starts from rest)
31. Power of a motor is directly proportional to
- A) V
- B)  $V^2$
- C)  $V^3$
- D)  $V^4$



32. If 75% of radioactive elements in a sample decay in 'x' s. Then half life of sample is .....

33. Time period of simple pendulum depends on

A) Amplitude

B) Length

C) Mass

34. A force between the two charges  $8\mu\text{C}$  and  $2\mu\text{C}$  is 16 N. If the charges are brought in to contact and then separated by same distance, then force is

35. If Boltzman's constant is k. what is the kinetic energy for N molecules.

36. The specific heat capacity at constant volume  $C_v$  of one mole of an ideal gas is

related to the gas constant R and  $\gamma \left( = \frac{C_p}{C_v} \right)$

37. For an ideal gas at temperature T having number of molecules N, the product of pressure and volume is .....

38. The magnetic field in synchrotron is provide by .....

A) Electromagnetic only

B) Toroid only

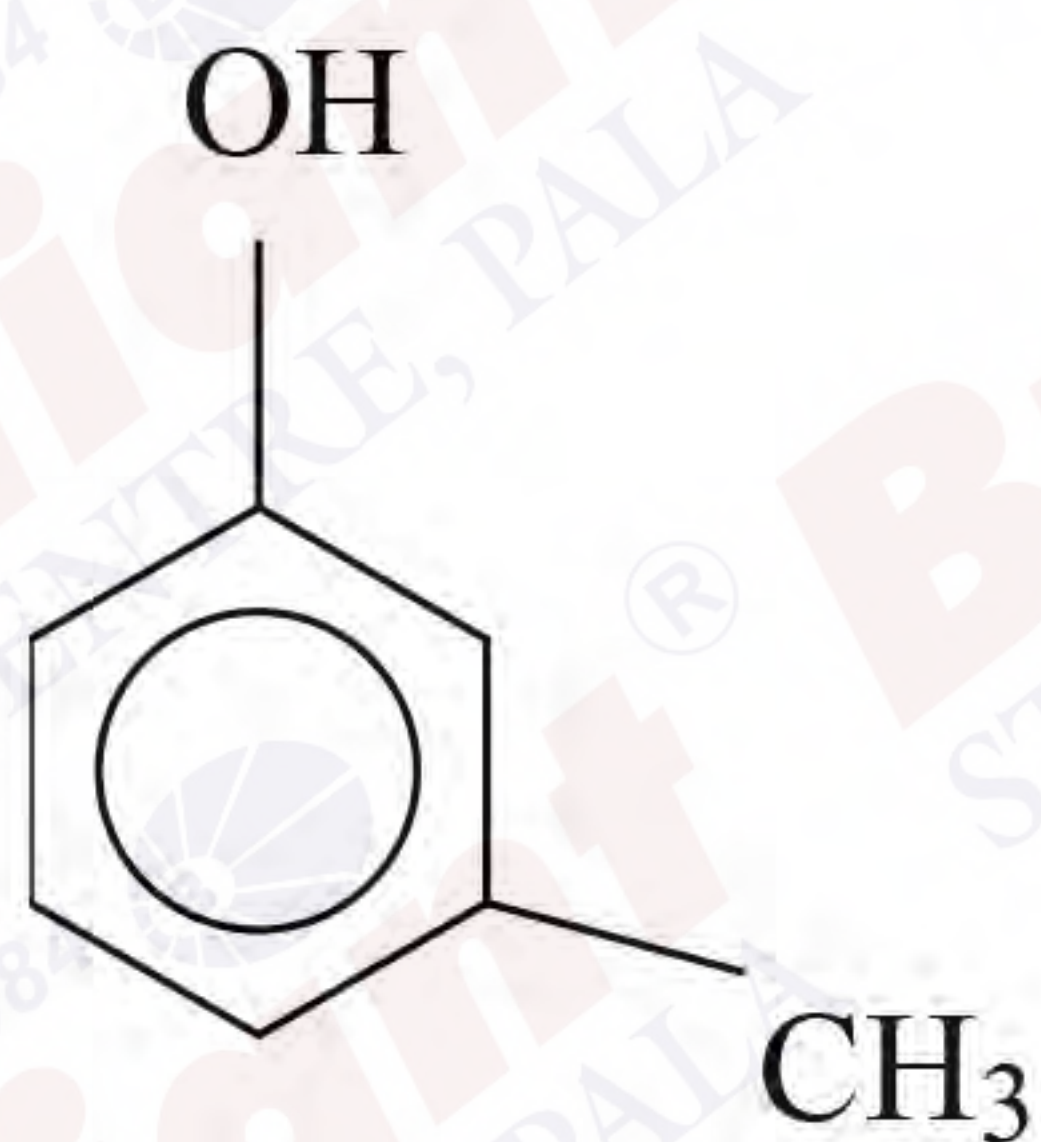
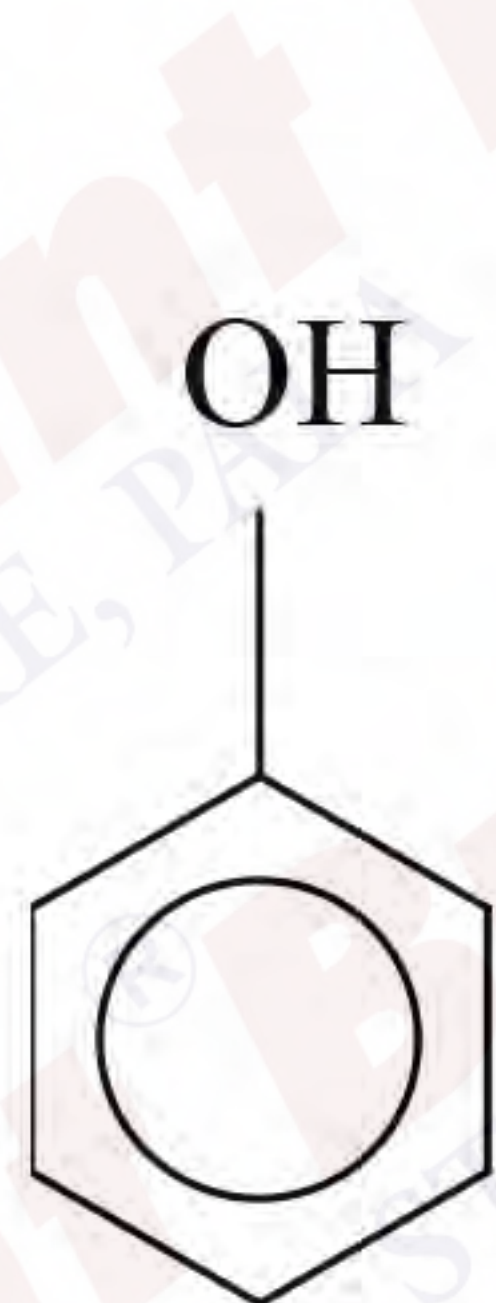
C) Toroid and solenoid

