Kerala Board

# Answer Key

2024

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# ANSWER KEY

SECOND YEAR HIGHER SECONDARY EXAMINATION ...MARCH.... 2024

PART-~~I/II~~/III

SUBJECT: ..MATHEMATICS..(SCIENCE)..

CODE NO: **SY 554**

VERSION:...Q..

..80.. SCORES

..$2\frac{1}{2}$... HOURS

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| 1. | | $f(x) = \cos x \qquad g(x) = 3x^2$ | | |
| | | $g \circ f(x) = g[f(x)]$ | ½ | |
| | | $= g[\cos x]$ | ½ | |
| | | $= 3\cos^2 x$ | ½ | 3 |
| | | $f \circ g(x) = f[g(x)]$ | ½ | |
| | | $= f(3x^2)$ | ½ | |
| | | $= \cos(3x^2)$ | ½ | |
| 2. | | $[a_{ij}]_{2\times 3} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{bmatrix}$ | 1 | |
| | | $a_{ij} = 2i+j$ | | 3 |
| | | $\therefore$ required matrix is $\begin{bmatrix} 3 & 4 & 5 \\ 5 & 6 & 7 \end{bmatrix}$ | 2 | |
| 3. | (i) | (c) $k^3\lvert A\rvert$ | 1 | |
| | (ii) | $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ | | |
| | | $3 - x^2 = 3 - 8 = -5$ | 1 | 3 |
| | | $x^2 = 3 + 5 = 8$ | ½ | |
| | | $x = \pm\sqrt{8} = \pm 2\sqrt{2}$ | ½ | |

