MCQ Answer

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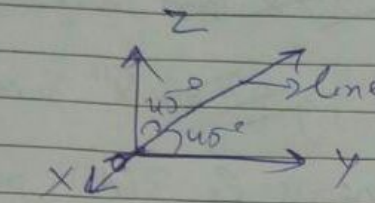
Maths-1 - Part B

xi] MCQ

i) (d) $\frac{\pi}{2}$



ii) (c) Ans is multiplied by -1

iii) (d) 1

Maths-2- Part B

xi] MCQ

i) (c) 2, 9

ii) Put $1+\sin^2 x = t$, Diff wrt x we get

$2\sin x \cos x \, dx = dt$

$$\int \frac{2\sin x \cos x \, dx}{t} = \int \frac{1}{t} dt = \log t$$

(d) $\log|1+\sin^2 x| + C$ [For such problems you can also differentiate answer/option & check]

iii] $I.F = e^{\int \frac{1}{\cos^2 x} dx} = e^{\int \sec^2 dx} = e^{\tan x}$

(c) $e^{\tan x}$

Part A

Answer Key - Maths - 1

XI.1(A) MCQ

i) $x = \cot^{-1}\left(\frac{-1}{\sqrt{3}}\right)$

II Q	-ve, cot (+ve)]
other II Q	I Q

Principal Sol^n for cot x lies between 0 to π

$x = \pi - \frac{\pi}{3} = \frac{2\pi}{3}$ (d)

ii) $[(T \to F) \wedge \sim T] \equiv F$, (b) F

iii) $\tan^2\theta = \tan^2 \pi/4$

$\theta = n\pi \pm \alpha = n\pi \pm \frac{\pi}{4}$

(c) $\theta = n\pi \pm \frac{\pi}{4}$, $n \in Z$

XI.1(B) 2M Question

i) 1) $(P \wedge q) \vee T$ [For Dual replace $\wedge \to \vee$, $\vee \to \wedge$ and $T \to F$, $F \to T$]

2) Ravi and Vasi went to Chennai

ii) $m_1 + m_2 = \frac{-2h}{b} = \frac{-k}{-100} = \frac{k}{100}$

$m_1 m_2 = \frac{a}{b} = \frac{1}{-100}$

Given, $m_1 + m_2 = 3 m_1 m_2$

$\therefore \frac{k}{100} = \frac{3}{-100}$

$\therefore \boxed{k = -3}$

iii) Let $\bar{p} = 2\bar{i} + 4\bar{j} + 16\bar{k}$ & $\bar{q} = 6\bar{i} - p\bar{j} + 48\bar{k}$

Given collinear $\therefore \bar{p} = \lambda \bar{q}$

$2\bar{i} + 4\bar{j} + 16\bar{k} = \lambda(6\bar{i} - p\bar{j} + 48\bar{k})$

$2 = 6\lambda$, $4 = -p\lambda$, $16 = \lambda(48)$

$\lambda = \frac{1}{3}$, $p = \frac{-4}{\lambda} = \frac{-4}{\frac{1}{3}} = -4 \times 3 = -12$

$\therefore p = -12$

iv) $\cos 2\theta = 2\cos^2\theta - 1$

$\therefore \cos 2\alpha + \cos 2\beta + \cos 2\gamma = 2\cos^2\alpha - 1 + 2\cos^2\beta - 1 + 2\cos^2\gamma - 1$

$= 2[\cos^2\alpha + \cos^2\beta + \cos^2\gamma] - 3 = 2 - 3 = \underline{-1}$

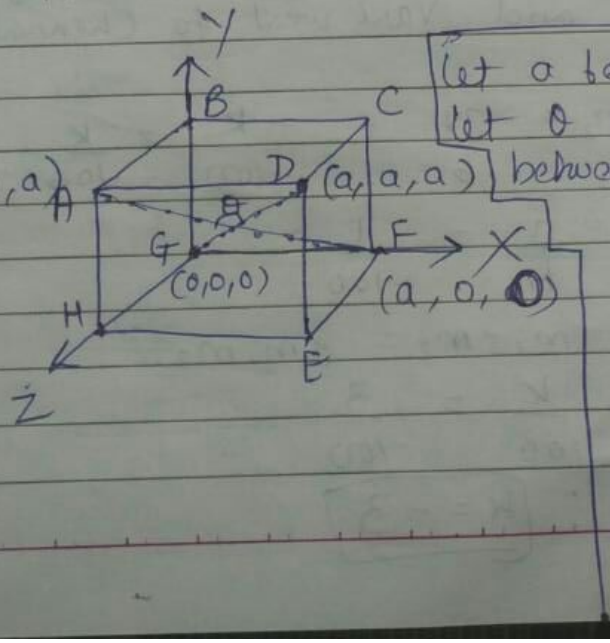
v) $\sin\theta = \left| \frac{a_1 a_2 + b_1 b_2 + c_1 c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2}\ \sqrt{a_2^2 + b_2^2 + c_2^2}} \right|$

