Aakash
Medical | IIT-JEE | Foundations

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MM : 180 AIATS For One Year JEE(Advanced)-2026 (XII Passed)_Test-2A_Paper-1_ONLINE **Time : 180 Min.**

CHEMISTRY

Section-I

1. (C,D)

2. (A,B,C)

3. (A,B)

Section-II

4. (C)

5. (C)

6. (A)

7. (C)

Section-III

8. (2)

9. (2)

10. (6)

11. (20)

12. (12)

13. (3)

Section-IV

14. (B)

15. (A)

16. (C)

17. (B)

MATHEMATICS

Section-I

18. (B,C,D)

19. (C)

20. (A,B,C,D)

Section-II

21. (C)

22. (C)

23. (D)

24. (B)

Section-III

25. (13)

26. (11)

27. (24)

28. (4)

29. (0)

30. (2)

Section-IV

31. (D)

32. (A)

33. (A)

34. (B)

PHYSICS

Section-I

35. (B,D)

36. (A,C,D)

37. (A,B,D)

Section-II

38. (A)

39. (C)

40. (A)

41. (B)

Section-III

42. (3)

43. (6)

44. (7)

45. (4)

46. (4)

47. (5)

Section-IV

48. (B)

49. (D)

50. (B)

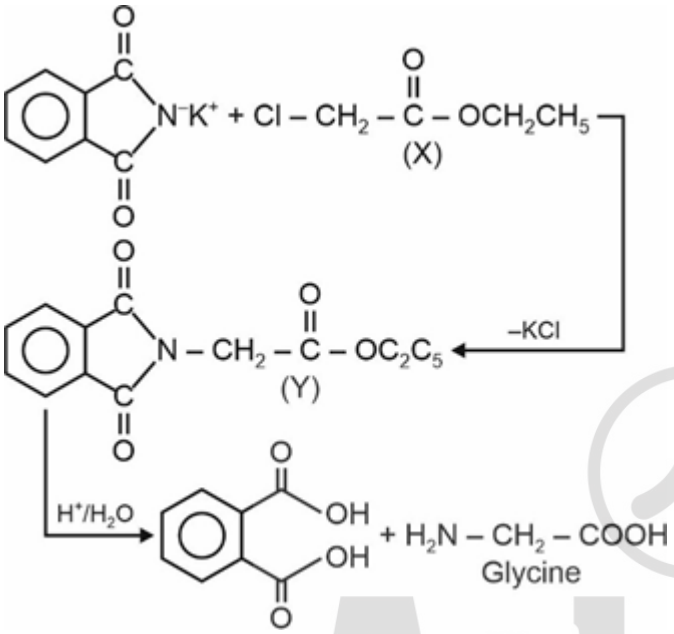
51. (D)

Hints and Solutions

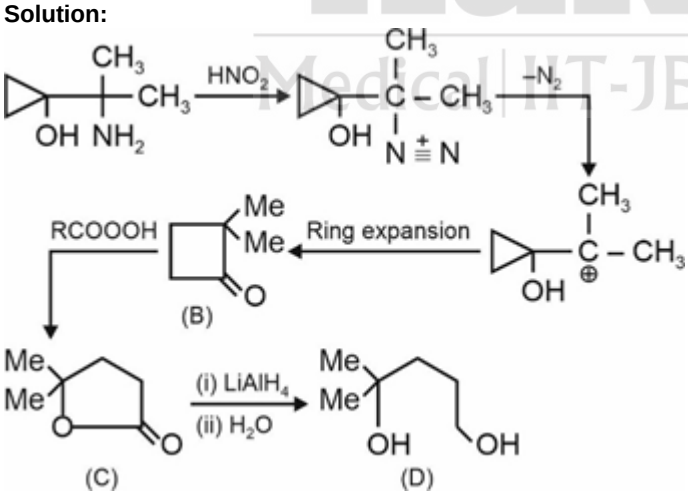
CHEMISTRY

Section-I

(1) **Answer :** (C,D)
Hint:
Given reaction is related to Gabriel phthalimide synthesis.
Solution:



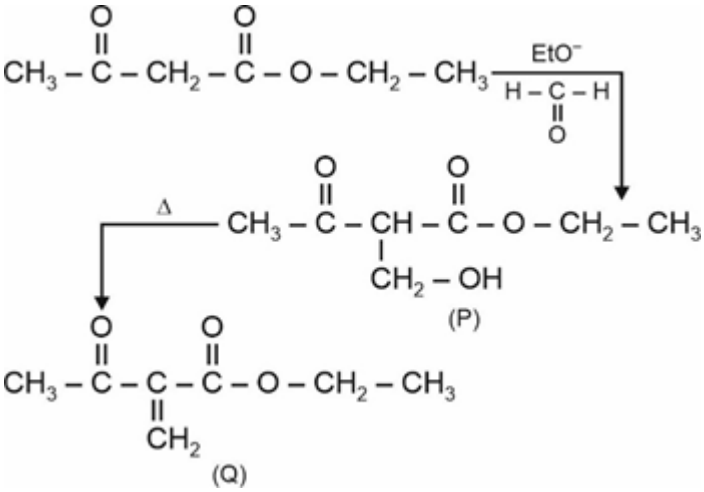
(2) **Answer :** (A,B,C)
Hint:
(C) is formed when 1° amine reacts with HNO_2.
Solution:



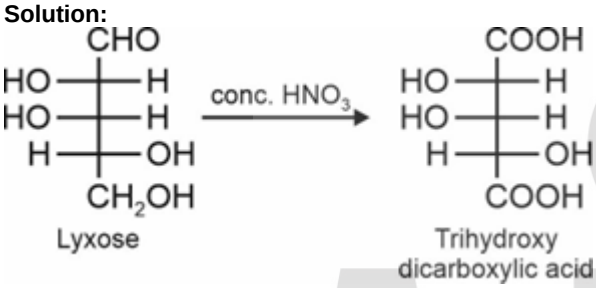
(3) **Answer :** (A,B)
Hint:
The formation of terylene or dacron by the interaction of ethylene glycol and terephthalic acid is an example of this type of polymerisation.
Solution:
Dacron is crease resistant fibre.
Polystyrene is a thermoplastic.
Natural rubber is an elastomer.
Polyester is a copolymer.

Section-II

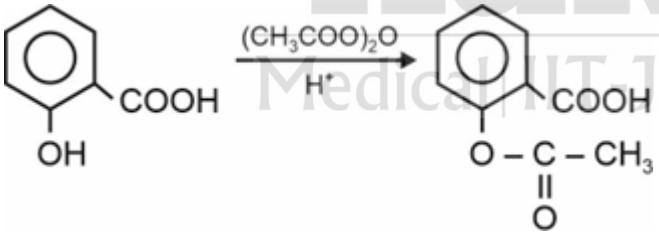
(4) **Answer :** (C)
Hint:
CH_3CO- gives positive iodoform test.
Solution:



(5) **Answer :** (C)
Hint:
Tetrahydroxy aldose and ketose forms dicarboxylic acid with HNO_3.
Solution:



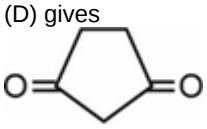
(6) **Answer :** (A)
Hint:
The final product (Z) called aspirin is a non-narcotic drug.
Solution:



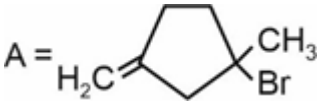
(7) **Answer :** (C)
Hint:
Competitive inhibitors bind with enzyme's active site.
Solution:
Competitive inhibitors do not occupy allosteric site.

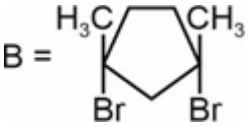
Section-III

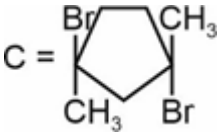
(8) **Answer :** 2
Hint:
HBr in presence of peroxide gives anti-Markovnikoff addition product.
Solution:
(D) gives

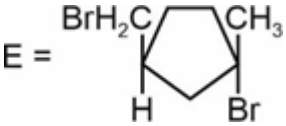


and 2HCHO on reductive ozonolysis. So, (D) must be

A = 

B = 

C = 

E = 

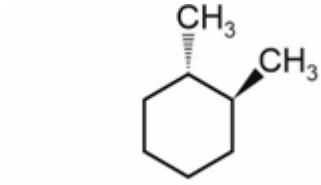
has 2 chiral carbon atoms.

(9) **Answer :** 2

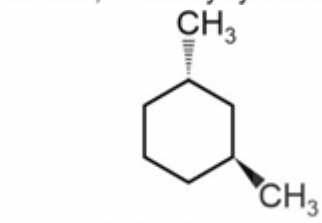
Hint:

Optically active alkenes are chiral.

Solution:



Trans-1,2-dimethylcyclohexane



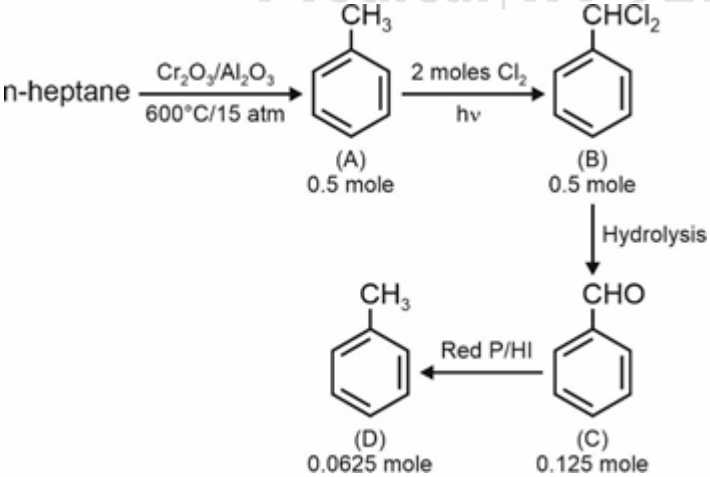
Trans-1,3-dimethylcyclohexane

(10) **Answer :** 6

Hint:

n-Heptane aromatises in presence of Cr_2O_3 at high temperature and pressure.