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|---|---|---|---|---|
| 4. | | $f$ is continuous at $x=5$ | | |
| | | $\therefore \lim_{x\to 5^-} f(x) = \lim_{x\to 5^+} f(x)$ | 1 | |
| | | $\lim_{x\to 5^-} kx+1 = \lim_{x\to 5^+} 3x-5$ | ½ | 3 |
| | | $5k+1 = 10$ | ½ | |
| | | $5k = 9$ | 1 | |
| | | $k = 9/5$ | | |
| 5. | (i) | (I) $\dfrac{\cos x}{2\sqrt{\sin x}}$ | 1 | |
| | | (II) $y+\sin y = \cos x$ | | |
| | | D.H w.r.t $x$ | | |
| | | $\dfrac{dy}{dx} + \cos y \dfrac{dy}{dx} = -\sin x$ | 1 | 3 |
| | | $(1+\cos y)\dfrac{dy}{dx} = -\sin x$ | ½ | |
| | | $\dfrac{dy}{dx} = \dfrac{-\sin x}{1+\cos y}$ | ½ | |
| 6 | (i) | $f(x) = x^2-4x+6$ | 1 | |
| | | $f'(x) = 2x-4$ | | |
| | (ii) | $f'(x) > 0$ when $f$ is increasing | 1 | 3 |
| | | i.e) $2x-4 > 0$ | ½ | |
| | | $2x > 4$ | ½ | |
| | | $x > 2$ | | |
| | | $f$ is increasing in the interval $(2,\infty)$ | | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| 7. | (i) | (B) 2 | 1 | |
| | (ii) | $\frac{dy}{dx} = (1+x^2)(1+y^2)$ | 1 | |
| | | $\frac{dy}{1+y^2} = (1+x^2)\,dx$ | | 3 |
| | | Integrating | | |
| | | $\int \frac{dy}{1+y^2}\,dx = \int (1+x^2)\,dx$ | ½ | |
| | | $\tan^{-1} y = x + x^3/3 + c$ | ½ | |
| | | $y = \tan(x + x^3/3 + c)$ | | |
| 8 | | $A(-1,0,2)$ $B(3,4,6)$ | | |
| | | $\bar{a} = -\hat{i} + 2\hat{k}$ $\bar{b} = 3\hat{i} + 4\hat{j} + 6\hat{k}$ | 1 | 3 |
| | | required equation is | | |
| | | $\bar{r} = \bar{a} + \lambda(\bar{b} - \bar{a})$ | 1 | |
| | | ie) $\bar{r} = -\hat{i} + 2\hat{k} + \lambda(4\hat{i} + 4\hat{j} + 4\hat{k})$ | 1 | |
| 9 | (i) | $f(x_1) = f(x_2) \Rightarrow 2x_1 + 3 = 2x_2 + 3$ | 1 | |
| | | $\Rightarrow 2x_1 = 2x_2$ | ½ | |
| | | $\Rightarrow x_1 = x_2$ | ½ | |
| | | $\Rightarrow f$ is one-one | | 4 |
| | (ii) | let $y = 2x+3$ | | |
| | | $\therefore 2x = y - 3 \Rightarrow x = \frac{y-3}{2} \in R$ | 1 | |
| | | $\therefore f$ is onto | | |
| | | Hence $f$ is invertible | 1 | |
| | | $f^{-1}(x) = \frac{x-3}{2}$ | | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| 10 | (i) | (A) $\frac{\pi}{3}$ | 1 | |
| | (ii) | $\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{2}{11} = \tan^{-1}\left[\frac{1/2 + 2/11}{1 - 1/2 \cdot 2/11}\right]$ | 1 | 4 |
| | | $= \tan^{-1}\left[\frac{\frac{11+4}{22}}{\frac{22-2}{22}}\right]$ | 1/2 | |
| | | $= \tan^{-1}\left[\frac{15}{20}\right]$ | 1/2 | |
| | | $= \tan^{-1}\frac{3}{4}$ | 1 | |
| 11. | (i) | $x = \log t \qquad y = \sin t$ | | |
| | | $\frac{dx}{dt} = \frac{1}{t} \qquad \frac{dy}{dt} = \cos t$ | 1 | |
| | | $\frac{dy}{dx} = \frac{dy/dt}{dx/dt}$ | 1/2 | |
| | | $= \frac{\cos t}{1/t}$ | 1/2 | |
| | | $= \underline{\underline{t \cos t}}$ | | 4 |
| | (ii) | $y = 3\sin x + 2\cos x$ | 1 | |
| | | $\frac{dy}{dx} = 3\cos x - 2\sin x$ | | |
| | | $\frac{d^2y}{dx^2} = -3\sin x - 2\cos x$ | 1 | |
| | | $= -y$ | | |
| | | $\therefore \frac{d^2y}{dx^2} + y = 0$ | | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
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| 12. | (i) | (D) $\int_0^a f(a-x)\,dx$ | 1 | |
| | (ii) | let $I = \int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$ —— ① | | |
| | | Also $I = \int_0^{\pi/2} \frac{\sqrt{\sin(\pi/2 - x)}}{\sqrt{\sin(\pi/2-x)}+\sqrt{\cos(\pi/2-x)}}\,dx$ | 1/2 | |
| | | $I = \int_0^{\pi/2} \frac{\sqrt{\cos x}}{\sqrt{\cos x}+\sqrt{\sin x}}\,dx$ —— ② | 1/2 | |
| | | ① + ② $\Rightarrow$ | | |
| | | $2I = \int_0^{\pi/2} \frac{\sqrt{\sin x}+\sqrt{\cos x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$ | 1/2 | 4 |
| | | $= \int_0^{\pi/2} dx$ | 1/2 | |
| | | $= [x]_0^{\pi/2}$ | | |
| | | $= \pi/2 - 0$ | 1/2 | |
| | | $2I = \frac{\pi}{2}$ | | |
| | | $\therefore I = \frac{\pi}{4}$ | 1/2 | |
| | | $\therefore \int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx = \frac{\pi}{4}$ | | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
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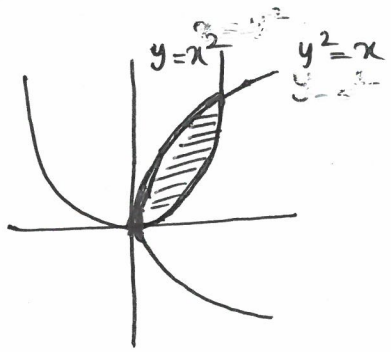
| 13 | | $y = x^2$ <br> $y^2 = x \Rightarrow y = \sqrt{x}$ <br> $\therefore x^2 = \sqrt{x}$ <br> $x^4 = x$ <br> $x^4 - x = 0 \Rightarrow x(x^3 - 1) = 0$ <br> $\therefore x = 0$ or $1$ <br> points of intersection of curves is <br> $(0,0)$ and $(1,1)$ <br> Required Area $= \int_a^b y_2 - y_1 \, dx$ <br> $= \int_0^1 \sqrt{x} - x^2 \, dx$ <br> $= \left[\frac{x^{3/2}}{3/2} - \frac{x^3}{3}\right]_0^1$ <br> $= \frac{1}{3/2} - \frac{1}{3}$ <br> $= 2/3 - 1/3$ <br> $= 1/3$ sq. units <br> Area of the region bounded by the two parabola is $1/3$ sq. units. | 1 <br> 1/2 <br> 1/2 <br> 1/2 <br> 1/2 <br> 1/2 <br> 1/2 | 4 |



