GOVERNMENT OF KARNATAKA
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD
II YEAR PUC EXAMINATION SUPPLEMENTARY AUGUST-2022
SCHEME OF VALUATION

MATHEMATICS **SUBJECT CODE : 35**

INSTRUCTIONS:

i) Strictly follow the scheme of valuation to maintain uniformity.
ii) Answer by alternate method should be valued and suitably awarded.
iii) All answers including extra, strike off and repeated should be valued. Answers with maximum marks awarded must be considered.
iv) Highlight the mistakes in the answer by underlining or circling them and suitable award marks.
v) Write the question number if not written or rewrite if written wrong.
vi) In part A, award marks for direct answers.

Q.No.	PART-A	Marks
1.	$(1,2) \in R$ *but* $(2,1) \notin R \quad \therefore R$ *is not symmetric*	1
2.	*A binary operation* $*$ *on a set A is a function* $*: A \times A \to A$	1
3.	*Writing* $[-1,1]$	1
4.	*Writing* $\quad tan^{-1}(-\sqrt{3}) = \frac{-\pi}{3}$	1
5.	$A = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$	1
6.	Getting $x = \pm 2\sqrt{2}$	1
7.	*Getting* $\quad \frac{dy}{dx} = 2Sec^2(2x+3)$ *OR* $Sec^2(2x+3)2$	1
8.	*Getting* $\quad \frac{dy}{dx} = e^{cosx}(-sinx)$	1
9.	*Getting* $\quad I = -\cos x + \sin x + C$	1
10.	*Getting* $I = 1$	1
11.	*A Vector whose magnitute is one, that is* $\lvert\bar{a}\rvert = 1$	1
12.	$\overrightarrow{AB} = -3\hat{\imath} - 5\hat{\jmath} - 4\hat{k}$	1
13.	*Writing* $\quad 0, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$ *OR* $cos90^0, cos135^0, cos45^0$	1
14.	A set of values of the variables satisfying all the constraints is known as a feasible region.	1
15.	*Getting* $P(A\lvert B) = \frac{16}{25} = 0.64$	1

PART-B

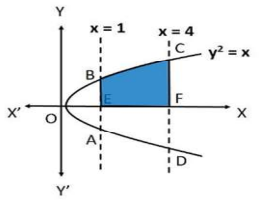
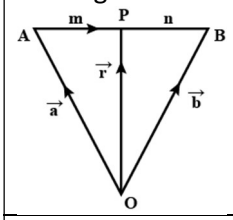
16.	$Getting\ a * b = \frac{ab}{2} = \frac{ba}{2} = b * a, \forall a, b \in Q \quad \therefore is\ Commutative$	1
	Getting $(a * b) * c = \left(\frac{ab}{2}\right) * c = \frac{\left(\frac{ab}{2}\right)c}{2} = \frac{abc}{4}$ and $a * (b * c) = a * \left(\frac{bc}{2}\right) = \frac{a\left(\frac{bc}{2}\right)}{2} = \frac{abc}{4} \therefore is\ Associative$	1
17.	$Let\ sin^{-1}x = y$ $Then, x = siny = cos\left(\frac{\pi}{2} - y\right)$	1
	$Getting \quad sin^{-1}x + cos^{-1}x = \frac{\pi}{2}$	1
18.	$Getting \quad tan^{-1}(1) - sin^{-1}\left(\frac{1}{2}\right) + \left[\pi - cos^{-1}\left(\frac{1}{2}\right)\right]$	1
	$Getting \quad = \frac{\pi}{4} - \frac{\pi}{6} + \frac{2\pi}{3} = \frac{3\pi - 2\pi + 8\pi}{12} = \frac{9\pi}{12} = \frac{3\pi}{4}$	1
19.	Getting $2x = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix} - y = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix} - \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} -2 & -2 \\ -4 & -2 \end{bmatrix}$	1
	$Getting \quad x = \begin{bmatrix} -1 & -1 \\ -2 & -1 \end{bmatrix}$	1
20.	Writing $Area\ of\ \triangle le = \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}\ OR\ \frac{1}{2}\begin{vmatrix} 3 & 3 & 1 \\ -4 & 2 & 1 \\ 5 & 1 & 1 \end{vmatrix}$	1
	Getting $Area\ of\ \triangle le = \frac{61}{2}\ Sq.Units$	1
21.	Writing $2x + x\frac{dy}{dx} + y + 2y\frac{dy}{dx} = 0$	1
	Getting $\frac{dy}{dx} = -\frac{(2x+y)}{(x+2y)}$	1
22.	$Let\ x = tan\theta, \theta = tan^{-1}x\ \ OR\ \ cos^{-1}\left(\frac{1 - tan^2\theta}{1 + tan^2\theta}\right)$	1
	$\frac{dy}{dx} = \frac{2}{1 + x^2}$	1
23.	$Getting \quad \frac{dy}{dx} = 3x^2 + sec^2x$	1
	$Getting \quad \frac{d^2y}{dx^2} = 6x + 2sec^2x\ \ tanx$	1
24.	$Getting \quad \frac{dy}{dx} = 3x^2 - 1$	1
	Getting $\left(\frac{dy}{dx}\right)_{x=2} = 3(2)^2 - 1 \ \ = 11$	1

