Monthly Progressive Test (Solution)

Class: XII

Subject: PCMB

Academic Excellence Programme
TECHNO ACE

Test Booklet No.: MPT09 | **Test Date: 22012025**

Physics

1. Ⓐ

As $E \propto \frac{1}{r}$

2. Ⓐ

Q_{net} enclosed is zero

3. Ⓒ

$\tau = PE\sin\theta$

$4 = (q)(2/100) \times 2 \times 10^5 \times \frac{1}{2}$

$2 = q \times 10^3$

$q = 2$ mC

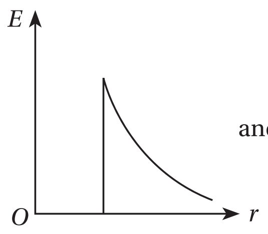
4. Ⓑ

A $\rightarrow$ True; B $\rightarrow$ True

But reason is not the correct explanation of Assertion

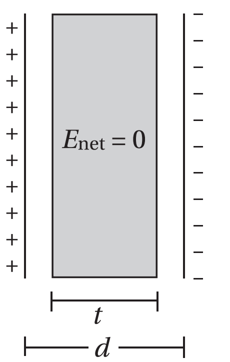
5. Ⓒ

As variation of E is



and $E = -\frac{dV}{dr}$

6. Ⓓ



$C = \frac{A\varepsilon_0}{d - t}$

As

7. Ⓓ

As $E = -\dfrac{dV}{dr}$

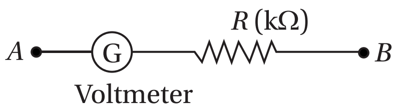
8. Ⓓ

As $B \propto r \qquad r \le R$

$B \propto \dfrac{1}{r} \qquad r > R$

9. Ⓒ

As



10. Ⓓ

$\dfrac{1}{2}mv^2 = qv$

$r = \dfrac{mv}{qB} = \dfrac{m}{qB}\sqrt{\dfrac{2qv}{m}}$

$r \propto \sqrt{v} \quad \Rightarrow 2r = \sqrt{4v}$

11. Ⓒ

As $\quad i \propto A \cdot v_d$

if A (↓) then v_d (↑)

So, Reason is wrong

12. Ⓓ

Area $= \dfrac{1}{2} \times 5 \times 5 + 5 \times 5 = 12.5 + 25 = 37.5$ C

13. Ⓒ

Magnetic field inside paramagnetic is denser.

For diamagnetic it in just opposite.

14. Ⓑ

$$B = \frac{\mu_0}{4\pi} \cdot \frac{2M}{r^3} = \frac{\mu_0}{4\pi}(2)\frac{2 \cdot \pi a^2 \cdot 2l(n)i}{r^3}$$

$$= \frac{\mu_0}{2}(2)\frac{nla^2}{r^3} \cdot i = \frac{(\mu_0 ni)la^2}{r^3}$$

15. Ⓑ

When temperature rises above Curie point ferromagnetic becomes paramagnetic.

16. Ⓐ

Magnetic susceptibility of diamagnetic is negative and small.

17. Ⓒ

$E_0 = WBAN = 60 \times 0.8 \times 0.5 \times 100 = 2400$ Volt

$$i_0 = \frac{2400}{100} = 24 \text{ A}$$

$$E_0 \cdot i_0 = \frac{1}{2} \times 2400 \times 24 = 57600 = 5.76 \times 10^4 \text{ watt}$$

18. Ⓐ

$$v_{avg} = \frac{2v_0}{\pi} = (0.637)v_0$$

19. Ⓑ

$$M = \frac{L \cdot D}{f_0 \cdot f_e} \quad \text{where } D = 25 \text{ cm}$$

20. Ⓒ

For telescope $M = \frac{f_0}{f_e}$

21. Ⓑ

$A = r_1 + r_2$

Condition for minimum deviation $r_1 = r_2 = r$

$\therefore A = 2r$

22. Ⓒ

$$\beta = \frac{\lambda D}{d} = \lambda \cdot \frac{\left(\frac{D}{3}\right)}{\left(\frac{d}{3}\right)}$$

$$\beta \propto \frac{D}{d}$$

Reason statement is wrong

23. Ⓓ

All the statements are correct.

24. Ⓑ

As stable daughter nucleus.