D) Solenoid only

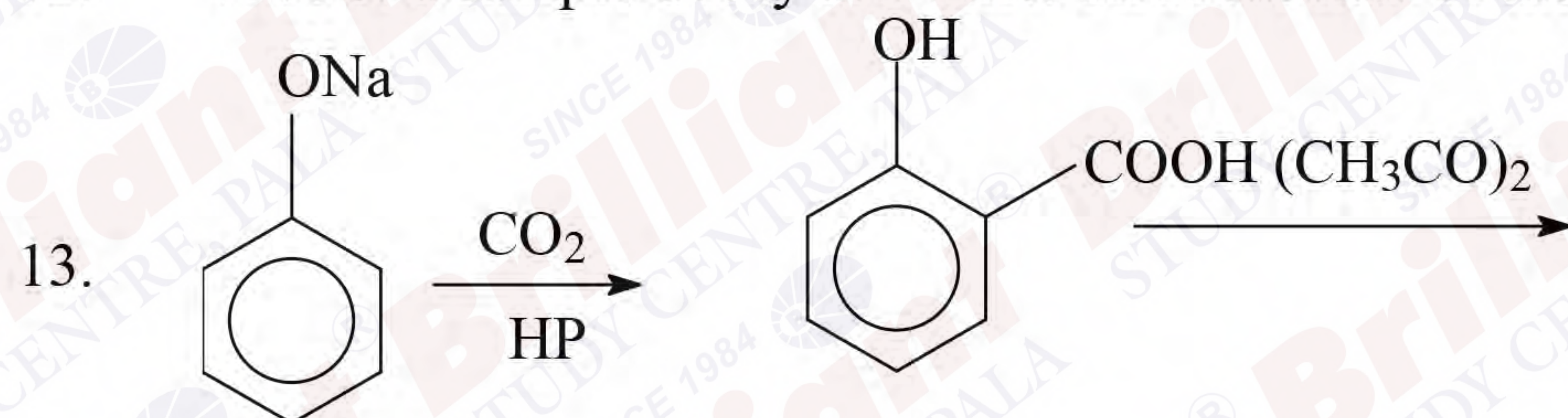
39. Peak value of ac voltage source is 200V. Find rms value



