SINCE 1984

Brilliant®

STUDY CENTRE, PALA

JEE MAIN 2025

SESSION-2

SHIFT -1

SCAN ME

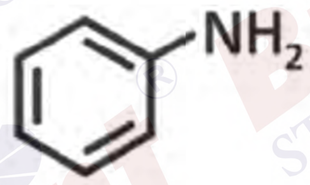
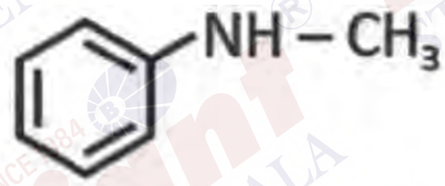
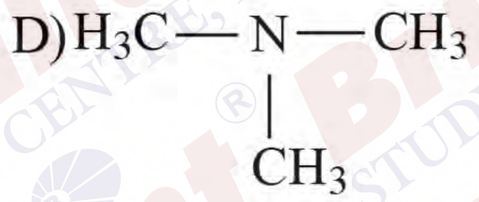
VIDEO SOLUTION

MEMORY BASED QUESTIONS

1. A compound having molecular formula MX_3 has van't Hoff factor of 2. What is the degree of dissociation?

1) 0.25 2) 0.5 3) 0.3 4) 0.75

2. Which among the following compounds gives positive carbylamine test?

A) $CH_3–NH_2$ B)  C)  D) 

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

3. 500 mg of organic compound gives 220 mg of CO_2. Find mass % of carbon atoms present in organic compound

4. What is the number of valence electrons of the element that has the lowest enthalpy of atomization among the following: Cr, Fe, Co and Ni?

1) 9 2) 8 3) 6 4) 10

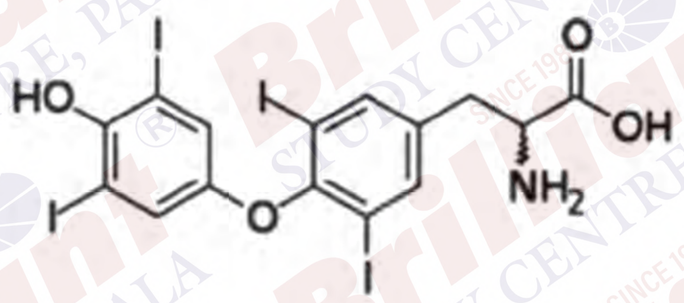
5. In a hydrogen like ion the energy difference between the second excitation energy state and ground is 108.8 eV. The atomic number the ion is

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

6. An aqueous solution of HCl with pH 1.0 is diluted by adding equal volume of water (ignoring dissociation of water). The pH of HCl solution would ..... (Given log 2 = 0.30)

1) remains same 2) increases to 1 3) reduces to 0.5 4) increases to 2

7. Given below is the structure of hormone "Thyroxine". What is the % of I(iodine) in the molecule



8. Transition metal belonging to 3d series having lowest enthalpy of atomization in its most stable oxidation state forms oxide MO. Nature of oxide is

1) Highly acidic 2) Amphoteric 3) Highly basic 4) Neutral

9. Assertion (A) : Sodium on reaction with alcohols liberates H_2 gas.

Reason (R) : alcohols are acidic in nature

1) Both A and R are correct and R explains A

2) Both A and R are correct but R does not explains A

3) A is correct R is incorrect

4) A is incorrect, R is correct

10. Statement-I : D-(+)-glucose and D-(+)-fructose are formed on hydrolysis of

Statement-II : Sucrose in an invert sugar

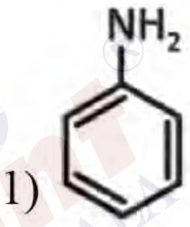
1) Statement-I is correct and statement-II is incorrect

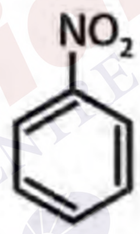
2) Statement-I is incorrect and Staement-II is correct

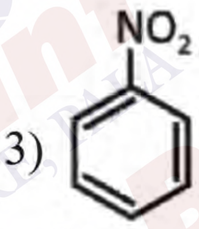
3) Statement-I and statement-II are correct