Solution:



Molar mass of (D) = 92

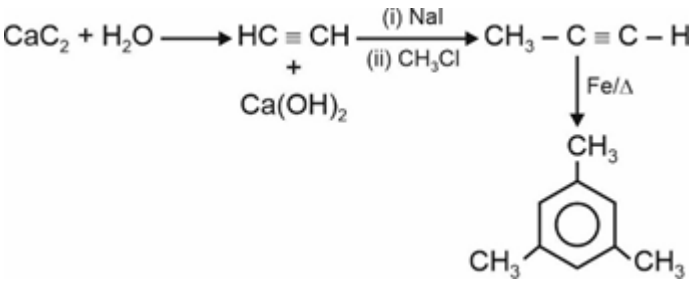
Mass of (D) formed = 0.0625 × 92 = 5.75 g

(11) **Answer :** 20

Hint:

$CaC_2 + H_2O \rightarrow HC \equiv CH$

Solution:



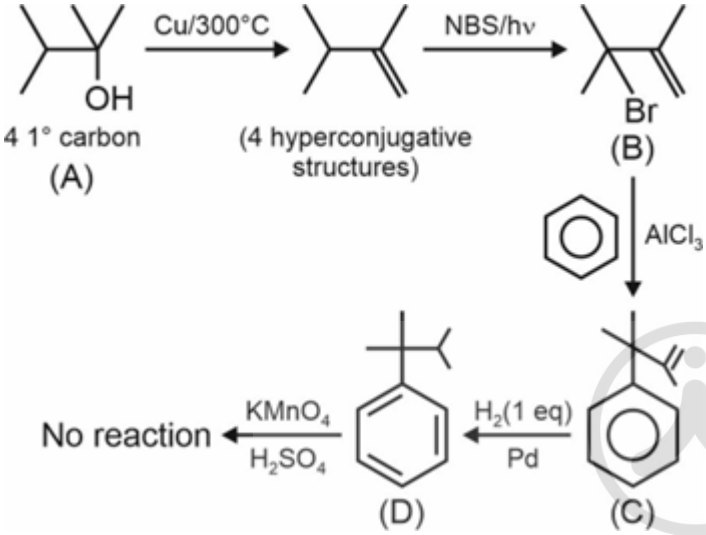
Calcium is an important constituent of bones.

(12) **Answer :** 12

Hint:

Side chain having zero benzylic hydrogen does not oxidise.

Solution:



(13) **Answer :** 3

Hint:

If anion is stable, the nucleophilicity is low.

Solution:

(B) and (C) are incorrect orders.

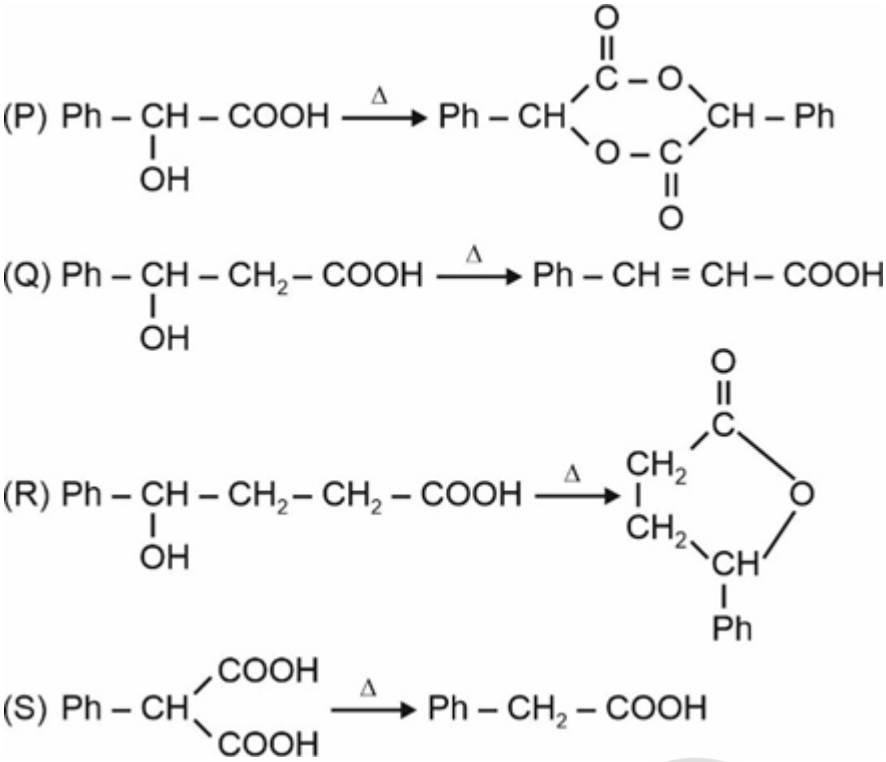
Section-IV

(14) **Answer :** (B)

Hint:

α-dicarboxylic acid, decarboxylate on heating.