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|---|---|---|---|---|
| 14 | (i) | $\frac{dy}{dx} + \frac{y}{x} = x^2$ | | |
| | | $P = \frac{1}{x}$ $\quad Q = x^2$ | ½ | |
| | | $\int P\,dx = \log x$ | | |
| | | Integrating factor (IF) $= e^{\int P\,dx}$ | | |
| | | $= e^{\log x}$ | ½ | |
| | | $= x$ | | 4 |
| | (ii) | general solution is | | |
| | | $y \times IF = \int Q \times IF\,dx$ | 1 | |
| | | $yx = \int x^2 \times x\,dx$ | 1 | |
| | | $xy = \frac{x^4}{4} + c$ | 1 | |
| 15. | | $\bar{a}_1 = i + j$ $\quad \bar{b}_1 = 2i - j + k$ | | |
| | | $\bar{a}_2 = 2i + j - k$ $\quad \bar{b}_2 = 3i - 5j + 2k$ | 1 | |
| | | $\bar{a}_2 - \bar{a}_1 = i - k$ | ½ | |
| | | $\bar{b}_1 \times \bar{b}_2 = \begin{vmatrix} i & j & k \\ 2 & -1 & 1 \\ 3 & -5 & 2 \end{vmatrix}$ | ½ | |
| | | $= 3i - j - 7k$ | ½ | |
| | | $\lvert \bar{b}_1 \times \bar{b}_2 \rvert = \sqrt{3^2 + 1^2 + 7^2}$ | ½ | |
| | | $= \sqrt{59}$ | | |