4) Statement-I and statement-II are incorrect

11. Which one of the following reactions will result in the formation of deuterated benzene (C_6H_5D)?

1) 

2) 

3) 

4) None

12. 1 mol of water at 10°C is converted into ice at –10°C. The change in enthalpy for complete conversion is [Given : C_p of water = $xJK^{-1}\ mol^{-1}$]

[C_p of ice = $y\ JK^{-1}\ mol^{-1}$

$\Delta^{H}_{fusion} = zJ$]

1) $(-10x - 10y - z)J$ 2) $(10x + 10y + z)\ J$ 3) $(x + y - z)\ J$ 4) $10(x + y - z)J$

13. Consider the following sequence of reaction:

$NH_4Cl + NaOH \longrightarrow X(gas)$

$X(gas) + Y \longrightarrow$ Brown ppt.

Find out X(gas) and compound Y, respectively.

1) Cl_2 and K_2HgI_4 2) NH_3 and K_2HgI_4 3) NH_3 and KOH 4) HCl and HgI

14. Consider the following values of standard reduction potential,

$$E^{\circ}_{Cu^{2+}/Cu} = +0.34V, E^{\circ}_{Ag^{+}/Ag} = +0.80V$$

Find E_{cell} constituted by these two electrodes if, it contains 0.2 M Ag^{+}(aq) and 1.5 M Cu^{2+} (aq)

1) 0.50 volts 2) –0.50 volts 3) 0.41 volts 4) –0.41 volts

15. 100 mL HCl solution having pH-1 is diluted to 250 mL. The pH of final solution is

1) 1 2) 1.4 3) 1.7 4) 2

16. Match the following compounds in List-I with its lone pairs on central bond pairs in List-II

List-I	List-II
A) XeF_4	i) 2 lone pairs and 3 bond pairs
B) ClI_3	ii) 1 lone pair and 4 bond pairs
C) SF_4	iii) 3 lone pairs and 2 bond pairs
D) I_3^-	iv) 2 lone pairs and 4 bond pairs

1) A-IV; B-II; C-III; D-I 2) A-II; B-I; C-III; D-IV

3) A-IV; B-I; C-II; D-III 4) A-I; B-IV; C-III; D-II

17. Correct order of wavelength of the following colours

I) Red II) Yellow III) Blue IV) Violet

1) I > II > III > IV 2) IV > III > II > I 3) II > I > IV > III 4) II > I > III > IV

18. Consider the following first order reaction A(g) →2B(g) + C(g). The total pressure at t = 10 min is 160 mm Hg and t = ∞ is 240 mm of Hg. Choose the correct statemetn

1) The reaction will be 100% complete 2) $k = 1.693\ s^{-1}$

3) t = 10 min P_A = 40 mm Hg 4) At t = 5 min pressure of system is 180 mm Hg

19. How many of the following complex ions are paramagnetic ad have d^2sp^3 hybridisation of the central metal ion?

$[FeF_6]^{3-}, [Fe(CN)_6]^{3-}, [CoF_6]^{3-}, [Co(CN)_6]^{3-}, [Mn(CN)_6]^{3-}, [Co(OX)_3]^{3-}$

