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SESSION-1

SHIFT-2 EVENING

SCAN ME

VIDEO SOLUTION

MEMORY BASED QUESTIONS

Brilliant STUDY CENTRE, PALA
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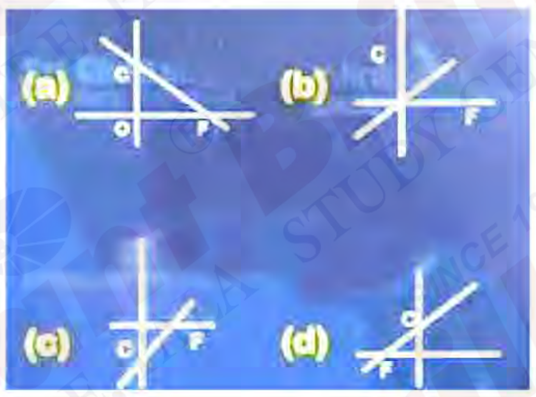
24-01-2025 SHIFT 2-EVENING

MEMORY BASED QUESTIONS

PHYSICS

1. A solid sphere and hollow sphere rolls down purely equal distances on same inclined plane (starting from rest) in time t_1 and t_2 then
   1) $t_1 > t_2$ 2) $t_1 < t_2$ 3) $t_1 = 2t_2$ 4) $t_1 = t_2$
2. A solid spherre rolls without slipping on a horizontal plane. What is ratio of translational kinetic energy to the rotational kinetic energy of the sphere
   1) 4/3 2) 3/4 3) 2/5 4) 5/2
3. If the acceleration due to gravity on the surface of earth is g, then acceleration due to gravity on a planet whose diameter is 1/3 of that of earth and same mass as that of earth is $g' = ng$, where n is
4. If E,p,m and c denote the energy, linear momentum, mass and speed of light, then the equation representing the correct relation could be
   1) $E^2 = p^2c^2+m^2c^4$ 2) $E^2 = pc^2 + m^2c^4$ 3) $E = p^2c^2 + m^2c^2$ 4) $E^2 = pc^2 + m^2c^2$
5. A conical pendulum of mass 'm' and length 'l' moving with constant speed '$\pi / 3$'m/sec. Find out the tension in the string
6. Temperature of a body reduces from 40° to 24°C in 4 minutes in surrounding of 16°C. What is the temperature of body after further 4 minutes?
   1) 20°C 2) 22°C 3) 4) 17°C
7. Power of two sources S_1 & S_2 are in ratio 2:1 and 2×10^{15} photons per sec of 600nm from S_1 are emitted and find the number of photons per second emitted from 300nm from S_2
8. The position of a particle varies with time as $\vec{r} = \left(5t^2\hat{i} - 5t\hat{j}\right)m$. The magnitude and direction of velocity at $t = \frac{1}{2}s$ is
   1) $5\sqrt{2}m/s, -45^o$ with +X axis
   2) 5m/s, –45° with + X axis
   3) $5\sqrt{2}m/s, -45^o$ with + Y axis
   4) 5m/s, +45° with + Y axis
9. Which graph shows a relation between Celsius scale & Fahrenheit scale