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| | | $(\bar{a}_2-\bar{a}_1)\cdot(\bar{b}_1\times\bar{b}_2) = 1\times3+1\times7 = 10$ | | |
| | | $SD = \left\lvert \dfrac{(\bar{a}_2-\bar{a}_1)\cdot(\bar{b}_1\times\bar{b}_2)}{\lvert\bar{b}_1\times\bar{b}_2\rvert} \right\rvert$ | ½ | 4 |
| | | $= \dfrac{10}{\sqrt{59}}$ | ½ | |
| 16 | (i) | $\bar{a}\times\bar{b} = \begin{vmatrix} i & j & k \\ 1 & -1 & 3 \\ 2 & -7 & 1 \end{vmatrix}$ | 1 | |
| | | $= 20i+5j-5k$ | 1 | 4 |
| | (ii) | Area of parellelogram $= \lvert\bar{a}\times\bar{b}\rvert$ | 1 | |
| | | $= \sqrt{20^2+5^2+5^2}$ | | |
| | | $= \sqrt{450}$ sq.units | 1 | |
| 17 | (i) | $\bar{r}\cdot(i+j-k) = 2$ | | |
| | | Cartesian equation is | | |
| | | $x+y-z = 2$ | 2 | |
| | (ii) | Distance $= \left\lvert \dfrac{ax_1+by_1+cz_1+d}{\sqrt{a^2+b^2+c^2}} \right\rvert$ | 1 | 4 |
| | | $= \left\lvert \dfrac{6x_1-3y_1+2z_1-4}{\sqrt{6^2+3^2+2^2}} \right\rvert$ | ½ | |
| | | $= \left\lvert \dfrac{6\times2-3\times5+2\times-3-4}{\sqrt{49}} \right\rvert = \dfrac{13}{7}$ | ½ | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| 18 | (i) | $P(A \text{ and } B) = P(A \cap B)$ | | |
| | | $= P(A) \cdot P(B)$ | 1/2 | |
| | | $= 0.3 \times 0.6 = 0.18$ | 1/2 | |
| | (ii) | $P(A \text{ or } B) = P(A \cup B)$ | | |
| | | $= P(A) + P(B) - P(A \cap B)$ | 1 | |
| | | $= 0.3 + 0.6 - 0.18 = 0.72$ | 1 | 4 |
| | (iii) | $P(\text{neither } A \text{ nor } B) = P(A' \cap B')$ | | |
| | | $= P(A \cup B)'$ | | |
| | | $= 1 - P(A \cup B)$ | 1/2 | |
| | | $= 1 - 0.72 = 0.28$ | 1/2 | |
| 19. | (i) | $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ | | |
| | | $A^2 = A \times A$ | 1/2 | |
| | | $= \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$ | 1 | |
| | | $A^2 - 5A + 7I = \begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix} - \begin{bmatrix} 15 & 5 \\ -5 & 10 \end{bmatrix} + \begin{bmatrix} 7 & 0 \\ 0 & 7 \end{bmatrix}$ | 1 | |
| | | $= \begin{bmatrix} 15 & 5 \\ -5 & 10 \end{bmatrix} - \begin{bmatrix} 15 & 5 \\ -5 & 10 \end{bmatrix} = 0$ | 1/2 | |
| | (ii) | let $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$ $\therefore A^T = \begin{bmatrix} 1 & 6 \\ 5 & 7 \end{bmatrix}$ | 1/2 | |
| | | $A + A^T = \begin{bmatrix} 2 & 11 \\ 11 & 14 \end{bmatrix}$ | 1/2 | |
| | | let $P = \frac{A + A^T}{2} = \frac{1}{2} \begin{bmatrix} 2 & 11 \\ 11 & 14 \end{bmatrix} = \begin{bmatrix} 1 & 11/2 \\ 11/2 & 7 \end{bmatrix}$ | 1/2 | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| | | $A - A^T = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ | 1/2 | |
| | | Let $Q = \dfrac{A - A^T}{2}$ <br> $= \begin{bmatrix} 0 & -1/2 \\ 1/2 & 0 \end{bmatrix}$ | 1/2 | 6 |
| | | $A = P + Q$ <br> $\begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix} = \begin{bmatrix} 1 & 11/2 \\ 11/2 & 7 \end{bmatrix} + \begin{bmatrix} 0 & -1/2 \\ 1/2 & 0 \end{bmatrix}$ <br> where P is symmetric and Q is skew-symmetric | 1/2 | |
| 20 | (i) | let $A = \begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$ <br> $B = \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$ $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ <br> $AX = B$ <br> $\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$ | 1 | |
| | (ii) | $A_{11} = -1$ $A_{12} = -8$ $A_{13} = -10$ <br> $A_{21} = -5$ $A_{22} = -6$ $A_{23} = 1$ <br> $A_{31} = -1$ $A_{32} = 9$ $A_{33} = 7$ | 1 | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| | | Co-factor matrix $= \begin{bmatrix} -1 & -8 & -10 \\ -5 & -6 & 1 \\ -1 & 9 & 7 \end{bmatrix}$ | 1/2 | |
| | | $\text{Adj } A = \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}$ | 1/2 | |
| | (iii) | $A^{-1} = \frac{1}{\lvert A \rvert} (\text{Adj } A)$ | | |
| | | $\lvert A \rvert = 3 \times -1 + -2 \times -8 + 3 \times -10$ | | |
| | | $= -3 + 16 - 30 = -17$ | 1/2 | |
| | | $A^{-1} = \frac{-1}{17} \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix}$ | 1/2 | 6 |
| | | $X = A^{-1} B$ | 1/2 | |
| | | $= \frac{-1}{17} \begin{bmatrix} -1 & -5 & -1 \\ -8 & -6 & 9 \\ -10 & 1 & 7 \end{bmatrix} \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$ | 1/2 | |
| | | $= \frac{-1}{17} \begin{bmatrix} -8-5-4 \\ -64-6+36 \\ -80+1+28 \end{bmatrix}$ | 1/2 | |
| | | $= \frac{-1}{17} \begin{bmatrix} -17 \\ -34 \\ -51 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ | | |
| | | $\therefore x = 1, \; y = 2, \; z = 3$ | 1/2 | |