1) 2 2) 3 3) 4 4) 5

20. Statement-I : Di-methyl ether is almost completely soluble in water

Statement-II : Sodium can be used in dry diethyl ether but not ethyl alcohol

1) Statement- I is correct but statement-II is incorrect

2) Statement- I is incorrect but statement-II is correct

3) Both statements are correct

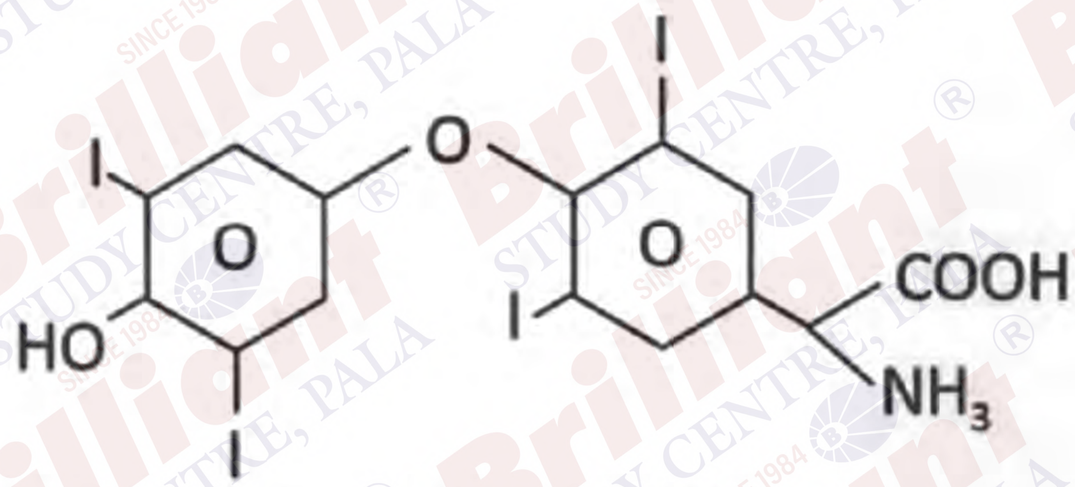
4) Both statements are incorrect

21. In air, mass% composition is given as N_2 = 70%, O_2 = 27%, Ar = 3%. Find the ratio of partial pressures of gases (N_2 : O_2 : Ar)

1) 0.73 : 0.02 : 0.01 2) 0.67 : 0.31 : 0.09 3) 0.67 : 0.31 : 0.03 4) 0.73 : 0.25 : 0.2

22. Given below are some ionic species Fe^{2+}, Co^{2+}, Mn^{2+}, Fe^{3+}, Cu^{+}, Cr^{+}. Find the number of ions which have electronic configuration of $3d^5$

23. The percentage by mass of iodine is x and that of N in y in the following organic compound, then the value of (x+y) is



[MW of I = 127 : O = 16; C = 12; N = 14]

1. Consider a squad of 15 players consisting of 7 batsman, 6 bowler, 1 captain and 1 vice-captain. A team of 10 players to be selected such that team has at least 4 batsman and 4 bowler and out of captain and vice-captain atleast 1 must be present in the team. Then number of ways to select such team is

1) 1475 2) 1575 3) 1075 4) 1500

2. If $x(x^2+e^x)dy + (e^x(x-2)y-x^3)dx = 0$ such that $f(1) = 1$. Then which of the following is correct ?

1) $y=\frac{(x-e)x^2}{x^2-ex}$ 2) $y=\frac{(ex+1)x^3}{e^x+x^2}$ 3) $y=\frac{(x+e)x^2}{e^x+x^2}$ 4) $y=\frac{(3x+e)x^2}{e^x+x^3}$

3. Line L passes through (1, 1, 1) and line L intersects L_1 and L_2 when

$L_1:\frac{x-1}{2}=\frac{y+1}{3}=\frac{z}{4}$ and $L_2:\frac{x-1}{1}=\frac{y-3}{4}=\frac{z}{1}$, then L passes through

1) (0, 0, 0) 2) (1, 2, 3) 3) (-1, 3, 4) 4) (9, 15, 18)

4. Consider two statements :

Statement 1 : If $\left(\frac{z+i}{z-i}\right)$ is purely real, then there are exactly 2 complex numbers z.

Statement 2 : If $\left(\frac{z+1}{z-1}\right)$ is purely imaginary, then there are infinite such complex numbers z.

Then

1) Statement 1 is true

2) Statement 2 is true

3) Both statement 1 and statement 2 are true

4) Both statement 1 and statement 2 are false

5. If $\vec{a}$ and $\vec{b}$ are unit vectors such that angle between $\vec{a}$ and $\vec{b}$ is $\sin^{-1}\left(\frac{\sqrt{65}}{9}\right)$ and $\vec{c}=3\vec{a}+4\vec{b}+9\left(\vec{a}\times\vec{b}\right)$