Solution:

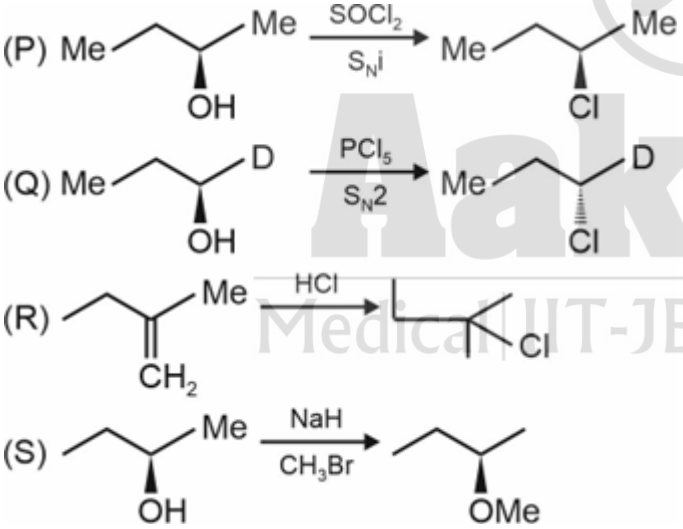


(15) **Answer :** (A)

Hint:

$SOCl_2$ gives intramolecular substitution.

Solution:



(16) **Answer :** (C)

Hint:

2,4-DNP test is given by aldehydes and ketone.

Solution:

Bayer's test is given by alkenes and alkynes iodoform test is given by methyl ketones and alcohols having $CH_3CH(OH)^-$.

(17) **Answer :** (B)

Hint:

The nitrophenols due to H-bonding ortho is less acidic than para isomer.

Solution:

The cresol $–CH_3$ group exert +I.

In chlorophenols, –Cl group exerts –I and increases acidic strength.

Cresol : m > p > o

Among nitrobenzoic acids, ortho-isomer is most acidic due to ortho effect followed by para-isomer due to –R effect and meta-isomer is least acidic due to –I effect of NO_2 group.

MATHEMATICS

Section-I

(18) Answer : (B,C,D)

Hint:

[*x*] takes only integer value.

Solution:

For $x = 1$,

LHL at $x = 1$,

$\lim\limits_{x\to 1^-} 1 \sin\left((2-0+1)\frac{\pi}{2}\right) = -1$

RHL at $x = 1$,

$\lim\limits_{x\to 1^+} 1 \sin\left((3(1)-1)\frac{\pi}{2}\right) = 0$

LHL ≠ RHL

For $x = -1$,

$\lim\limits_{x\to -1^-} \sin\left((-2-2+1)\frac{\pi}{2}\right) = 1$

$\lim\limits_{x\to -1^+} \sin\left((-2-1+1)\frac{\pi}{2}\right) = 0$

For $x = 2$,

$\lim\limits_{x\to 2^-} 4\sin(4-1+2)\frac{\pi}{2} = 4$

$\lim\limits_{x\to 2^+} 4\sin(4-2+2)\frac{\pi}{2} = 0$

For $x = 0$,

$\lim\limits_{x\to 0^-} f(x) = \lim\limits_{x\to 0^+} f(x) = f(0) = 0$

(19) Answer : (C)

Hint:

Let $A = (3m_1^2,\ -6m_1)$, $B = (3m_2^2,\ -6m_2)$, $D = (3m_3^2,\ -6m_3)$

Solution:

Let $A = (3m_1^2,\ -6m_1)$, $B = (3m_2^2,\ -6m_2)$, $D = (3m_3^2,\ -6m_3)$

A and *B* lies on $x + y = 1$.

$\therefore\ 3m_1^2 - 6m_1 = 1$ and $3m_2^2 - 6m_2 = 1$

$3m_1^2 - 3m_2^2 - 6(m_1 - m_2) = 0$

$m_1 + m_2 = 2 \Rightarrow -m_3 = 2$

$\therefore$ Coordinates of *D* are (12, 12).

(20) Answer : (A,B,C,D)

Hint:

If $n(X) = n$, then $n(P(X)) = 2^n$

Solution:

$n(P(A)) + 1 = n(P(P(A)))$

$2^n + 1 = 2^{2^n}$

$\Rightarrow n = 0$

$\Rightarrow n(A) = 0$

$\Rightarrow A = \phi$

$\frac{n(P(P(B)))}{n(P(B))} = 32$

Take $n(B) = m$

$\frac{2^{2^m}}{2^m} = 2^5$

$2^{2^m - m} = 2^5$

$2^m - m = 5$

$\Rightarrow m = 3$

Section-II

(21) Answer : (C)

Hint:

$\left(f+n\right)\left(x\right) = \begin{cases} x; & x \in Q \\ -x; & x \in Q^c \end{cases}$

Solution:

$\left(f+x\right)\left(x\right)=\begin{cases}x; & \text{if } x \text{ is rational}\\ -x; & \text{if } x \text{ is irrational}\end{cases}$

If we draw a line parallel to x-axis, it cuts the curve exactly at one point.
⇒ $(f+n)(x)$ is one-one
$y = x$ and $y = -x$ for rational and irrational values.
⇒ $y \in$ real numbers.
⇒ Codomain = Range
$(f+g)(x)$ is onto function.