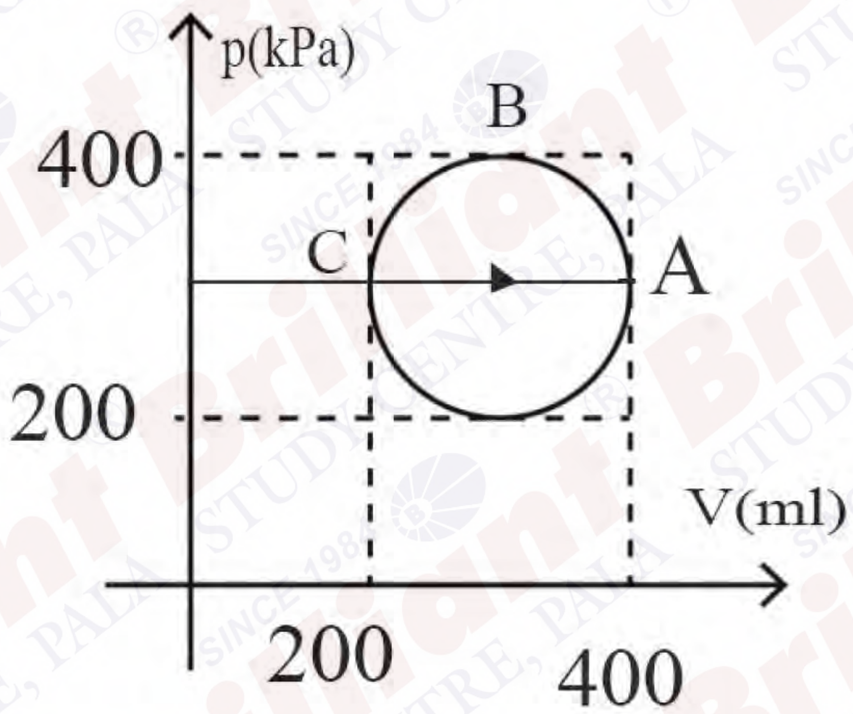


10. One sphere is charged with Q = $4\times10^{-8}C$ and other is initially uncharged. After connecting them with wires they experience a force $9\times10^{-3}N$. Find distance between them. (Both the spheres are identical)
11. If the given acceleration due to gravity of earth is g, and its radius is reduced to 1/3rd of the original, mass remains unchanged. Now find the acceleration due to gravity
12. Arrange the following wavelengths in ascending order. Ultra violet (λ_1), Radio wave (λ_2) and X - ray (λ_3) and gamma rays (λ_4)

13. The position of a particle varies with time as $\vec{r} = \left(5t^2\hat{i} - 5t\hat{j}\right)m$. The magnitude and direction of velocity at $t = \frac{1}{2}S$ is

1) $5\sqrt{2}m/s, -45^o$ with +X axis
2) 5m/s, -45^o with + X axis
3) $5\sqrt{2}m/s, -45^o$ with +Y axis
4) 5m/s, $+45^o$ with + Y axis

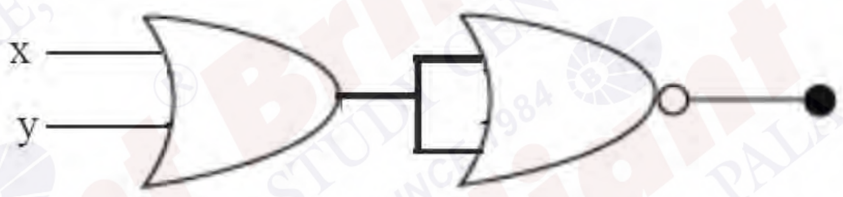
14. In given thermodynamics process (Circular in nature), find magnitude of work done by the gas in cycle ABCA.



1) 2π 2) 10π 3) 5π 4) zero

15. A particle oscillates along x - axis according to law $x = x_o \sin^2(t/2)$ where $x_o = 1$. Variation of kinetic energy (k) with position (x) is given by graph

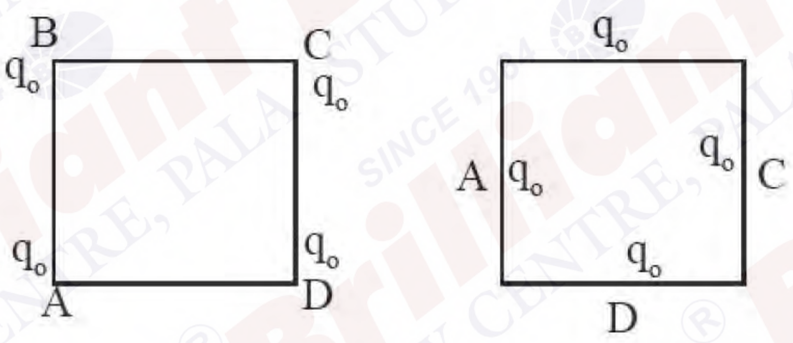
16. The following gate represents which logic gate