25.	Writing $\frac{1}{2}\int[sin7x - sinx]\,dx$	1
	Getting $-\frac{1}{14}cos7x + \frac{1}{2}cosx + c$	1
26.	Writing $put\ tan\sqrt{x} = t \Rightarrow dt = \frac{sec^2\sqrt{x}}{2\sqrt{x}}dx \Rightarrow 2dt = \frac{sec^2\sqrt{x}}{\sqrt{x}}dx$	1
	Getting $\frac{2}{5}tan^5\sqrt{x} + c$	1
27.	Getting $I = \int_0^{\pi/2} cos^2x\,dx$ $I = \int_0^{\pi/2} sin^2x\,dx$	1
	Getting $2I = \int_0^{\pi/2}(cos^2x + sin^2x)\,dx \Rightarrow I = \frac{\pi}{4}$	1
28.	Order is 2	1
	Degree is 1	1
29.	Writing $\bar{a} = \frac{\bar{a}}{\lvert\bar{a}\rvert} = \frac{5\hat{\imath}+j+2k}{\sqrt{25+1+4}} = \frac{1}{\sqrt{30}}5\hat{\imath} - j + 2k$	1
	Writing $8a = \frac{8}{\sqrt{30}}(5\hat{\imath} - j + 2k)$	1
30.	Getting $\bar{a} \times \bar{b} = \begin{vmatrix} \hat{\imath} & j & k \\ 3 & 1 & 4 \\ 1 & -1 & 1 \end{vmatrix} = 5\hat{\imath} + j - 4\hat{k}$	1
	Getting Area of Parallelogram $= \sqrt{42}\ Sq.Units\ (Unit\ is\ not\ compulsory)$	1
31.	Writing $cos\theta = \left\lvert\frac{\overrightarrow{b_1}.\overrightarrow{b_2}}{\lvert\overrightarrow{b_1}\rvert\,\lvert\overrightarrow{b_2}\rvert}\right\rvert\ OR\ Getting\ \overrightarrow{b_1}.\overrightarrow{b_2} = 19\ OR\ \lvert\overrightarrow{b_1}\rvert = 7\ and\ \lvert\overrightarrow{b_2}\rvert = 3$	1
	Getting $\theta = cos^{-1}\left(\frac{19}{21}\right)$	1
32.	Writing $P = \frac{\lvert Ax_1+By_1+Cz_1-D\rvert}{\sqrt{A^2+B^2+C^2}}\ OR\ P = \frac{\lvert 0+0+0-6\rvert}{\sqrt{4+9+16}}$	1
	Getting $P = \frac{6}{\sqrt{29}}$	1
33.	Writing $\sum P(x) = 1$	1
	Getting $k = \frac{1}{6}$	1

PART-C

34.	$R = \{(1,3),(2,6),(3,9),(4,12)\}$ $Reflexive: As\ 1 \in R\ but\ (1,1) \notin R \Rightarrow \therefore R\ is\ not\ reflexive$	1
	$Symmetric: As(1,3) \in R\ but\ (3,1) \notin R \Rightarrow \therefore R\ is\ not\ Symmetric$	1
	$Transitive: As\ (1,3) \in R\ and\ (3,9) \in R\ but(1,9) \notin R$ $\therefore R\ is\ not\ transitive.$	1
35.	Writing : $tan^{-1}\left[\frac{2\times\frac{1}{2}}{2-\left(\frac{1}{2}\right)^2}\right] = tan^{-1}\left(\frac{4}{3}\right)$	1
	Getting $tan^{-1}\left[\frac{\frac{4}{3}+\frac{1}{7}}{1-\left(\frac{4}{3}\right)\left(\frac{1}{7}\right)}\right]$	1
	Getting $tan^{-1}\left(\frac{31}{17}\right)$	1