(22) Answer : (C)
Hint:

Centroid : $\left(\frac{x_1+x_2+x_3}{3},\ \frac{y_1+y_2+y_3}{3}\right)$

Solution:

Take point $A(x_1, y_1)$ and $D(\alpha, \beta)$

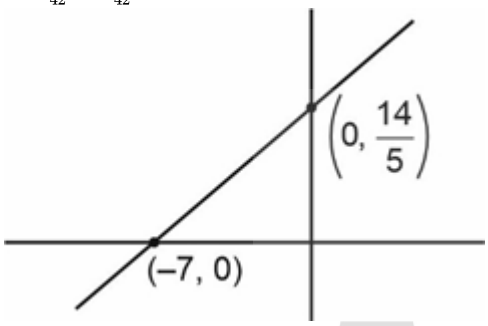
$D=\left(\frac{1+5+x_1}{3},\ \frac{3+7+y_1}{3}\right)=(\alpha,\ \beta)$

$x_1 = 3\alpha - 6$, $y_1 = 3\beta - 10$

Point $A(x_1, y_1)$ moves on $2x - 5y + 4 = 0$

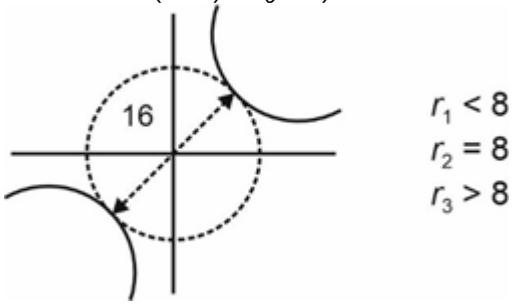
$2x_1 - 5y_1 + 4 = 0$

⇒ $\frac{-6\alpha}{42}+\frac{15\beta}{42}=1$



Area = $\frac{1}{2}\times 7\times\frac{14}{5}=\frac{49}{5}$ sq. units

(23) Answer : (D)
Hint:
$(x - 3)(y - 4) = 32$
Solution:
$xy - 4x - 3y = 20$
⇒ $(x - 3)(y - 4) = 32$
and the circle $(x - 3)^2 + (y - 4)^2 = r^2$



(24) Answer : (B)
Hint:

$3\cos x + \sec^3 x \geq 4$

Solution:

For $x \in \left[0,\ \frac{\pi}{2}\right)$, $3\cos x$ and $\sec^3 x$ are positive.

$\frac{\cos x+\cos x+\cos x+\sec^3 x}{4}\geq\sqrt[1/4]{\cos^3 x\sec^3 x}$

$3\cos x + \sec^3 x \geq 4$
Range : $[4, \infty)$

Section-III

(25) Answer : 13

Hint:

$\frac{-\pi}{2} \le \sin^{-1}\left(\frac{3x+2}{x-5}\right) \le \frac{\pi}{2}$

Solution:

$\frac{-\pi}{2} \le \sin^{-1}\left(\frac{3x+2}{x-5}\right) \le \frac{\pi}{2}$

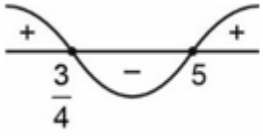
$-1 \le \frac{3x+2}{x-5} \le 1$ and $x \neq 5$

$-1 - \left(\frac{3x+2}{x-5}\right) \le 0$ and $\frac{3x+2}{x-5} - 1 \le 0$

$\frac{5-x-3x-2}{x-5} \le 0$ and $\frac{3x+2-x+5}{x-5} \le 0$

$\frac{3-4x}{x-5} \le 0$ and $\frac{2x+7}{x-5} \le 0$

$\frac{4x-3}{x-5} \ge 0$



$x \in \left(-\infty, \frac{3}{4}\right] \cup (5, \infty)$ $x \in \left[\frac{-7}{2}, 5\right)$

So, $x \in \left[\frac{-7}{2}, \frac{3}{4}\right]$

$a = \frac{-7}{2}$

$b = \frac{3}{4}$

$\therefore\ a^2 + b = \frac{49}{4} + \frac{3}{4} = \frac{52}{4} = 13$

(26) Answer : 11

Hint:

5 = 2.0 + *p*

Solution:

f(0) = 5 = *p* ⇒ *p* = 5

$2(2)^3 + 5 = 2q + r$

⇒ 2*q* + *r* = 21

18 = 36 + *s*

⇒ *s* = –18

16 + *s* = 4*q* + *r*

⇒ 4*q* + *r* = – 2

$q = \frac{-23}{2},\ r = 44$

Non-differentiable at *x* = 2, 4, 6 ⇒ *t* = 3

p + 2*q* + *r* + *s* + *t* = 5 + (–23) + 44 + (–18)

= 52 – 41 = 11

(27) Answer : 24

Hint:

P′(*x*) = λ(*x* – 3)(*x* – 5)

Solution:

P′(*x*) = λ(*x* – 3)(*x* – 5) = λ(x^2 – 8*x* + 15)

$P(x) = \lambda\left(\frac{x^3}{3} - 4x^2 + 15x\right) + c$

P(3) = 5,

λ(9 – 36 + 45) + *c* = 5

18λ + *c* = 5

P(5) = 1,

$\lambda\left(\frac{125}{3} - 4(25) + 75\right) + c = 1$

⇒ λ = 3, *c* = –49

P′(*x*) = 3(*x* – 3)(*x* – 5)

P′(1) = 3(–2)(–4) = 24

(28) Answer : 4

Hint:

Number of possible symmetric relations on $A = 2^{\frac{n^2+n}{2}}$, where *n*(*A*) = *n*.