1) NOR 2) OR C) AND D) NAND

17. There is a line solid cylinder carrying current along the axis with uniform current density. Variation of magnetic field (B) with radial distance from axis of cylinder (r) is best denoted by

18. Find the change in potential energy of system in configuration 1 and 2



1. Consider the following reaction

$$S_{(s)} + \frac{3}{2}O_{2(g)} \rightarrow SO_{3(g)} + 2xKJ$$

$$SO_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow SO_{3(g)} + y\ KJ$$

Calculate ΔH_z for following reaction (KJ)

$$S_{(s)} + O_2 \rightarrow SO_{2(g)}$$

1) $-(x+y)$ 2) $-(2x+y)$ 3) x/y 4) $y-2x$

2. The conditions and consequences that favour the $t_{2g}^3 e_g^1$ configuration in a metal complex are

1) Strong field ligand; High spin complex

2) Weak field ligand; High spin complex

3) Strong field ligand; Low spin complex

4) Weak field ligand; Low spin complex

3. When ethane-1,2-diammine is progressively added to aqueous solution of Nickel (II) chloride the sequence of colour change observed will be

1) Pale Blue $\rightarrow$ Blue $\rightarrow$ Green $\rightarrow$ Violet

2) Violet $\rightarrow$ Blue $\rightarrow$ Pale Blue $\rightarrow$ Green

3) Pale Blue $\rightarrow$ Blue $\rightarrow$ Violet $\rightarrow$ Green

4) Green $\rightarrow$ Pale Blue $\rightarrow$ Blue $\rightarrow$ Violet

4. Statement - 1 : First ionization energy Ge is greater than Si

Satement - 2 : First ionization energy Pb is greater than Sn

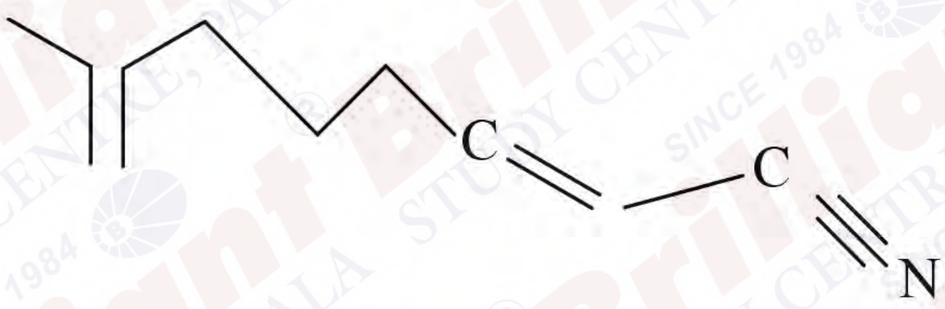
1) State-1 is true Statement - 2 is false

2) Statement-1 & Statement-2 are false

3) Both the Statements are true

4) Statement- 1 is false Statement-2 is true

5. Find the number of sp and sp^2 are carbon atoms



6. Match the following reactions with respective reagents

a) Etard reaction	p) $SnCl_2 + HCl$
b) Gattermann reaction	q) CrO_2Cl_2
c) Gattermann Koch reaction	r) $Cu + HCl$
d) Stephen reduction	s) $CO+HCl$, Anhyd. $AlCl_3$

7. Match the following Cations with respective spin magnetic moment

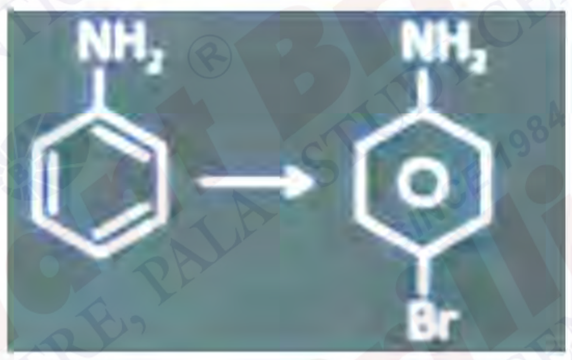
Ion	μ(B.M)
A) Ti^{+3}	p) 2.83
B) Sc^{+1}	q) 0.00
C) V^{+2}	r) 1.83
D) Ni^{+2}	s) 3.82

1) A - p, B - q, C - r, D -s

2) A - r, B - s, C - p, D -q

3) A - q, B - p, C - s, D -r

4) A - q, B - p, C - r, D -s

8. 