- Order of  $SN_2$  reactivity  
a)  $CH_3 - Cl$     b)  $(CH_3)_3 - ccl$     c)  $CH_3 - CH_2Cl$   
d)  $CH_3 - CH_2 - d - CH_3$
- Which of the following has maximum atomic mass?  
a) potassium nitrate    b) silver nitrate    c) lead nitrate    d) sodium nitrate
- Which of the following has maximum oxidation state  
a)  $3d^5 4s^2$     b)  $3d^5 4s^1$     c)  $3d^4 4s^2$     d)  $3d^3 4s^2$     e)  $3d^7 4s^2$
- $t_{1/2}$  1st order reaction having  $k = 6.93 \times 10^{-3}$
- Increasing ionic radii of lanthanoid having +2 oxidation state
- Radius order of  $Yb^{3+} La^{3+} Ce^{3+} Pm^{3+}$
- $CrO_3$  is — oxide
- Which of the following is not a EWG  
A) CN    B) COOH    C) COOR    D)  $OCH_3$
- Decreasing order of acidic strength



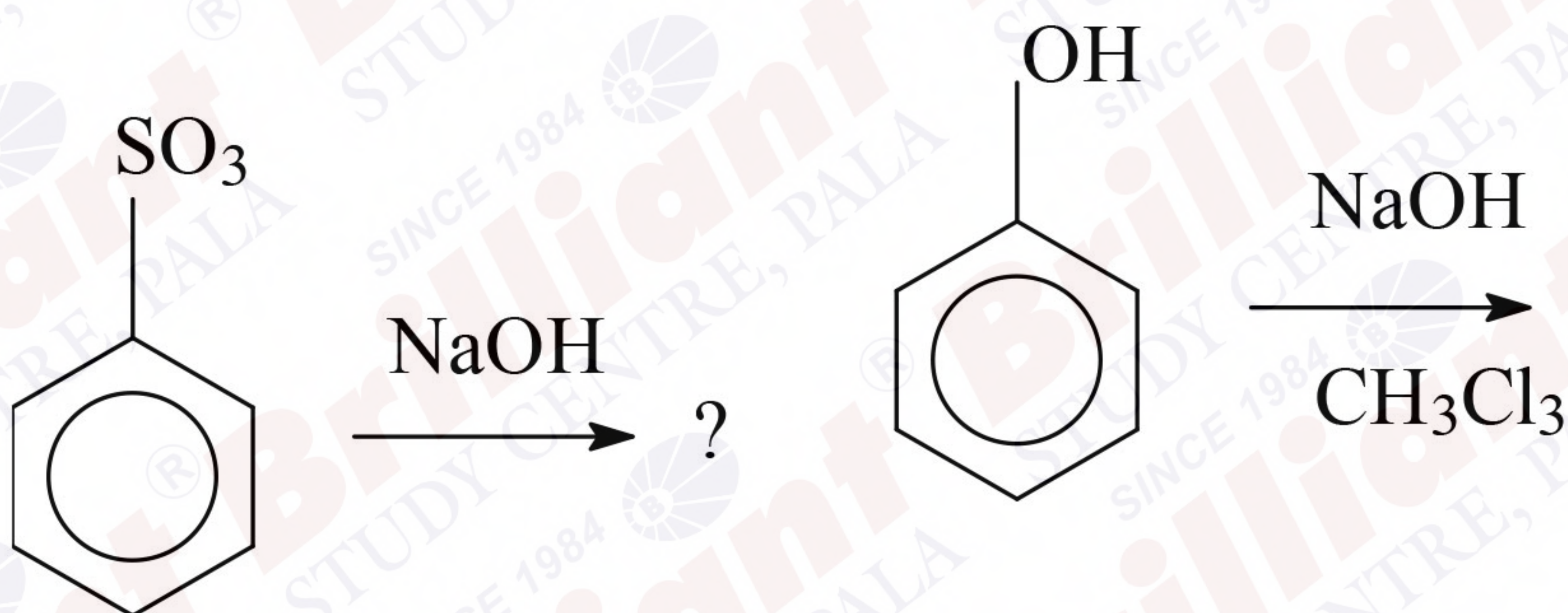
- Match the following  
Fish oil - vit B<sub>2</sub>  
sunflower oil - vit E  
yeast - vit A  
Amla - vit c
- pH of a liquid is  $10^{-4}$  then  $p^{OH}$  is
- 75% of a sample decay at x time. Then the half of the sample is?