. Then, the value of $\vec{c}\cdot\vec{a}-3\vec{c}\cdot\vec{b}$ is

1) $\frac{101}{3}$ 2) $\frac{-101}{9}$ 3) $\frac{101}{9}$ 4) $\frac{-101}{3}$

6. If α and β are negative real roots of the quadratic equation $x^2-(p+2)x+(2p+9)=0$ and

$p\in(\alpha,\beta)$. Then the value of $\beta^2-2\alpha$ is

1) 11 2) 13 3) 7 4) 5

7. Let the straight line AB : x + y -2 = 0, AC : 3y - x = 2 intersects x-axis at B and C respectively. If P is the orthocentre of the triangle ABC, then area of the triangle CPB is

1) 10 sq. units

2) 8 sq. units

3) 6 sq. units

4) 7 sq. units

8. If $f(x)=\left[\frac{x^2}{2}\right]-\left[\sqrt{x}\right]\ \forall\, x\in[0,4]$, where $[\cdot]$ denotes the greatest integer function, then number

of points of discontinuity of f (x) is

1) 12 2) 8 3) 6 4) 4

9. Solve : $\int_0^{\pi}\frac{(x+3)\sin x}{1+3\cos^2 x}dx$

1) $\frac{\pi(\pi+6)}{3\sqrt{3}}$ 2) $\frac{\pi(\pi+6)}{2\sqrt{3}}$ 3) $\frac{\pi^2}{2\sqrt{3}}$ 4) $\frac{\pi^2}{4\sqrt{3}}$

10. The value of the limit $\lim\limits_{x\to0^+}\frac{\left(\tan^{-1}5x^{1/3}\right)^2\cdot\log_e\left(1+3x^2\right)\cdot\left(e^{5x^{4/3}}-1\right)}{\left(\sin^{-1}\left(3\sqrt{x}\right)\right)^8}$ is

1) $\frac{5^3}{3^7}$ 2) $\frac{5^3}{3^6}$ 3) $\frac{5^2}{3^7}$ 4) $\frac{5^2}{3^6}$

11. Area bounded by the curves $y = 4 - \frac{x^2}{4}$ and $y = \frac{x-4}{2}$ (in square units) is

1) $\frac{125}{3}$ 2) $\frac{20}{3}$ 3) $\frac{80}{3}$ 4) $\frac{120}{3}$

12. If x_1, x_2, x_3, x_4 are in GP, then we subtract 2, 4, 7, 8 from x_1, x_2, x_3, x_4 respectively, then the resultant numbers are in AP, then the value of $\frac{1}{24}(x_1 \cdot x_2 \cdot x_3 \cdot x_4)$ is

1) $\frac{2^4}{3^8}$ 2) $\frac{2^3}{3^9}$ 3) $\frac{2}{3^9}$ 4) $\frac{2}{3^8}$

13. The remainder when $64^{64^{64}}$ is divided by 7 is equal to

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

14. Let A be a set defined as A = {2.3, 6, 9}. Find the number of singular matrices of order 2×2 such that elements are from the set A.

15. Let x = -1 & x = 2 be the critical points of the function $f(x) = x^3 + ax^2 + b\log_e|x| + 1,\ x \neq 0$. Let m and M respectively be the absolute minimum and the absolute maximum values of f in the interval $\left[-2, -\frac{1}{2}\right]$. Then |M+m| is equal to _____ ($\log_e 2 = 0.7$)

1) 20.9 2) 19.8 3) 22.1 4) 21.1

16. Let the angle $\theta,\ 0 < \theta < \pi/2$ between two unit vectors $\hat{a}$ and $\hat{b}$ be $\sin^{-1}\left[\frac{\sqrt{65}}{9}\right]$. If the vector $\vec{c} = 3\hat{a} + 6\hat{b} + 9(\hat{a} \times \hat{b})$, then the value of $9(\vec{c} \cdot \hat{a}) - 3(\vec{c} \cdot \hat{b})$ is _____

1) 24 2) 31 3) 29 4) 27

17. Let 'P' be the parabola, whose focus is (-2, 1) and directrix is 2x + y + 2 = 0. Then the sum of the ordinates of the points on P, whose abscissa is -2 is _____