25. Ⓑ

$$E_3 = -\frac{13.6}{3^2} \text{ eV} = -\frac{13.6}{9} \text{ eV} = -1.51 \text{ eV}$$

$n = 1$ ground state

$n = 2$ 1st excited state

$n = 3$ second excited state

$kE = x$

$TE = -x$

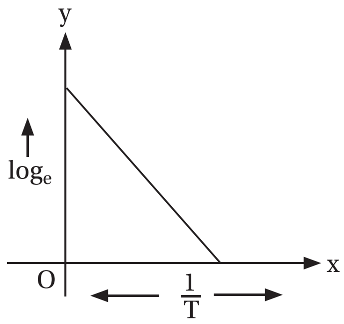
$\therefore PE = -2x = -3.02 \, eV$

Chemistry

26. Ⓐ

$K = A.e^{-\frac{Ea}{RT}}$;

$\therefore \log_e K = \log_e A - \frac{Ea}{RT}$; Hence graph of $\log_e K$ vs $\frac{1}{T}$ will be linear with –ve slope and intercept on y-axis equal to $\log_e A$.



27. Ⓓ

$K = A.e^{-\frac{Ea}{RT}}$; Arrhenins equation. The rate constant is inversely related to activation energy. It is energy required to make it equal to threshold level and it can be grater than ΔH of the reaction.

28. Ⓒ

$i = 2A,\ t = 5 \times 60 \times 60\ S$

$W = 22.2\ g\ ;\ A = 177$

$\therefore\ w = \frac{i \times t \times E}{F} = \frac{i \times t \times \frac{A}{V}}{F}$

$\Rightarrow\ V = \frac{2 \times 5 \times 60 \times 60 \times 177}{22.2 \times 96500} = 3$

29. Ⓑ

$AgCl \rightleftharpoons Ag^+ + Cl^-\ ;\ \Lambda_{sp} = K\ \Omega^{-1}\ cm^{-1}$

$\wedge_{sp} = \frac{K \times 1000}{C}$; $\wedge_{AsCl} = \wedge^o_{Ar} + \wedge^o_{Cl^-} = x + y$

$(x + y) = \frac{K \times 1000}{C}$

$C = \frac{K \times 1000}{(x + y)}$

$K_{sp} = C^2 = \left(\frac{K \times 1000}{x + y}\right)^2$

30. Ⓑ

$CH_3COOH \rightleftharpoons CH_3COO^{\ominus} + H^{\oplus}$

$i > 1$, as CH_3COOH Undergoes ionization in aqueous solution

31. Ⓒ

0.167 atm; : $Na_4[Fe(CN)_6]$ undergoes 60% ionization

$i = 1 + (n - 1)\alpha = 1 + (5 - 1)\alpha = 1 + 4\alpha$

$= 1 + 4(0.6)$

$= 3.4$

$C = 2 \times 10^{-3}$ M

$\pi = i \times CRT$

$= (3.4)(2 \times 10^{-3})(0.0823)\,300$

$= 0.167$ atm.

32. Ⓑ

Boiling point decreases as the number of molecules decreases.

33. Ⓑ

b > d > C > a

b = 0.05 M glucose   n = 0.05

d = 0.02 M KCl $\Rightarrow$ n = 0.04

C = 0.01 M $CaCl_2$ $\Rightarrow$ n = 0.03

a = 0.01 M $\Rightarrow$ n = 0.02

34. Ⓑ

$H_3C - \overset{*}{C}H(OH) - \overset{*}{C}H(OH) - CH_3$

has to optically active isomers. Meso is optically inactive

35. Ⓓ

Assertion is wrong but reason is correct.

36. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of assertion.

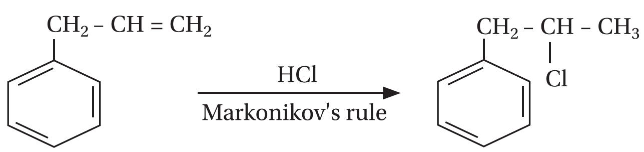
37. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of assertion.