Above conversion can be done by using which reagents among the following

1) Fe / Br_2, $H_2O(\Delta)$, H_2SO_4

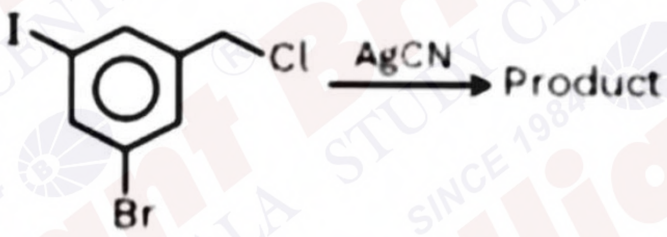
2) Ac_2O, H_2SO_4, Br_2, NaOH

3) Ac_2O, Fe / Br_2, H_2O / H^+

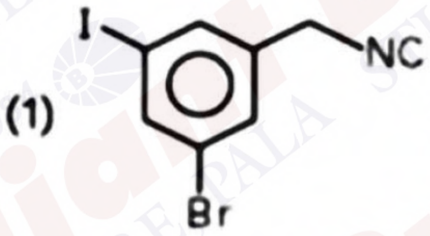
4) Ac_2O, Br_2 / Fe, NaOH

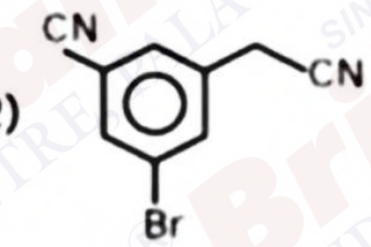
9. In a compound contains 54.2% carbon, 9.2% of hydrogen and rest are oxygen. What is molecular formula of compound, if molecular mass is 132 g/mol?

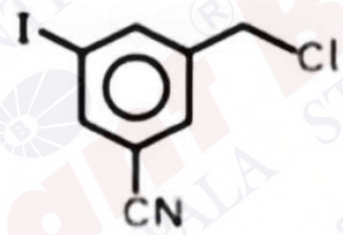
1) $C_6H_2O_3$ 2) $C_4H_{12}O_3$ 3) $C_4H_{12}O_6$ 4) $C_6H_{13}O_6$

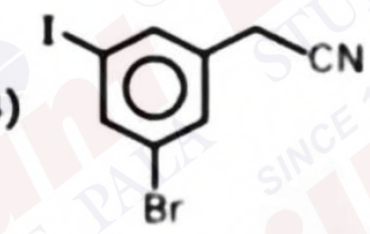
10. 

What will be final product?

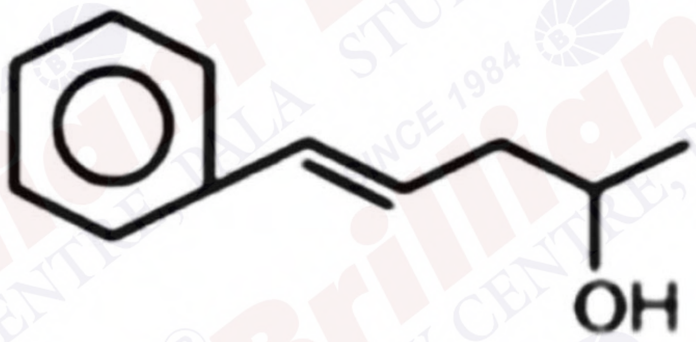
(1) 

(2) 