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| 21 | (i) | (a) $y = x^3 - x$ | | |
| | | $\frac{dy}{dx} = 3x^2 - 1$ | 1 | |
| | | $\left(\frac{dy}{dx}\right)_{x=2} = 11 \quad (m)$ | ½ | |
| | | $\therefore$ slope of tangent $= 11$ | ½ | |
| | | (b) equation of tangent at $x = 2$ | | |
| | | $x = 2 \Rightarrow y = 2^3 - 2 = 6$ | ½ | |
| | | Equation is $y - y_1 = m(x - x_1)$ | ½ | |
| | | $y - 6 = 11(x - 2)$ | ½ | |
| | | $y - 6 = 11x - 22$ | ½ | 6 |
| | | $11x - y - 16 = 0$ | | |
| | (ii) | $y = \sqrt{x}$ ; $x = 36$, $\Delta x = 0.6$ | ½ | |
| | | $\Delta y = \sqrt{x + \Delta x} - \sqrt{x}$ | ½ | |
| | | $= \sqrt{36.6} - \sqrt{36}$ | | |
| | | $= \sqrt{36.6} - 6$ | ½ | |
| | | $\therefore \sqrt{36.6} = 6 + \Delta y$ | | |
| | | $\Delta y \approx dy \approx \left(\frac{dy}{dx}\right)\Delta x$ | | |
| | | $= \frac{1}{2\sqrt{x}} \times 0.6 = \frac{0.6}{12} = 0.05$ | ½ | |
| | | $\therefore \sqrt{36.6} = 6 + 0.05 = 6.05$ | | |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
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| 22 | (i) | $\int \frac{e^{\tan^{-1}x}}{1+x^2}\,dx$ | | |
| | | put $\tan^{-1}x = u$, $\frac{1}{1+x^2}\,dx = du$ | 1 | |
| | | $= \int e^u \cdot du$ | | |
| | | $= e^u + c = e^{\tan^{-1}x} + c$ | 1 | |
| | (ii) | $\int \frac{1}{x^2-6x+13}\,dx$ | | |
| | | $= \int \frac{1}{(x-3)^2+4}\,dx$ | 1 | |
| | | $= \int \frac{1}{(x-3)^2+2^2}\,dx$ | ½ | |
| | | $= \frac{1}{2}\tan^{-1}\frac{x-3}{2} + c$ | ½ | 6 |
| | (iii) | $\int x \log x\,dx$ | | |
| | | $= \int \log x \cdot x\,dx$ | ½ | |
| | | $= \log x \cdot \frac{x^2}{2} - \int \frac{1}{x}\cdot\frac{x^2}{2}\,dx$ | ½ | |
| | | $= \frac{x^2}{2}\log x - \frac{1}{2}\int x\,dx$ | ½ | |
| | | $= \frac{x^2}{2}\log x - \frac{x^2}{4} + c$ | ½ | |

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| 23 | (i) | $\bar{a}\cdot\bar{b} = 1\times1 + 1\times-1 + -1\times1$ | 1 | |
| | | $= 1-1-1 = -1$ | 1 | |
| | (ii) | $\cos\theta = \dfrac{\bar{a}\cdot\bar{b}}{\lvert\bar{a}\rvert\lvert\bar{b}\rvert}$ | ½ | |
| | | $= \dfrac{-1}{\sqrt{3}\ \sqrt{3}}$ | ½ | |
| | | $= \dfrac{-1}{3}$ | ½ | 6 |
| | | $\theta = \cos^{-1}\left[\dfrac{-1}{3}\right]$ | ½ | |
| | (iii) | projection of $\bar{a}$ on $\bar{b}$ | | |
| | | $= \dfrac{\bar{a}\cdot\bar{b}}{\lvert\bar{b}\rvert}$ | 1 | |
| | | $= \dfrac{-1}{\sqrt{3}}$ | 1 | |
| 24. | | $x+y = 50$ | | |
| | | $\begin{array}{c\|c\|c} x & 0 & 50 \\ \hline y & 50 & 0 \end{array}$ | | |
| | | $3x+y = 90$ | 1 | |
| | | $\begin{array}{c\|c\|c} x & 0 & 30 \\ \hline y & 90 & 0 \end{array}$ | | |