38. Ⓑ

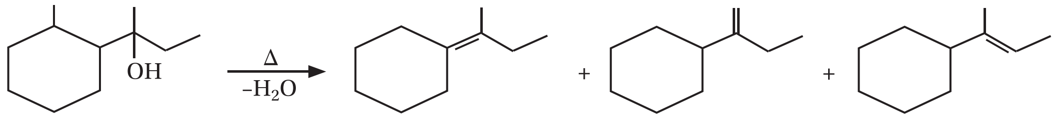
Both assertion and reason are correct but reason is not the correct explanation of assertion

39. Ⓒ



(C)

40. Ⓑ

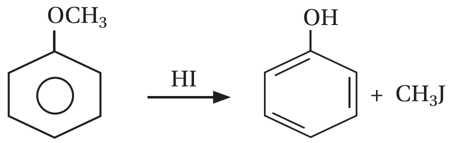


41. Ⓑ

III > I > II

→ Decreasing acidic order

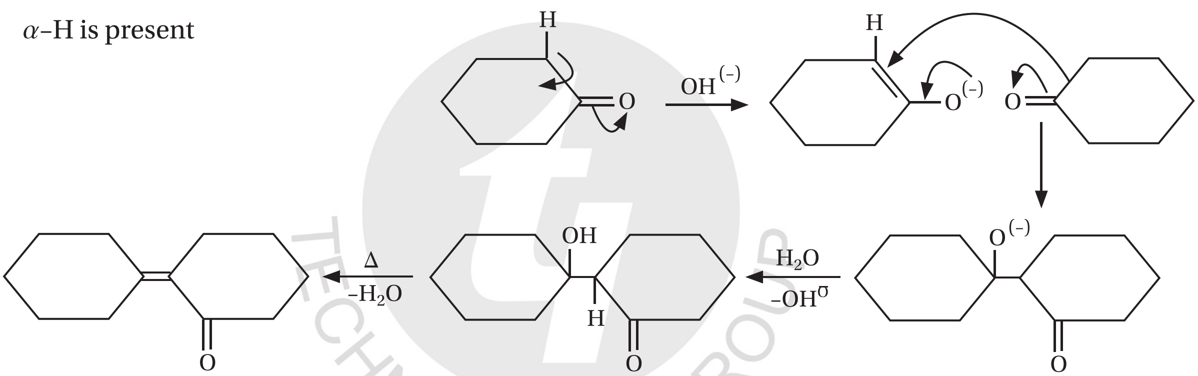
42. Ⓒ



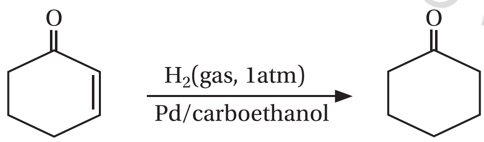
(Anisole)

43. Ⓑ

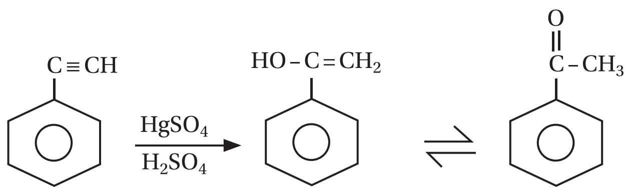
α–H is present



44. Ⓑ



45. Ⓐ



(enol)

(keto)
Acetophenon

46. Ⓒ

Glucose does not react with $NaHSO_3$

47. Ⓓ

Fructose reduces Tollen's reagent due to enolisation of fructose followed by conversion to aldehyde by base.

48. Ⓓ

During mutarotation of β-D-glucose in aqueous solution angle of optical rotation changes from an angle of $+19.2°$ to a constant value of $+52.5°$.

49. Ⓓ

$[Pt(Py)(NH_3)(Br)(Cl)]$ will have three geometrical isomers.

50. Ⓐ

(a) XeF_2 – Linear

(b) XeF_4^- – Square planar

(c) XeO_3 – Pyramidal

(d) $XeOF_4$ – Square pyramidal

Mathematics

51. Ⓑ

R = {(1, 2), (1, 3), (1, 4)} is not symmetric

R = {(1, 2), (2, 1)} is symmetric but not reflexive and not transitive.

52. Ⓒ

$f(x) = x^2 + 12$

$f(x_1) = f(x_2)$

$\Rightarrow x_1^2 + 12 = x_2^2 + 12$

$\Rightarrow x_1^2 = x_2^2$

$\Rightarrow x_1 = x_2 \qquad (\because x \in N)$

$\Rightarrow$ f(x) is one - one (injective) function.