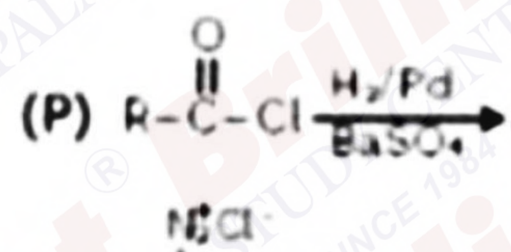
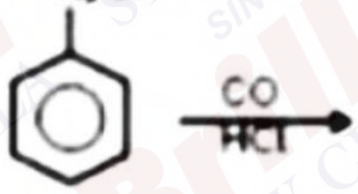
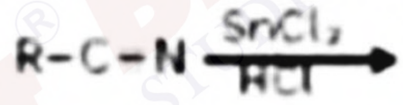
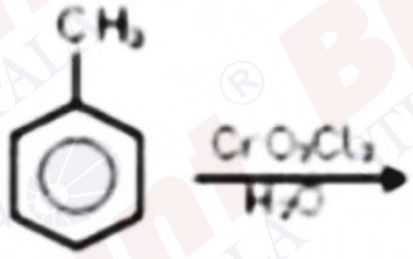
(3) 

(4) 

11. Number of stereoisomers for given compound?



12. Match the following

List -I (Name)	List -II (Reaction)
(A) Gettermann reaction	(P) 
(B) Stephan's reaction	(Q) 
(C) Rosenmund reaction	(R) 
(D) Etard Reaction	(S) 

(1) A→Q, B→R, C→P, D→S (2) A→R, B→P, C→Q, D→S

(3) A→Q, B→P, C→R, D→S (4) A→Q, B→R, C→S, D→P

13. 0.25 gm of organic compound gives 0.15 gm of AgBr in Carius method. Percentage of bromine in organic sample is ..... $\times 10^{-1}$.

(Atomic mass : Ag = 108, Br = 80)

(Give your answer as neares integer)

14. $A \xrightarrow{\text{Aqua-regia}} B \xrightarrow[CH_3COOH]{KNO_2}$ Yellow ppt

A is

1) NiS 2) CoS 3) MnS 4) FeS

15. The correct order of melting point of 14 th group elements is

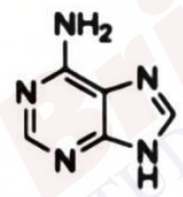
1) C > Si > Ge > Pb > Sn

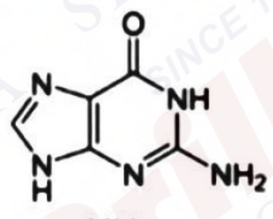
2) Sn > Pb > Ge > Si > C

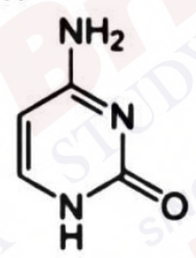
3) C > Si > Ge > Sn > Pb

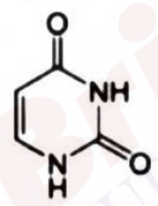
4) C > Ge > Si > Pb > Sn

16. Match the following Nitrogenous bases with their respective structures

a) Adenine **p)** 

b) Guanine **q)** 

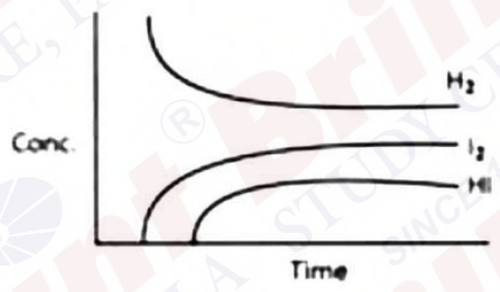
c) Cytosine **r)** 

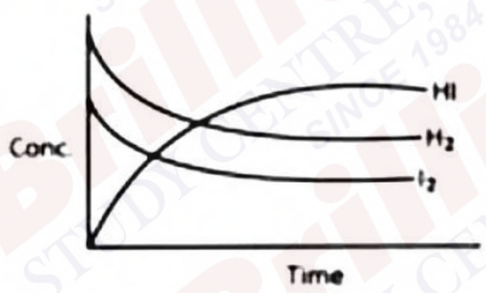
d) Uracil **s)** 

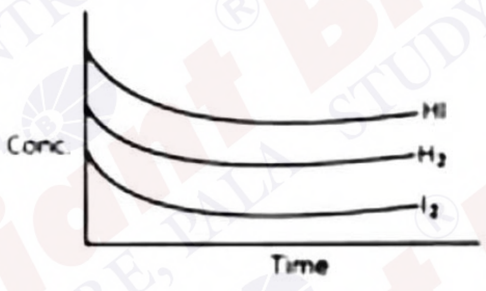
17. Consider the following gaseous reaction