1) 5/2 2) 1/4 3) 3/4 4) 3/2

18. Let A be 3×3 matrix such that $\left|\text{adj}\left(\text{adj}\left(\text{adj}A\right)\right)\right|=81$. Let $S=\left\{n\in z:\left(\left|\text{adj}\left(\text{adj}A\right)\right|\right)^{\frac{(n-1)^2}{2}}=\left|A\right|^{\left(3n^2-5n-4\right)}\right\}$

then $\sum_{n\in S}\left|A^{\left(n^2+n\right)}\right|$ is equal to

1) 750 2) 820 3) 732 4) 866

19. Let the set of all values of $p\in R$, for which both the roots of the equation $x^2-(p+2)x+(2p+9)=0$ are negative real numbers, be the interval $(\alpha,\beta]$, then $\beta-2\alpha$ is equal to _____

1) 20 2) 0 3) 5 4) 9

Let x_1, x_2, x_3, x_4 be in a geometric progression. If 2,7,9,5 are subtracted respectively from x_1, x_2, x_3, x_4, then the resulting numbers are in an arithmetic progression. Then the value of $\frac{1}{24}(x_1.x_2.x_3.x_4)$ is _____

a) 36 b) 72 c) 18 d) 216

From a group of 7 batsmen and 6 bowlers, 10 players are to be chosen for a team, which should include at least 4 batsmen and at least 4 bowlers. One batsmen and one bowler who are captain and vice captain respectively of the team should be included. Then the total number of ways such a selection can be made is _____

a) 165 b) 145 c) 155 d) 135

Let A be 3×3 matrix such that $|\text{adj}(\text{adj}(\text{adj}A))|=81$.

Let $S=\left\{n\in z:(|\text{adj}(\text{adj}A)|)^{\frac{(n-1)^2}{2}}=|A|^{(3n^2-5n-4)}\right\}$ then $\sum_{n\in S}\left|A^{(n^2+n)}\right|$ is equal to

a) 750 b) 820 c) 732 d) 866

Let the line L pass through (1,1,1) and intersect the lines $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-1}{4}$ and $\frac{x-3}{1}=\frac{y-4}{2}=\frac{z}{1}$. Then, which of the following points lies on the line L ?

a) (4,22,7) b) (5,4,3) c) $(10,-29,-50)$ d) (7,15,13)

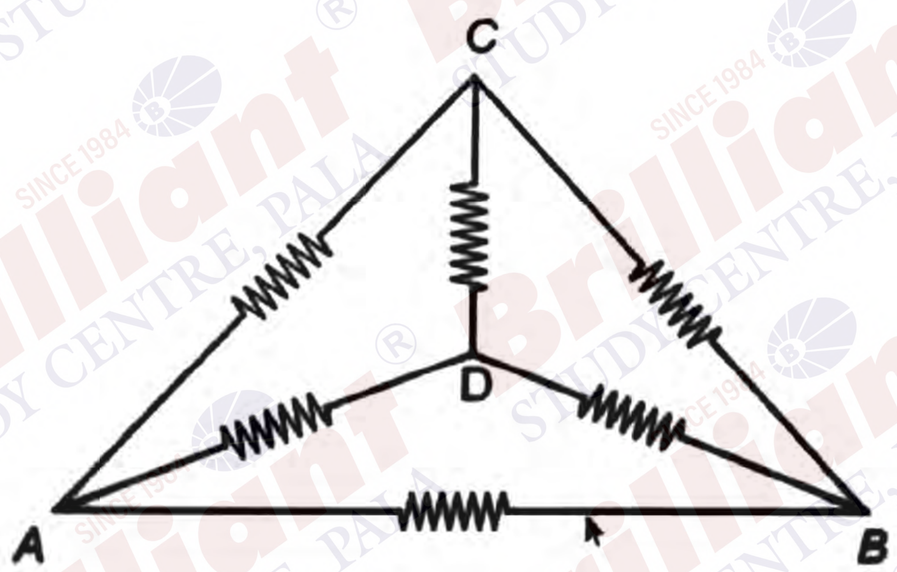
Let C_1 be the circle in the 3rd quadrant of radius 3, that touches both coordinate axes. Let C_2 be the circle with center (1, 3) that touches C_1 externally at the point (α,β). If $(\beta-\alpha)^2=\frac{m}{n}$, $\gcd(m,n)=1$, then $m+n$ is equal to.