14.  $C_6H_5NH_2 \xrightarrow[\text{pyridine}]{(CH_3COO)_2O} A \xrightarrow[\text{CH}_3\text{COOH}]{Br_2} \text{find product A \& B}$



15.



16.

Incorrect about kolbes electrolysis?

17.

$[\text{Co}(\text{NH}_3)_4\text{Br}_2]\text{Cl}$  which isomerism?

18.

IUPAC name of the following complex?

$[\text{Fe}(\text{CO})_4]$

19.

Closed system - No exchange of matter and energy

Open system - exchange of matter and energy

20.

Which among the following has the highest boiling and melting point?

a) Eicosane    b) 2,3 dimethyl pentane

21.

Molecule having zero dipole moment?

a)  $\text{NF}_3$    b)  $\text{NH}_3$    c)  $\text{CH}_2\text{Cl}_2$     d)  $\text{CH}_4$

22.

Incorrect uncertainty momentum is zero then uncertainty of position is ?

23.

What is osmotic pressure at 300k for 0.0001 urea

24.

Which is incorrect

a) group 16 is halogen

25.

Which is incorrect

a) Zn, Cd, Hg have high melting point and low volatility



1. If  $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$ ,  $\vec{b} = 2\hat{i} + \hat{j} + \hat{k}$ , then unit vector perpendicular to  $\vec{a} + \vec{b}$  and  $\vec{a} - \vec{b}$  is
2.  $\int \sin x \times \sin 2x \, dx =$
3. If 1, a, b, c, 16 is in G.P then  $\sqrt[3]{abc} =$
4.  $f(x)$  is continuous in R  

$$f(x) = \begin{cases} \frac{3x^2 - 12}{x - 2}, & x \neq 2 \\ k, & x = 2 \end{cases}$$
 find k?
5.  $2 + {}^{13}C_1 + {}^{15}C_2 + \dots + {}^{15}C_{14} =$
6.  $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$ , then  $x + y + z =$
7. If  $|x + 3| < 2$  then x lies in
8. If  $n(A) = 8$ , then number of subset of A which contain 2 or 6 elements
9. Distance between two foci of hyperbola  $x^2 - 4y^2 = 16$
10. Mean of 0, 2, 4, 6, 8
11.  $P(A) = 0.4$ ,  $P(B/A) = 0.9$  then  $P(A \cap B)$  is
12. The sum and difference of arithmetic mean and geometric mean are 8, 18, then the number are
13.  $\int_1^3 [x - 1] \, dx =$
14.  $\int e^x (1 - \cos ex) \cot x \, dx =$
15.  $\tan(x-y) = \frac{4}{5}$ ,  $\tan(x+y) = \frac{6}{5}$  then  $\tan 2x =$
16. If  $f(x) = \sin x e^{\sin x}$ , find  $f'(x) =$  ———
19.  $\int \frac{\sin x}{\sin x + \sin(1-x)} \, dx =$
20.  $\int_0^1 \sin 2x \times e^{\sin x} \, dx =$
21.  $x^3 - \sin \theta$ ,  $y^3 = \cos \theta$ . Find  $x \frac{dy}{dx}$
22.  $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$  then  $\cos^{-1} x + \cos^{-1} y =$
23.  $\int \left( \frac{\sin 3x}{\sin x} - \frac{\cos 3x}{\cos x} \right) \, dx =$