Codomain= N

but range is subset of N.

$\therefore$ f(x) is not onto function.

$\therefore$ f(x) is injective.

53. Ⓒ

$\sin^{-1}(\sin 6)$

$= \sin^{-1}\{\sin(2\pi + 6 - 2\pi)\}$

$= \sin^{-1}\{\sin(6 - 2\pi)\}$

$= 6 - 2\pi$

54. Ⓒ

$5\cos^{-1}\left(\frac{1}{2}\right) + 7\sin^{-1}\left(\frac{-1}{2}\right)$

$= 5\cos^{-1}\left(\cos\frac{\pi}{3}\right) + 7\sin^{-1}\left\{\sin\left(\frac{-\pi}{6}\right)\right\}$

$= \frac{5\pi}{3} + 7\left(\frac{-\pi}{6}\right)$

$= \frac{5\pi}{3} - \frac{7\pi}{6} = \frac{10\pi - 7\pi}{6} = \frac{3\pi}{6} = \frac{\pi}{2}$

Cont.. 8

55. Ⓑ

$\begin{bmatrix} 2+x & 3 & 4 \\ 1 & -1 & 2 \\ x & 1 & -5 \end{bmatrix}$ is a singular matrix.

$$\therefore \begin{vmatrix} 2+x & 3 & 4 \\ 1 & -1 & 2 \\ x & 1 & -5 \end{vmatrix} = 0$$

$\Rightarrow (2+x)(5-2) - 3(-5-2x) + 4(1+x) = 0$

$\Rightarrow 6 + 3x + 15 + 6x + 4 + 4x = 0$

$\Rightarrow 13x + 25 = 0$

$\Rightarrow x = \frac{-25}{13}$

56. Ⓓ

A is a square matrix of order 3.

$|A| = -4$

$|\text{Adj } A| = |A|^{n-1} = |A|^2 = (-4)^2 = 16$

57. Ⓒ

$\frac{d}{dx}\log(\log x^5)$

$= \frac{1}{\log x^5} \times \frac{d}{dx}(\log x^5)$

$= \frac{1}{\log x^5} \times \frac{5}{x}$

$= \frac{5}{x \log x^5}$

58. Ⓓ

$x = 6\sin^{-1}(2t), \; y = \frac{1}{\sqrt{1-4t^2}}$

$\frac{dx}{dt} = \frac{6}{\sqrt{1-4t^2}} \times 2 \qquad \frac{dy}{dt} = -\frac{1}{2}(1-4t^2)^{\frac{-3}{2}} \times -8t$

$= \frac{12}{\sqrt{1-4t^2}} \qquad = \frac{4t}{(1-4t^2)\sqrt{1-4t^2}}$

$\therefore \frac{dy}{dx} = \frac{\cancel{4}t}{(1-4t^2)\cancel{\sqrt{1-4t^2}}} \times \frac{\cancel{\sqrt{1-4t^2}}}{\cancel{12}\ 3}$

$= \frac{t}{3(1-4t^2)}$

59. Ⓐ

$$f(x) = \frac{\sin x^2}{x},\ x \neq 0$$
$$= 0,\ x = 0$$

$$\lim_{x \to 0} f(x)$$

$$= \lim_{x \to 0} \frac{\sin x^2}{x}$$

$$= \lim_{x \to 0} \frac{\sin x^2}{x^2} \times x = 1 \times 0 = 0$$

$$f(0) = 0$$

$$\therefore f(0) = \lim_{x \to 0} f(x)$$

$\therefore$ $f(x)$ is continuous at $x = 0$.

$$Rf'(0) = \lim_{h \to 0} \frac{f(o+h) - f(o)}{h}$$

$$= \lim_{h \to 0} \frac{\frac{\sin h^2}{h} - 0}{h} = 1$$

$$= \lim_{h \to 0} \frac{\sin h^2}{h^2} = 1$$

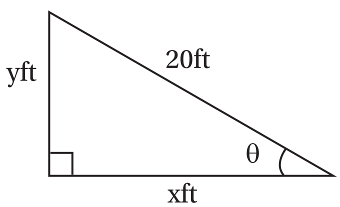
$$Lf'(0) = \lim_{h \to 0} \frac{f(o-h) - f(o)}{-h}$$