Solution:

Let number of elements in set *A* = *n*.

Number of possible symmetric relations = $2^{\frac{n^2+n}{2}}$

$\Rightarrow\ 2^{\frac{n^2+n}{2}} = 1024 \ \Rightarrow\ n = 4$

Number of possible reflexive relation is

= $2^{n^2-n} = 4096$

(29) Answer : 0

Hint:

$\ln e^{1/e} = \frac{1}{e}$

Solution:

$\frac{1}{e} - e^{\lim\limits_{x\to\infty}\left(\frac{x^2}{x^2+1}-1\right)x^2}$

$= \frac{1}{e} - e^{\lim\limits_{x\to\infty}\left(\frac{-x^2}{x^2+1}\right)}$

$= \frac{1}{e} - \frac{1}{e} = 0$

(30) Answer : 2

Hint:

Take $f(x) = \frac{5x^2}{2} + 2x\cos x - 2\sin x - 1$

Solution:

$f(x) = \frac{5x^2}{2} + 2x\cos x - 2\sin x - 1$

$f'(x) = 5x + 2x\sin x + 2\cos x - 2\cos x$

$f'(x) = x(5 + 2\sin x)$

$f'(x) < 0$ for $x < 0$

$f'(x) > 0$ for $x > 0$

$f(0) = -1$

$f(\infty) \to \infty$

$f(-\infty) \to \infty$

Only 2 solutions.

Section-IV

(31) Answer : (D)

Hint:

$y = m_1x + c$ and $y = m_2x + c_2$ are perpendicular if $m_1m_2 = -1$.

Solution:

Intersection point of L_1 and L_3 is $\left(\frac{-5}{3}, \frac{7}{3}\right)$.

Put it in L_2.

$\Rightarrow\ K = \frac{-26}{5}$

When $L_1 \parallel L_2 \Rightarrow K = -1$

When $L_2 \parallel L_3 \Rightarrow K = -2$

L_1, L_2, L_3 form triangle when L_1, L_2, L_3 are not parallel and concurrent.

So, $K = 4, 2$

$L_1 \perp L_2$, when

$\left(\frac{-1}{2}\right)\cdot\left(\frac{K}{2}\right) = -1$

$\Rightarrow K = 4$

$L_2 \perp L_3$, when

$\left(\frac{K}{2}\right)\cdot(-1) = -1$

$\Rightarrow K = 2$

(32) Answer : (A)

Hint:

$g_1g_2 + f_1f_2 = g_2g_3 + f_2f_3 = g_1g_3 + f_1f_3 = 0$

Solution:

$2g_1g_2 + 2f_1f_2 = 2g_2g_3 + 2f_2f_3 = 2g_3g_1 + 2f_3f_1 = 0$

Centroid (h, k) :

$h = \frac{-\left(\frac{g_1}{2}+\frac{g_2}{2}+\frac{g_3}{2}\right)}{3},\ k = \frac{-\left(\frac{f_1}{2}+\frac{f_2}{2}+\frac{f_3}{2}\right)}{3}$

$(6h)^2 + (6k)^2 = (g_1 + g_2 + g_3)^2 + (f_1 + f_2 + f_3)^2$

$(6h)^2 + (6k)^2 = m + n$

(1) $m + n = 1 \ \Rightarrow\ r = \frac{1}{6}$

(2) $m+n=4 \Rightarrow r=\frac{1}{3}$

(3) $m+n=9 \Rightarrow r=\frac{1}{2}$

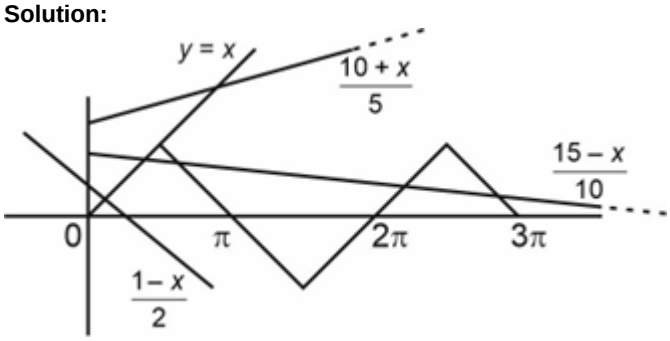
(4) $m + n = 36 \Rightarrow r = 1$

(33) Answer : (A)

Hint:

Sketch curve of $\sin^{-1}(\sin x)$.