24. Coefficient of  $x^5$  in  $\left(\sqrt{x} + \frac{1}{x}\right)^{10}$  is

25.  $\left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) - \sec^2 x =$

26.  $\int x(1-x)^{10} dx =$

27. If  $(2, 3, k)$  is a point on the line  $\frac{x-1}{1} = \frac{y+2}{5} = \frac{z-3}{3}$ , then  $k =$

28. If  $\vec{a}$  and  $\vec{b}$  are unit vectors then find angle between  $\vec{a}$  and  $\vec{b}$  if  $|\vec{a} - \vec{b}| = 1$

29. If  $f(x) = \sin^{-1}(2x\sqrt{1-x^2})$ , find  $f'(0)$

30.  $A = \{x : x \text{ is an integer and multiple of 2 greater than 16}\}$

$B = \{x : x \text{ is an integer and multiple of 3 less than 36}\}$

$C = \{x : x \text{ is an integer and multiple of 4}\}$  find  $(A \cap B) \cap C$

31. If  $A$  is a  $3 \times 3$  matrix with  $|A| = 4$  find  $|\text{adj}(\text{adj} A)|$

32.  $\int \frac{1}{\cos^{2/3} x \times \sin^{4/3} x} dx =$

33. If standard deviation of  $x_1, x_2, x_3$  is 4. What is the variance of  $2x_1 + 3, 2x_2 + 3, x_3 + 3$

34. If  $x, 6, y, 54$  in G.P then  $\frac{y}{x} =$

35.  $1 + i \tan \theta = z$ , then  $|z| =$

36. If  $x + y = -1$  then  $\begin{vmatrix} x & y & 1 \\ x+y & y+1 & x+1 \\ 1 & x & y \end{vmatrix} =$

37. Coefficient of  $x^3$  in  $f(f(x))$  if  $f(x) = ax + bx^2$

38. If  $f(x)^n = f(nx)$  find  $\frac{f'(nx)}{f'(x)}$

39. Find  $\sin^{-1}(\sin \theta)$  if  $\theta \in \left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

40.  $\tan \frac{\pi}{12} + \tan \frac{\pi}{6} + \tan \frac{\pi}{12} \times \tan \frac{\pi}{6}$

41.  $\lim_{x \rightarrow 0} \frac{(s - \sin 2x)(2x - \sin x)}{x^2} =$

42. Find the point which lies on the line  $x + y = 1$  and 2 unit distance from  $5x + 12y = 0$

43. Find the number of 4 digit number formed using the digits 0, 1, 2, 3, 4, 5



44.  $f(x) + 3 f(1-x) = x + 4$ , find  $f(x)$ ?

45.  $\sqrt{3}, \sqrt{12}, \sqrt{48}, \dots$  first 10 terms

46. If  $y = \sin x \times \sin 2x$   
 $t = \cos x$

find  $\frac{dy}{dt}$ ?

47. If  $Z = \frac{3-2i}{1-i}$  find  $z^{-1}$

48. If  $f(x) = \sqrt{10-x}$ , then  $\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1}$

49. Solution of  $\frac{dy}{dx} + y = e^{-x}$  when  $x=0, y=1$

50.  $y = (5x - 2) e^x$ , then  $\frac{d^2y}{dx^2}$

51. If  $\frac{x+1}{x-1} < 2$ , then  $x$  lies in the interval

53. The unit vector that bisect the angle between  $2\hat{i} + \hat{j} + 2\hat{k}$  and  $\hat{i} + 2\hat{j} - 2\hat{k}$  is

54. If  $f(x) = [2x]$ , where  $[x]$  denotes greatest integer function then the image of  $\{-2-3, 2-9\}$  is

55. If two circles  $(x-2)^2 + (y-3)^2 = 9$  and  $(x-2)^2 + (y+3)^2 = a^2$  intersect two distinct points then  
 A)  $1 < a < 6$    B)  $1 < a < 7$    C)  $3 < a < 7$    D)  $3 < a < 4$    E)  $3 < a < 9$

56. Solve,  $y dx - x dy = y^2 (x dy + y dx)$

57. If  $f(x) = \frac{x}{x^2 - 4}$ , find point of discontinuity of  $f(x)$