$$= \lim_{h \to 0} \frac{\sin h^2}{h^2} = 1$$

$\therefore Rf'(0) = Lf'(0)$

$\therefore$ $f(x)$ is derivable at $x = 0$

60. Ⓓ



$\therefore\ x^2 + y^2 = 400$

When $x = 12$, $y^2 = 400 - 144 = 256$

$\therefore\ y = 16$

$$\frac{dy}{dt} = -2 ft/sec.$$

$\therefore\ x^2 + y^2 = 400$

$$\Rightarrow\ 2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$$

$$\Rightarrow\ x\frac{dx}{dt} + y\frac{dy}{dt} = 0$$

$\Rightarrow \quad 12\frac{dx}{dt}+16(-2)=0$

$\Rightarrow \quad \frac{dx}{dt}=\frac{\cancel{32}^{\,8}}{\cancel{12}_{\,3}}=\frac{8}{3}\text{ ft/sec.}$

Let $m=\tan\theta=\frac{y}{x}$

$$\therefore \quad \frac{dm}{dt}=\frac{d}{dt}\left(\frac{y}{x}\right)=\frac{x\frac{dy}{dt}-y\frac{dx}{dt}}{x^2}$$

$$=\frac{12(-2)-16\times\frac{8}{3}}{144}$$

$$=\frac{-\cancel{200}^{\,25}}{3\times\cancel{144}_{\,18}}=\frac{-25}{54}$$

61. Ⓑ

$f'(x)=2x^3+3x^2-36x+10$

$f'(x)=6x^2+6x-36$

$f'(x)=0 \Rightarrow 6x^2+6x-36=0$

$\Rightarrow x^2+x-6=0$

$\Rightarrow x=-3, 2$

$f''(x)=12x+6$

at $x=-3$, $f''(-3)=-36+6=-30<0$

$\therefore$ f(x) is maximum at $x=-3$.

at $x=2$, $f''(2)=12\times 2+6=30>0$.

$\therefore$ f(x) is minimum at $x=2$.

$\therefore$ Point of minimum is 2.

62. Ⓓ

$$\int_1^2 x^2\log x\,dx$$

$$=\left[\log x\times\frac{x^3}{3}\right]_1^2-\int_1^2\frac{1}{x}\times\frac{x^3}{3}\,dx$$

$$=\frac{8}{3}\log 2-\frac{1}{3}\int_1^2\frac{1}{x}\times\frac{x^3}{3}\,dx$$

$$=\frac{8}{3}\log 2-\frac{1}{3}\left[\frac{x^3}{3}\right]_1^2$$

$$=\frac{8}{3}\log 2-\frac{1}{9}[8-1]$$

$$=\frac{8}{3}\log 2-\frac{7}{9}$$

63. Ⓑ

$$\int 2x^3 e^{x^2} dx$$

$= \int 2x \times x^2 \, e^{x^2} dx$ Let $x^2 = t$

$= \int t\, e^t dt$ $\therefore 2xdx = dt$

$= t\,e^t - e^t + C$

$= e^t (t - 1) + C$

$= e^{x^2} (x^2 - 1) + C$

64. Ⓑ

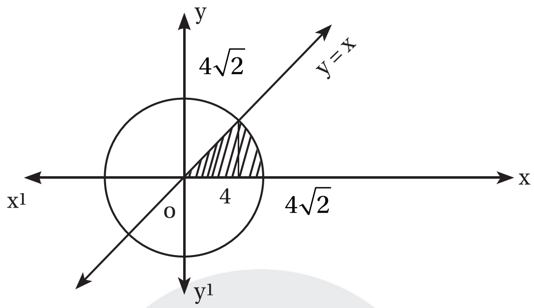
$x^2 + y^2 = 32$

$x^2 + x^2 = 32$

$2x^2 = 32$

$x^2 = 16$

$x = 4$



$$\text{Area} = \int_0^4 x \; dx + \int_4^{4\sqrt{2}} \sqrt{32 - x^2} \, dx$$

$$= \left[\frac{x^2}{2}\right]_0^4 + \left[\frac{x\sqrt{32-x^2}}{2} + \frac{32}{2}\sin^{-1}\left(\frac{x}{4\sqrt{2}}\right)\right]_4^{4\sqrt{2}}$$

$= 8 + 16 \times \frac{\pi}{2} - (8 + 16 \times \frac{\pi}{4})$

$= 8 + 8\pi - 8 - 4\pi$

$= 4\pi$ sq. units.