Solution:

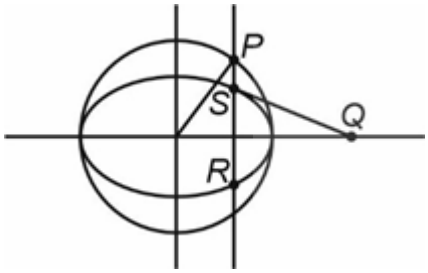


(34) Answer : (B)

Hint:

Auxiliary circle $x^2 + y^2 = 4$

Solution:



Auxiliary circle : $x^2 + y^2 = 4$

Let P be $(2\cos\theta, 2\sin\theta)$

S be $(2\cos\theta, \sqrt{3}\sin\theta)$

Equation of tangent at S,

$\frac{x\cos\theta}{2}+\frac{y\sin\theta}{\sqrt{3}}=1$

It cuts x-axis at $(2\sec\theta, 0)$

$Q = (2\sec\theta, 0)$

$R = (2\cos\theta, 0)$

$P = (2\cos\theta, 2\sin\theta)$

$\therefore$ Area of $\Delta PQR = \frac{1}{2}\times 2\sin\theta\,(2\sec\theta - 2\cos\theta)$

$= 2\sin\theta(\sec\theta - \cos\theta)$

PHYSICS

Section-I

(35) Answer : (B,D)

Hint:

$a=\frac{d^2y}{dt^2}$

Solution:

$y = a(1 - \cos\omega t)$

Acceleration = $a\omega^2\cos\omega t$

Force = $mg + ma\omega^2\cos\omega t$

$= mg\left[1+\frac{a\omega^2\cos\omega t}{g}\right]$

When object will lose the contact,

$g = a_{\min}\omega^2,\ a_{\min}=\frac{g}{2}$

When object jump,

$V = A\omega$

$A^2\omega^2 = V^2 = 2gh$

$A = \sqrt{\frac{2gh}{\omega^2}}$

Maximum amplitude = $A - a_{\min} = \sqrt{\frac{2gh}{\omega^2}} - \frac{g}{2}$

(36) **Answer :** (A,C,D)

Hint:

$P = (q\vec{E} + q(\vec{v} \times \vec{B}) \cdot \vec{v}$

Solution:

Let a = 1 m

During the motion,

$\frac{1}{2}m(2u)^2 - \frac{1}{2}m(u)^2 = (Eq)(2a)$

$E = \frac{3}{4}\left(\frac{mu^2}{qa}\right) = \frac{3mu^2}{4q}$

The rate of work done by E at point P

$= (qE) = \frac{3mu^3}{4}$

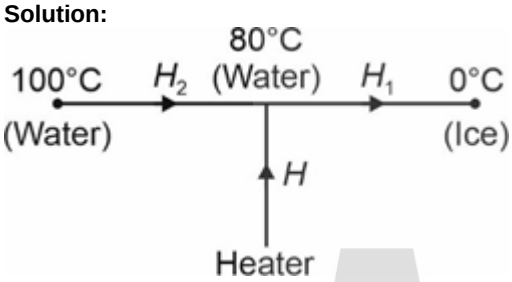
At point Q, $\vec{E}$ and $\vec{B}$ are perpendicular to $\vec{v}$, so net work done is zero.

(37) **Answer :** (A,B,D)

Hint:

$H = \frac{\Delta T}{R}$

Solution:



$H = H_2 - H_1$

$= \frac{80-0}{10} - \frac{100-80}{10}$

= 6 cal/s

$H_2 = L_f\frac{dm}{dt}$

$\frac{80-0}{10} = 80\frac{dm}{dt}$

$\frac{dm}{dt} = 0.1$ g/sec

Since the temperature of the middle container is constant, so H_2 is constant. Hence, the rate of melting of ice will be constant.

Section-II

(38) **Answer :** (A)

Hint:

$W = \Delta U$

Solution:

$U_i = \frac{Q^2}{2C}$

$U_f = \frac{Q^2}{2\left(\frac{C}{2}\right)}$

$\Delta V = W = \frac{Q^2}{2C}$

(39) **Answer :** (C)

Hint:

$V_P = V_C$

Solution:

$P = \frac{dE}{dt}$

(40) **Answer :** (A)

Hint:

$\Delta l = \frac{Fl}{YA}$

Solution:

$\Delta l = \frac{Mgl}{\pi Y r^2}$

(41) **Answer :** (B)

Hint:

$P = \sigma A T^4$

Solution:

$r_1^2 T_1^4 = r_2^2 T_2^4$

$r^2 = 2^4 \Rightarrow r = 4$

Section-III

(42) **Answer :** 3

Hint:

$C = \frac{f}{2}R + \frac{R}{1-\alpha}$

Solution:

$dQ = dU + dW$

Here, $dU = -dQ$

$2dQ = dW$

$dQ = -nC_V dT$

$-\frac{2nR}{r-1}dT = P \cdot dV$

From $PV = nRT$,

$PdV + VdP = \left(\frac{1-r}{2}\right)P \cdot dV$

$\left(\frac{1+r}{2}\right)\frac{dV}{V} = -\frac{dP}{P}$

$\ln V^{\left(\frac{1+r}{2}\right)} + \ln P = C$

$PV^{\frac{1+r}{2}}$ = constant

$TV^{\frac{r-1}{2}}$ = constant

$\Rightarrow\ TV^{\frac{1}{3}}$ = constant

(43) **Answer :** 6

Hint:

$\frac{dP}{dV} = 0$

Solution:

$PV = RT$

$P = \frac{R}{V}(300 + 3V^2)$

$\frac{dP}{dV} = 0$

$V = 10\ m^3$

$T = 300 + 3 \times 100 = 600\ K$

$P_{min} = \frac{RT}{V} = \frac{R \times 600}{10} = 60R$

(44) **Answer :** 7

Hint:

$dR = \frac{\rho dl}{A}$

Solution:

$dR = \frac{\rho(x) \cdot dx}{A} = \frac{1}{\sigma(x)}\frac{dx}{A}$

$\sigma = \sigma_1 + \left(\frac{\sigma_2 - \sigma_1}{d}\right)x$

$dR = \frac{1}{\sigma_1 + \left(\frac{\sigma_2 - \sigma_1}{d}\right)x} \cdot \frac{dx}{A}$

$R = \frac{1}{A}\int_0^d \frac{dx}{\sigma_1 + \left(\frac{\sigma_2 - \sigma_1}{d}\right)x}$

$R = \frac{d}{A(\sigma_2 - \sigma_1)}\ln\left(\frac{\sigma_2}{\sigma_1}\right)$

$I = \frac{V}{R} = \frac{AV}{d}\left[\frac{\sigma_2 - \sigma_1}{\ln\left(\frac{\sigma_2}{\sigma_1}\right)}\right] = \frac{10^{-9}}{\ln(2)}$

(45) Answer : 4

Hint:

$F = \frac{\Delta N}{\Delta t}\Delta P$

Solution:

$P = \frac{nRT}{V},\ P = \frac{F}{A},\ A = 1\ m^2,\ P = F$

$P = F = \frac{dP}{dt} = (2mV_x)\, f$

$m = \frac{M}{N_A}$

$f = \frac{PN_A}{2}\sqrt{\frac{1}{MRT}}$

(46) Answer : 4

Hint:

$P = i^2R$

Solution:

$i_0^2 \cdot 2 = 50 \Rightarrow i_0 = 5\ \text{A} \Rightarrow i = \frac{4i_0}{5}$

(47) Answer : 5

Hint:

$P_0 = Bks_0$

Solution:

For n^{th} overtone,

$k = \frac{2\pi}{\lambda} = (2n+1)\left(n + \frac{1}{2}\right)$

Amplitude of pressure variation,

$(\Delta P)_m = \rho V^2 AK$

$\Delta P = (\Delta P)_m \cos kx$

$P = \left(n + \frac{1}{2}\right)\frac{\pi\rho V^2 A}{l}\cos\left[\left(n + \frac{1}{2}\right)\frac{\pi x}{l}\right]$

For $n = 2$, $l = 1$,

$P = 2.5\pi\rho V^2 A\cos(2.5\pi x)$

Section-IV

(48) Answer : (B)

Hint:

$\Delta Q = \Delta U + \Delta W$

Solution:

Let $T_B = T_0 = 300$ K and $V_C = V_D = V_0$

Then, $T_D = T_A = 4T_0$ and $V_A = (8\sqrt{2})V_0$

$V_B = \left(\frac{V_A}{T_A}\right)T_B = 2\sqrt{2}V_0$

$T_C = T_B\left(\frac{V_B}{V_C}\right)^{\gamma - 1} = 2T_0$

$\Delta W = (\Delta W)_{AB} + (\Delta W)_{BC} + (\Delta W)_{CD} + (\Delta W)_{DA}$

$= R(T_B - T_A) + nC_V(T_B - T_C) + 0 + RT_0\ln\frac{V_A}{V_D}$

$= -3RT_0 - \frac{3}{2}RT_0 + 0 + 14RT_0\ln(2)$

$= 14RT_0\ln(2) - \frac{9}{2}RT_0$

$= 1548R$

$(\Delta Q)_{\text{absorbed}} = (\Delta Q)_{CD} + (\Delta Q)_{DA}$

$= 14RT_0\ln(2) + 3RT_0 = 3798R$

$\eta = \frac{\Delta W}{(\Delta Q)_{\text{absorbed}}} = 0.41 = 41\%$

(49) Answer : (D)

Hint:

$V = \sqrt{\frac{B}{\rho}}$

Solution:

$K = 15\pi$/m, $\omega = 600\pi$/s

$V = \frac{\omega}{K} = 400$ m/s

$V = \sqrt{\frac{B}{\rho}},\ \rho = 1$ kg/m^3

$A = \frac{(\Delta P)_{\max}}{BK} = \frac{24\pi}{1.6\times10^5\times15\pi} = 100\mu\text{m}$

$I = \frac{W}{4\pi r^2},\ I = \frac{(\Delta P)^2_{\max}}{2\rho V} = \frac{18\pi^2}{25}$

(50) **Answer :** (B)

Hint:

$r = \frac{mv}{qB}$

Solution:

(P) $N = mq + qE_0$

Magnetic force does not do anywhere.

(51) **Answer :** (D)

Hint:

$F = P \cdot \frac{dE}{dx}$

Solution:

(P) $E = \frac{kQx}{(R^2+x^2)^{3/2}}$,

$F = P \cdot \frac{dE}{dx} = 2kQqa\left\{\frac{R^2-2x^2}{(R^2+x^2)^{5/2}}\right\} = \frac{kQq}{16a^2}$

(Q) Net torque = 0