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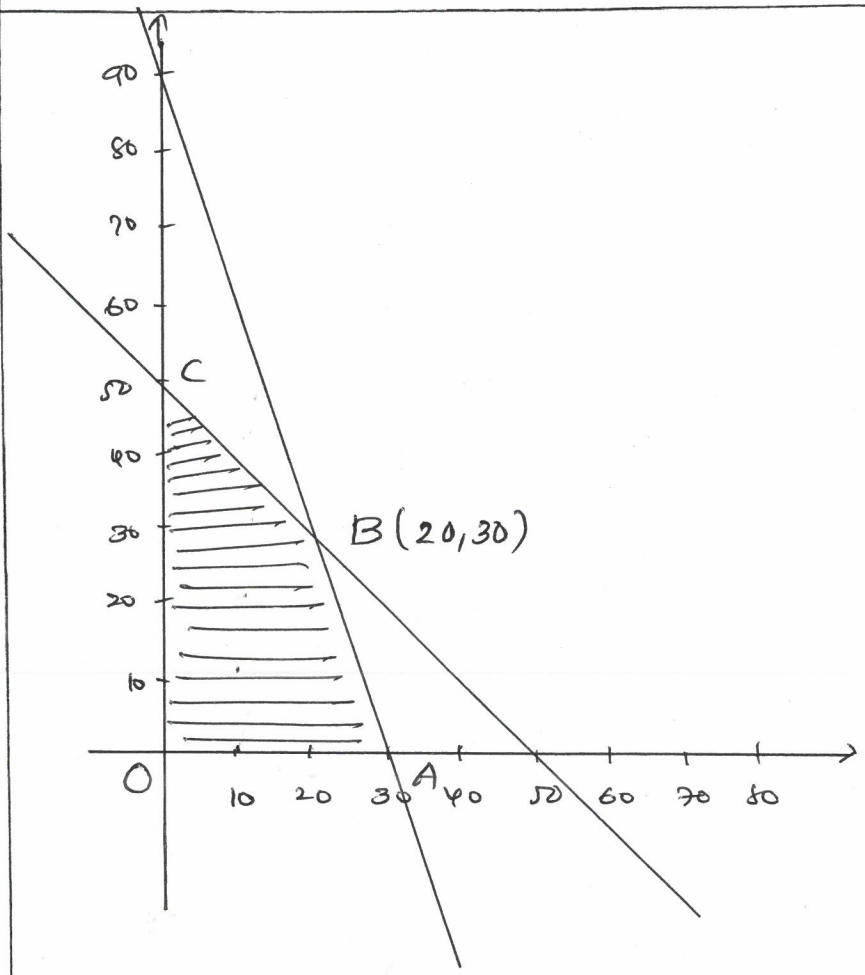
| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| | |   | 3 | |
| | | Corner points $Z = 4x + y$<br>O (0,0) 0<br>A (30,0) 120 ←<br>B (20,30) 110<br>C (0,50) 50<br><br>Maximum value of $Z = 120$<br>at A (30, 0) | 2 | |

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| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| 25 | (i) | X: No of heads | | |
| | | X can take values 0, 1, 2, 3 | | |
| | | $P(X=0) = P(\text{head}) \times P(\text{Head}) \times P(\text{Head})$ | | |
| | | $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$ | | |
| | | $P(X=1) = 3\left[P(\text{Head}) \times P(\text{Tail}) \times P(\text{Tail})\right]$ | | |
| | | $= 3 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{3}{8}$ | 1 | |
| | | $P(X=2) = \frac{3}{8}$ | | |
| | | $P(X=3) = \frac{1}{8}$ | | 6 |
| | | $\begin{array}{c\|c\|c\|c\|c} X & 0 & 1 & 2 & 3 \\ \hline P(X) & \frac{1}{8} & \frac{3}{8} & \frac{3}{8} & \frac{1}{8} \end{array}$ | 1 | |
| | (ii) | $\begin{array}{cccc} x_i & P_i & x_i P_i & x_i^2 P_i \\ 0 & 1/8 & 0 & 0 \\ 1 & 3/8 & 3/8 & 3/8 \\ 2 & 3/8 & 6/8 & 12/8 \\ 3 & 1/8 & 3/8 & 9/8 \\ \hline & & 3/2 & 3 \end{array}$ | 2 | |
| | | Mean of $X = \Sigma x_i P_i$ | $\frac{1}{2}$ | |
| | | $= 3/2$ | $\frac{1}{2}$ | |
| | | Variance of $X = \Sigma x_i^2 P_i - (\Sigma x_i P_i)^2$ | $\frac{1}{2}$ | |
| | | $= 3 - 9/4$ | $\frac{1}{2}$ | |
| | | $= 3/4$ | | |

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