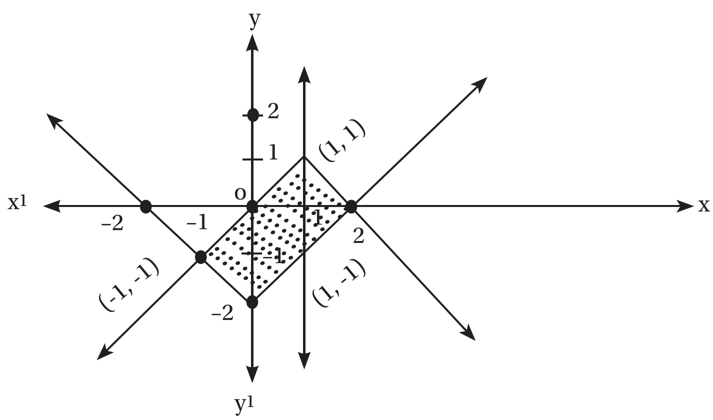
65. Ⓐ

$y = |x| - 2$, $y = 1 - |x - 1|$

$y = x - 2, x \geq 0$ $y = 1 - x + 1, x \geq 1$

$y = -x - 2, x < 0$ $= 2 - x, x \geq 1$

$y = 1 + x - 1 = x, x < 1$



$$\text{Area} = \int_0^1 x\,dx + \int_1^2 (2-x)\,dx + \left|\int_0^2 (x-2)dx\right| + \left|\int_{-1}^0 y\,dy\right| + \left|\int_{-2}^{-1} (-y-2)dy\right|$$

$$= \left[\frac{x^2}{2}\right]_0^1 + \left[2x - \frac{x^2}{2}\right]_1^2 + \left|\left[\frac{x^2}{2} - 2x\right]_0^2\right| + \left|\left[\frac{y^2}{2}\right]_{-1}^0\right| + \left|\left[\frac{-y^2}{2} - 2y\right]_{-2}^{-1}\right|$$

$$= \frac{1}{2} + \frac{1}{2} + 2 + \frac{1}{2} + \frac{1}{2} = 4\text{sq.units}$$

66. Ⓑ

$\vec{r} = \lambda(\hat{i} + 2\hat{j} - \hat{k})$

$\therefore$ equation of line is $\frac{x}{1} = \frac{y}{2} = \frac{z}{-1}$

67. Ⓓ $\vec{r} = \lambda(\hat{i} + 2\hat{j} - \hat{k})$

$\vec{r} = 3\hat{i} + 3\hat{j} + \mu)2\hat{i} + \hat{j} + \hat{k})$

$\vec{a}_1 = \vec{0}, \vec{a}_2 = 3\hat{i} + 3\hat{j},\ \vec{b}_1 = \hat{i} + 2\hat{j} - \hat{k},\ \vec{b}_2 = 2\hat{i} + \hat{j} + \hat{k}$

$$\vec{a}_2 - \vec{a}_1 = 3\hat{i} + 3\hat{j}, \vec{b}_1 \times \vec{b}_2 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2 & -1 \\ 2 & 1 & 1 \end{vmatrix} = 3\hat{i} - 3\hat{j} - 3\hat{k}$$

$\therefore \left|\vec{b}_1 \times \vec{b}_2\right| = \sqrt{9+9+9} = 3\sqrt{3}$

$\left(\vec{a}_2 - \vec{a}_1\right).(\vec{b}_1 \times \vec{b}_2) = 9 - 9 + 0 = 0$

$\therefore$ S. D. = 0 unit.

68. Ⓒ

Since S. D. of two lines is zero.

$\therefore$ $\vec{r} = \lambda(\hat{i} + 2\hat{j} - \hat{k})$ and $\vec{r} = 3\hat{i} + 3\hat{j} + \mu(2\hat{i} + \hat{j} + \hat{k})$ are intersecting lines.