36.	Writing $A = IA \Rightarrow \begin{bmatrix}1 & 3\\ 2 & 7\end{bmatrix} = \begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix} A$	1
	Operate $R_2 \to R_2 - 2R_1 \Rightarrow \begin{bmatrix}1 & 3\\ 0 & 1\end{bmatrix} = \begin{bmatrix}1 & 0\\ -2 & 1\end{bmatrix} A$ Operate $R_1 \to R_1 - 3R_2 \Rightarrow \begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix} = \begin{bmatrix}7 & -3\\ -2 & 1\end{bmatrix} A$	1
	Getting $A^{-1} = \begin{bmatrix}7 & -3\\ -2 & 1\end{bmatrix}$	1
37.	Writing Consider $\Delta = \begin{vmatrix}a_1 & a_2 & a_3\\ b_1 & b_2 & b_3\\ c_1 & c_2 & c_3\end{vmatrix} = a_1b_2c_3 - a_1b_3c_2 - a_2b_1c_3 + a_2b_3c_1 - a_3b_2c_1$	1
	Writing $\Delta_1 = \begin{vmatrix}a_1 & a_2 & a_3\\ c_1 & c_2 & c_3\\ b_1 & b_2 & b_3\end{vmatrix} = -(a_1b_2c_3 - a_1b_3c_2 - a_2b_1c_3 + a_2b_3c_1 + a_3b_1c_2 - a_3b_2c_1)$	1
	Writing Clearly $\Delta_1 = -\Delta$	1
38.	$Getting \;\; y = x^{sinx} \Rightarrow logy = sinx\, logx \; (taking \log on\, both\, side)$	1
	$Getting \;\; \frac{1}{y}\frac{dy}{dx} = sinx.\frac{1}{x} + logx\,.cosx$	1
	$Getting \;\; \frac{dy}{dx} = x^{sinx}\left(\frac{sinx}{x} + cosx.logx\right)$	1
39.	Getting $\frac{dx}{d\theta} = a\theta cos\theta$	1
	Getting $\frac{dx}{d\theta} = a\theta sin\theta$	1
	Getting $\frac{dy}{dx} = \frac{a\theta sin\theta}{a\theta cos\theta} \;\; OR \;\; tan\theta$	1
40.	Writing $f(x) is\, continuous\, in\, [1,4] and\, differentiable\, in\, (1,4)$ $f'(x) = 2x - 4$	1
	Writing $f'(c) = \frac{f(b)-f(a)}{b-a} \;\; OR \;\; f'(c) = \frac{(-3)-(-6)}{4-1}$	1
	Writing $c = \frac{5}{2} \in (1,4)$	1
41.	Writing $f'(x) = 4x - 3$	1
	$Writing \;\; Increasing\, in\, the\, interval \left(\frac{3}{4}, \infty\right)$	1
	$Writing \;\; Decreasing\, in\, the\, interval \left(-\infty, \frac{3}{4}\right)$	1
42.	Writing $\frac{x}{(x+1)(x+2)} = \frac{A}{x+1} + \frac{B}{x+2}$	1
	Getting $A = -1 \; and \; B = 2$	1
	Getting $-\log\lvert x+1\rvert + 2\log\lvert x+2\rvert + C \; OR \log\left\lvert\frac{(x+2)^2}{x+1}\right\rvert + C$	1
43.	Writing $I = \int e^x \frac{(x^2-1+1+1)}{(x+1)^2} dx$	1
	Writing $I = \int e^x \left[\frac{(x^2-1)}{(x+1)^2} + \frac{2}{(x+1)^2}\right] dx$	1
	Getting $e^x \left[\frac{(x-1)}{(x+1)}\right] + C$	1
44.	Writing $I = \int_0^2 (x^2+1)dx \;\; Where, \; f(x) = x^2 + 1$ $\therefore I = \lim_{h\to 0} h\{f(0) + f(0+h) + f(0+2h) + \ldots + \; f(0+(n-1)h)\}$ $Where \;\; nh = 2 - 0 = 2, \quad a = 0 \; and \; b = 2$	1
	Getting $\lim_{h\to 0} h\left\{nh + h^3 \frac{(n-1)(n)(2(n-1)+1)}{6}\right\}$	1
	Getting $I = \frac{14}{3}$	1