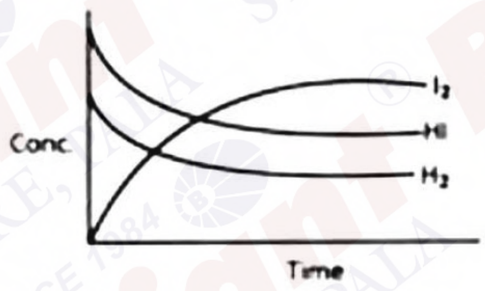
$$H_2(g) + I_2(g) \longrightarrow 2HI$$

The above reaction is started with 'a' moles of H_2 and 'b' moles of I_2 in a closed container at a certain temperature T(K) till the equilibrium is established. Which one of the following plots correctly describes the progress of reaction?

1) 

2) 

3) 

4) 

18. How many stereoisomers are possible for 5-phenylpent-4-en-2-ol?

19. A hybdrocarbon X which has molar mass 80g contains 90% carbon. Find degree of unsaturation in X.

20. Arrange the following wavelengths in ascending order.

Ultra violet (λ_1) Radio wave (λ_2) and X-ray (λ_3) and gamma rays (λ_4)

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MEMORY BASED QUESTIONS

MATHEMATICS

1. The equation of chord of the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ with (3, 1) as mid point is

   A) $48x + 25y - 169 = 0$

   B) $25x + 5y - 125 = 0$

   C) $65x + 2y - 12 = 0$

   D) $45x + 4y - 135 = 0$

2. If $7=5+\frac{1}{7}(5+\alpha)+\frac{1}{7^2}(5+2\alpha)+----\infty$ terms, then α is equal to

   A) 6 B) $\frac{6}{7}$ C) $\frac{1}{7}$ D) 1

3. If A and B are binomial coefficients of 30^{th} and 12^{th} term of binomial expansion $(1+x)^{2n-1}$.

   If 2A = 5B, then the value of n is

   A) 20 B) 21 C) 14 D) 20

4. If system of equations

   $x + 2y - 3z = 2$

   $2x + \lambda y + 5z = 5$

   $4x + 3y + \mu z = 33$

   has infinite solutions then r + u is equal to

   A) $\frac{1334}{5}$ B) $\frac{1269}{5}$ C) $\frac{261}{5}$ D) $\frac{1063}{5}$

5. Let S_n denotes the sum of the first n term of an arithmetic progesion. If $S_{40}=1030$ and $S_{12}=57$ then the value of $S_{30}-S_{10}$ is

   A) S05 B) S10 C) S15 D) S20

6. Consider an event $\in$ such that a matrix of order 2×2 is invertible with entries 0 or 1. Then P(E) is (where P(X) denote the probability of event x

   A) $\frac{5}{8}$ B) $\frac{3}{8}$ C) $\frac{1}{8}$ D) $\frac{7}{8}$

7. The area of region enclosed by the curves $y = e^x, y = |e^x - 1|$ and y-axis is (in sq. units)

A) 1 B) 1 – In2 C) 1 + In2 D) In2

8. The number of real roots of the equation $x^{2\backslash} + 3x + 2 = \min(|x+2|, |x-3|)$ is

A) 0 B) 1 C) 2 D) 3

9. A function f: R $\rightarrow$(–1, 1) such that $f(x) = \dfrac{2^x - 2^{-x}}{2^x + 2^{-x}}$. The function f is

A) both one one and onto

B) only one-one

C) only onto

D) both many-one and onto