$a_1 = 1$, $b_1 = -2$, $c_1 = 3$

$a_2 = 1$, $b_2 = -1$, $c_2 = 1$

$\therefore \sin\theta = \left| \frac{1 + 2 + 3}{\sqrt{1+4+9}\sqrt{1+1+1}} \right| = \frac{6}{\sqrt{14}\sqrt{3}}$

(12) A) Q. i)



Let a be the side of cube
Let θ be the angle between GD & AF

For finding angle between two line we should know their direction ratios / cosines.

$$\cos\theta = |l_1 l_2 + m_1 m_2 + n_1 n_2| = \left| \frac{a_1 a_2 + b_1 b_2 + c_1 c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2}\sqrt{a_2^2 + b_2^2 + c_2^2}} \right|$$

Direction Ratio of line GD

$a-0, a-0, a-0$

$(a, a, a) \longrightarrow$ Can also be written as $(1, 1, 1) \rightarrow$ bcz d.r.s

Direction Ratio of line AF

$0-a, a-0, a-0$

$-a, a, a \longrightarrow (-1, 1, 1)$

$$\cos\theta = \left| \frac{-1+1+1}{\sqrt{3}\sqrt{3}} \right| = \left| \frac{2-1}{3} \right| = \frac{1}{3}$$

Hence Proved, $\theta = \cos^{-1}\left(\frac{1}{3}\right)$

ii) For Solution Refer to page No 227

iii) Contingency

Q.2) B) 4 M Quest^n

i) $x + y + z = 6$

$3z + y = 11$

$x + z = 2y$

Always solve such problems using method of reduction

$AX = B$

Rearranging eq^n we get

$x + y + z = 6$

$0x + y + 3z = 11$

$x - 2y + z = 0$

$$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 3 \\ 1 & -2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 11 \\ 0 \end{bmatrix}$$

Try to make this 0 using [1] , $R_3 \to R_3 - R_1$ (Don't forget to do operation on R.H.S)

$$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 3 \\ 0 & -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 11 \\ -6 \end{bmatrix}$$

Equating we get

$x + y + z = 6 \quad -(1)$

$0x + y + 3z = 11 \quad -(2)$

$-3y = -6$

$\therefore y = 2 \to$ Substitute in eq^n (2)

$z = 3$ then Substitute value of y & z in eq^n (1)

$x = 6 - 2 - 3 = 1$

$x = 1, y = 2, z = 3$

ii) Parallel lines $h^2 - ab = 0$, $h^2 = ab$

$a = 2, 2h = 8, h = 4, b = p, 2g = q, g = q/2$

$2f = 2, f = 1, c = -15$

$h^2 = ab, \quad 16 = (2)p$

$\therefore p = 8$

Given eq^ represent pair of parallel lines

$$\therefore \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$$

$\boxed{q = 1}$, $\boxed{p = 8}$

iii) To show that 2 lines are coplanar

Prove $\begin{vmatrix} x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} = 0$

L.H.S $\begin{vmatrix} 2 & 4 & 6 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{vmatrix}$

Take 2 common from R_1

L.H.S $= 2 \begin{vmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{vmatrix} = 0$

To find eq^ of plane containing them

$$\begin{vmatrix} x - x_1 & y - y_1 & z - z_1 \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} = \begin{vmatrix} x - 0 & y - 2 & z + 3 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{vmatrix}$$

Solve

Ans: $\boxed{x - y + z + 5 = 0}$

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A3(A) 3M Quest^n

i) Solution :- Refer to pg 116

ii) To prove lines intersect Show

$$\begin{vmatrix} x_2-x_1 & y_2-y_1 & z_2-z_1 \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} = 0$$

For finding coordinates of the point of intersection

From 1st given eq^n find values of x, y, z & from 2nd given eq^n also then equate them

$$\frac{x+1}{-10} = \frac{y+3}{-1} = \frac{z-4}{1} = \lambda$$

$x = -10\lambda - 1$, $y = -\lambda - 3$, $z = \lambda + 4$

$$\frac{-x-10}{1} = \frac{-y-1}{3} = \frac{1-z}{-4}$$ [Note x, y & z must be multiplied with 1]

$$-\left(\frac{x+10}{1}\right) = -\left(\frac{y+1}{3}\right) = -\left(\frac{z-1}{-4}\right) = b$$

$x = -b - 10$, $y = -3b - 1$, $z = 4b + 1$

$-10\lambda - 1 = -b - 10$
$-\lambda - 3 = -3b - 1$
$\lambda + 4 = 4b + 1$

Solve any 2 eq^n simultaneously $\Rightarrow \lambda = 1, b = 1$

$\therefore x = -11, y = -4, z = 5$ $(-11, -4, 5)$

A·iii) Ex 8·2, ~~pg 298~~ last sum

A·3·B) i) Ex q·3, ~~pg 298~~ 4th Sum

ii) Miscellaneous Ex 3(A), pg 75
Q·no) 14

iii) Sorry question repeated. [~~☆☆~~ Imp]