Any point on the first line be (t, 2t, –t)

$\therefore$ $t\hat{i} + 2t\hat{j} - t\hat{k} = (3 + 2\mu)\hat{i} + (3 + \mu)\hat{j} + \mu\hat{k}$

$\Rightarrow$ $3 + 2\mu = t$

$3 + \mu = 2t$

$\mu = -t$

$\therefore$ $3 = 3t \Rightarrow t = 1$

$\therefore$ Point of intersection is (1, 2, –1)

$\therefore$ The motorcyles will meet with an accident at (1, 2, –1).

69. Ⓐ

$P(E) = \frac{13}{52} = \frac{1}{4}, P(F) = \frac{1}{13}$

$P(E \cap F) = \frac{1}{52}$

$\therefore$ $P(E/F) = \dfrac{\frac{1}{52}}{\frac{1}{13}} = \frac{1}{4} = P(E)$ and $P(F/E) = \dfrac{\frac{1}{52}}{\frac{1}{4}} = \frac{1}{13} = P(F)$

Again, $P(E\cap F)=\frac{1}{4}\times\frac{1}{13}=P(E)\times P(F)$

$\therefore$ Assertion is true. Reason is also true and reason is the correct explanation of assertion (A).

70. Ⓓ

If A and B be two independent events.

$\therefore$ $P(A\cap B) = P(A)P(B)$

$\therefore$ Assertion (A) is false. But reason is correct.

71. Ⓒ

$$\frac{d^3y}{dx^3}-3\left(\frac{d^2y}{dx^2}\right)+2\left(\frac{dy}{dx}\right)^4+y^3=0$$

$\therefore$ Order = 3, degree = 1.

72. Ⓓ

$$\frac{dy}{dx}+8x=16x^2+4$$

$\Rightarrow$ $dy=(16x^2+4-8x)\,dx$

$\Rightarrow$ $\int dy=\int 16x^2dx+4\int dx-8\int x\,dx$

$\Rightarrow$ $y=16\times\frac{x^3}{3}+4x-8\times\frac{x^2}{2}+c$

$\Rightarrow$ $y=\frac{16}{3}x^3+4x-4x^2+c$

When $x = 1$, $y=\frac{1}{3}$

$\frac{1}{3}=\frac{16}{3}+4-4+c$

$\therefore$ $c = -5$

$\therefore$ $y=\frac{16}{3}x^3+4x-4x^2-5$

73. Ⓑ

Max $Z = 5x + 10y$

Subject to $x + 2y \le 120$

$x + y \ge 60$

$x - 2y \ge 0$

$x \ge 0, y \ge 0$

For $x + 2y = 120$

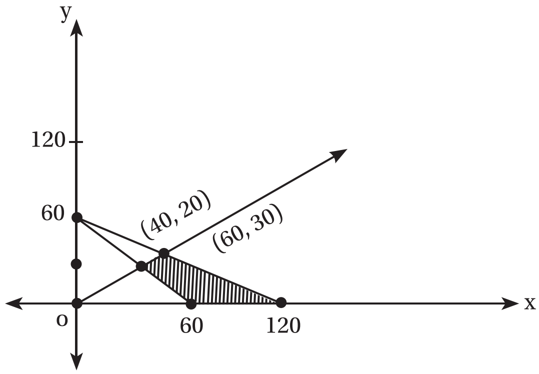
(0, 60), (120, 0)

For $x + y = 60$

(0, 60), (60, 0)

For $x = 2y$

(0, 0), (60, 30)



Corner points one (40, 20), (60, 30), (120, 0) and (60, 0).

at (40, 20), Z = 200 + 200 = 400

at (120, 0), Z = 300 + 300 = 600

at (120, 0), Z = 600

at (60, 0), Z = 300

$\therefore$ Max. value of Z = 600.

74. ©

Min Z = 6x + 21y
Subject to $x + 2y \geq 3$

$x + 4y \geq 4$

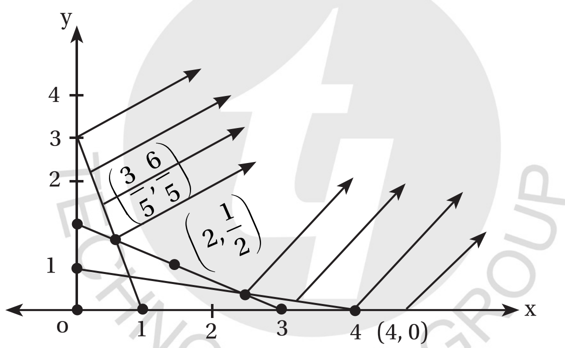
$3x + y \geq 3$

$x \geq 0, y \geq 0$

For $x + 2y = 3$, (3, 0), (1, 1)