a) 31 b) 22 c) 13 d) 9

1. The dimensions of a physical quantity $\varepsilon_0 \frac{d\phi_E}{dt}$ are similar to [Symbols have their usual meanings]

1) Electric current
2) Electric field
3) Electric flux
4) Electric charge

2. Six resistors of resistance R each, are connected as shown in figure. Find equivalent resistance across points A and B

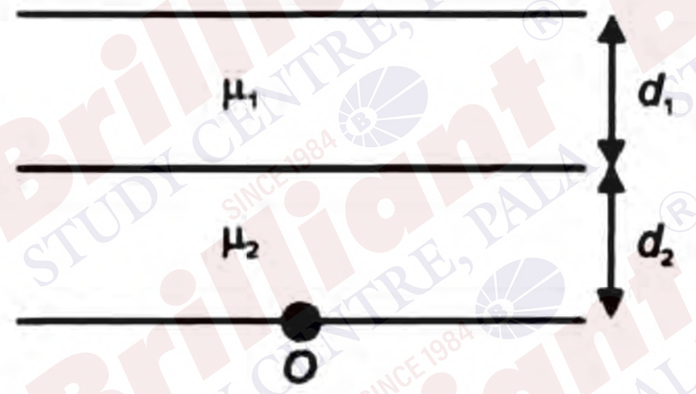


1) R/2
2) R/3
3) 2R/3
4) 3R/2

3. A lens of focal length 20 cm in air is made of glass with refractive index 1.6. What is its focal length when it is immersed in a liquid of refractive index 1.8 ?

1) –36 cm
2) –76 cm
3) –60 cm
4) –108 cm

4. An object is placed below two parallel layers of thickness d_1, d_2 are refractive index μ_1, μ_2 respectively. Find apparent depth of the object.

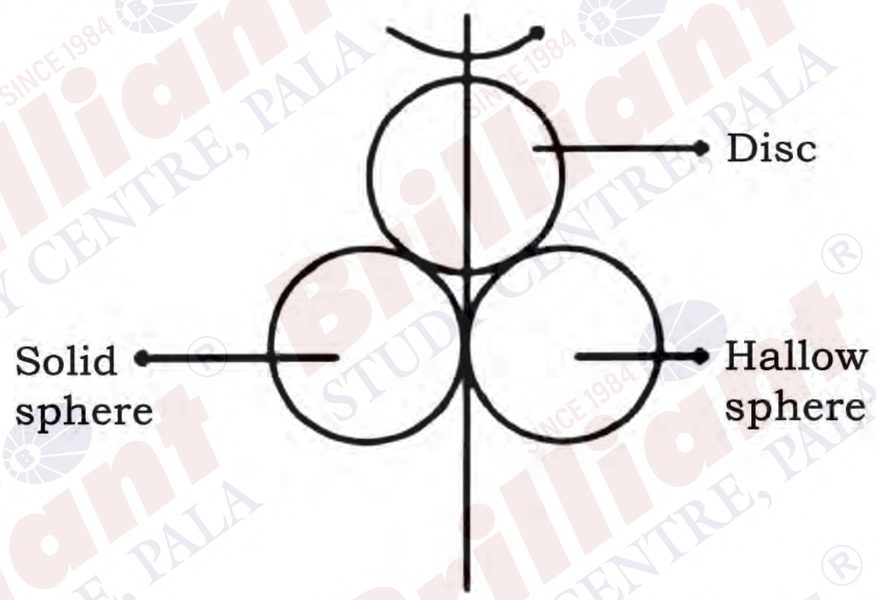


1) $\frac{d_1\mu_2 - d_2\mu_1}{\mu_1\mu_2}$
2) $\frac{d_1\mu_2 + d_2\mu_1}{\mu_1\mu_2}$
3) $\frac{d_1\mu_1 + d_2\mu_2}{\mu_1\mu_2}$
4) $\frac{d_1\mu_1 - d_2\mu_2}{\mu_1\mu_2}$