For $x + 4y = 4$, (4, 0), (0, 1)

For $3x + y = 3$, (1, 0), (0, 3)



Corner points of the unbounded region are (0, 3), $\left(\frac{3}{5}, \frac{6}{5}\right)$, $\left(2, \frac{1}{2}\right)$ and (4, 0).

at (0, 3), Z = 63

at $\left(\frac{3}{5}, \frac{6}{5}\right), Z = \frac{18}{5} + \frac{126}{5} = \frac{144}{5} = 28.8$

at $\left(2, \frac{1}{2}\right), Z = 12 + \frac{21}{2} = \frac{45}{2} = 22.5$

at (4, 0), Z = 24

Now, $6x + 21y < 22.5$ determines the open half plane where no point is common with the feasible region.

Min Z = 22.5 at $\left(2, \frac{1}{2}\right)$.

75. ©

$$= \int \frac{dx}{\cos^3 x \sqrt{2 \sin 2x}}$$

$$= \int \frac{dx}{\cos^3 x \sqrt{2 \times 2 \sin x \cos x}}$$

$$= \int \frac{dx}{\cos^4 x \sqrt{\tan x}}$$

$= \frac{1}{2}\int \frac{\sec^2 x \times \sec^2 x\, dx}{\sqrt{\tan x}}$ Let $\tan x = z^2$

$\sec^2 x dx = 2\, z dz$

$= \frac{1}{2}\int \frac{(1+z^4)\, 2\, \cancel{z} dz}{\cancel{z}}$

$= \int dz + \int z^4 dZ$

$= z + \frac{z^5}{5} + k$

$= (\tan x)^{\frac{1}{2}} + \frac{(\tan x)^{\frac{5}{2}}}{5} + k$

$\therefore\ (\tan x)^{\frac{1}{2}} + \frac{1}{5}(\tan x)^{\frac{5}{2}} + k = (\tan k)^{A} + C(\tan x)^{B} + k$

$\Rightarrow\ A = \frac{1}{2},\ C = \frac{1}{5},\ B = \frac{5}{2}$

$\therefore\ A + B + C = \frac{1}{2} + \frac{5}{2} + \frac{1}{5} = \frac{16}{5}$

Biology

76. Ⓑ

Lie close to each other

77. Ⓐ

12.

78. Ⓑ

1.

79. Ⓓ

The marsupials are examples of divergent evolution.
The Australian mammals are examples of convergent evolution. In convergent evolution, organisms not closely related, independently evolve similar traits as a result of adaptation to similar environment or ecological niches.

80. Ⓐ

Morphine.

81. Ⓒ

Trichoderma polysporum-Statin
Statin is obtained from *Monascus purpureas*

82. Ⓐ

By elution

83. Ⓐ

PCR.
The DNA polymerase obtained from the microbe , can be heated to a temperature high enough to melt DNA and yet is still able to function.

84. Ⓐ

Formation of hydrogen bonds between sticky ends of DNA fragments.

85. Ⓑ

Commensalism.

86. Ⓐ

Both A and R are true and R is the correct explanation of A.

87. Ⓑ

Both A and R are true but R is not the correct explanation of A.

88. Ⓐ

Both A and R are true and R is the correct explanation of A.

89. Ⓒ

A is true but R is false.
The amphibians evolved into reptiles.

90. Ⓑ

Both A and R are true but R is not the correct explanation of A

91. Ⓐ

Diploid; mitosis.

92. Ⓐ

Spermiation.

93. Ⓐ

One second polar body and one ovum.

94. Ⓐ

Secretory phase.

95. Ⓒ

This occurs due to failure of segregation of chromatids during cell division cycle, resulting in the gain of chromosomes.

96. Ⓐ

A polypeptide of 24 amino acids will be formed.
UAA is a termination codon which will stop the polypeptide synthesis. So the resultant polypeptide will have 24 amino acids.

97. Ⓒ

Klinefelter's syndrome.

98. Ⓑ

The diversity in the organisms living in the region.

99. Ⓑ

Cynodon.

100. Ⓐ

Lesser inter-specific competition.