5. A composite sound wave is represented by $y = A\cos\omega t.\cos\omega' t$. The observed beat frequency is

1) $\frac{\omega-\omega'}{2\pi}$ 2) $\frac{\omega-\omega'}{\pi}$ 3) $\frac{\omega'}{2\pi}$ 4) $\frac{\omega'}{\pi}$

6. MOI of disc about central axis perpendicular to surface is *l* then moment of inertia of given assembly is, where each round object is of same mass and same radius. (Given centre of round bodied and axis are planar)



1) $\frac{89}{15}l$ 2) $\frac{79}{17}l$ 3) $\frac{199}{30}l$ 4) $\frac{209}{32}l$

7. A block of man *m* slides an inclined plane of inclination 60° with an acceleration of g/2 then friction coefficient between block and plane is

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

8. Two convex lenses of focal length 30 cm and 10 cm are kept 10 cm apart. Principal axis of the lenses is common. Find equivalent power of the lens system

1) 5 D 2) 10 D 3) 6 D 4) 13.33 D

9. Two rods whose lengths are in ratio of 1 : 3 and of diameter are in ratio of 2 : 1, then ratio of allegations of rod if force applied and material of rods are same

1) 1 : 12 2) 1 : 3 3) 4 : 1 4) 1 : 1

11. The percentage increase in magnetic field (B) when space within a current carrying solenoid is filled with magnetism

1) $\frac{5}{6}\times10^{-4}\,\%$ 2) $\frac{5}{2}\times10^{-5}\,\%$ 3) $\frac{6}{5}\times10^{-3}\,\%$ 4) $\frac{5}{6}\times10^{-5}\,\%$

12. A variable force $\vec{F}=2t\hat{i}+3t^2\hat{j}$ acts on a particles of mass 1 kg, which is at rest at t= 0. Find the power supplied as a function of time.

1) $2t^3+3t^5$ 2) t^3+4t^5 3) t^3+4t^3 4) t^3+5t^4

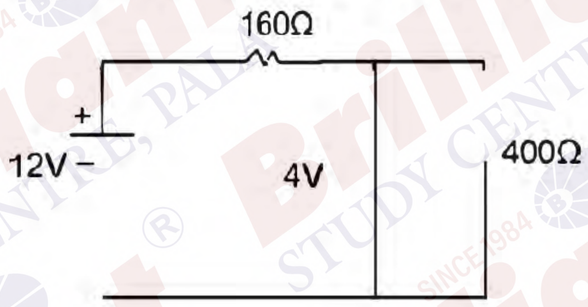
13. Two particles A and B are projected from a point on ground with same speed at angles $45°+\theta$ and $45°-\theta$ with horizontal. If the times of flight are T_A and T_B respectively, then $\frac{T_A}{T_B}$ is equal to

1) $\frac{1+\tan\theta}{1-\tan\theta}$ 2) $2\tan\theta$ 3) $\tan 2\theta$ 4) $\frac{1-\tan\theta}{1+\tan\theta}$

14. Find the dimensions of the physical quantity $\frac{2B^2\mu_0}{\varepsilon_0}$. (Symbols have their usual meaning)

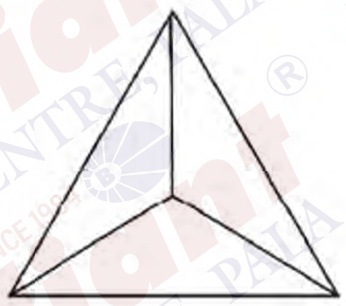
1) $M^4L^{-2}T^{-4}A^{-1}$ 2) $M^4L^4T^{-10}A^{-2}$ 3) $M^{-1}L^{-2}T^{-3}A^{-1}$ 4) $M^{-1}L^{-4}A^{-1}$

Find the current in Zener Diode



a) 50mA b) 30mA c) 10mA d) 40mA

A wire of resistance R is made into a pyramid of a triangle. The equivalent resistance b/w $A\&B$ is $\frac{R}{n}$. Find 'n'.



a) 10 b) 14 c) 12 d) 16