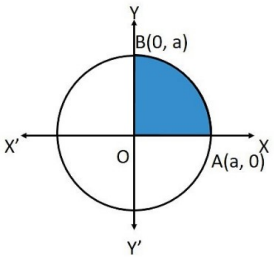
45.	Writing $y = \sqrt{x}, x = 1, x = 4$ OR Writing $Area, A = \int_1^4 \sqrt{x}\, dx$ OR 	1
	Writing $Area = \frac{2}{3}\left[x^{3/2}\right]_1^4$	1
	Getting $Area = \frac{14}{3}$	1
46.	Writing $\frac{dy}{dx} = a\cos(x + b)$	1
	Writing $\frac{d^2y}{dx^2} = -a\sin(x + b)$	1
	Writing $\frac{d^2y}{dx^2} + y = 0$	1
47.	Writing $\frac{sec^2x}{\tan x}dx = -\frac{sec^2y}{\tan y}dy$	1
	Writing $\int \frac{sec^2x}{\tan x}dx = -\int \frac{sec^2y}{\tan y}dy$	1
	Getting $\log\tan x + \log\tan y = \log C$ OR $\therefore \tan x.\tan y = C$	1
48.	Writing 	1
	Writing $\frac{AP}{PB} = \frac{m}{n}$ $Then$ $nAP = mPB$	1
	Getting $\therefore (m+n)\overrightarrow{OP} = m\overrightarrow{OB} + n\overrightarrow{OA}$ OR $\vec{r} = \frac{m\vec{b}+n\vec{a}}{m+n}$	1
49.	Writing $\overrightarrow{AB} = -4\hat{\imath} - 6j - 2k$ $\overrightarrow{AC} = -\hat{\imath} + 4j + 3k$ $\overrightarrow{AD} = -8\hat{\imath} - j + 3k$	1
	Writing $\left[\overrightarrow{AB}\ \overrightarrow{AC}\ \overrightarrow{AD}\right] = \begin{vmatrix} -4 & -6 & -2 \\ -1 & 4 & 3 \\ -8 & -1 & 3 \end{vmatrix}$	1
	Getting $= -60 + 126 - 66 = 0$ $\therefore$ $\overrightarrow{AB}\ \overrightarrow{AC}\ \overrightarrow{AD}$ $are\ coplanar.\ Hence, given\ points\ are\ Coplanar$	1
50.	Writing $Given\ planes\ is\ of\ the\ form$ $(3x - y + 2z - 4) + \lambda(x + y + z - 2) = 0$	1
	Writing $2 + 3\lambda = 0 \Rightarrow \lambda = \frac{-2}{3}$	1
	Getting $\Rightarrow 7x - 5y + 4z - 8 = 0$	1

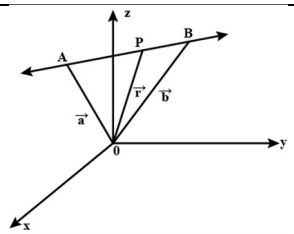
51.	Writing $P(E_1)=\frac{2000}{12000}=\frac{1}{6}$ $P(E_2)=\frac{4000}{12000}=\frac{1}{3}$ $P(E_3)=\frac{6000}{12000}=\frac{1}{2}$ OR $P(E\|E_1)=0.01=\frac{1}{100}$ $P(E\|E_2)=0.03=\frac{3}{100}$ $P(E\|E_3)=\frac{15}{100}$	1
	Writing $\frac{P(E_1\|E)P(E_1)}{P(E_1\|E)P(E_1)+P(E_2\|E)P(E_2)+P(E_3\|E)P(E_3)}$ **OR** $=\frac{\frac{1}{6}\times\frac{1}{100}}{\frac{1}{6}\times\frac{1}{100}+\frac{1}{3}\times\frac{3}{100}+\frac{1}{2}\times\frac{15}{100}}$	1
	Getting $P(E_1\|E)=\frac{1}{52}$	1

PART-D

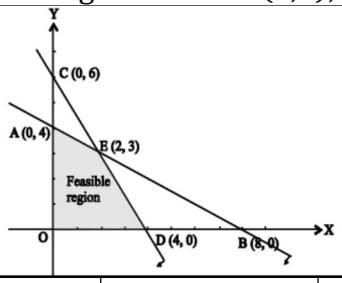
52.	Writing $f(x_1)=f(x_2) \Rightarrow \frac{x_1-2}{x_1-3}=\frac{x_2-2}{x_2-3}$	1
	Getting $x_1=x_2 \therefore f\ is\ one-one$	1
	Writiting $Such\ that\ f(x)=y \Rightarrow \frac{x-2}{x-3}=y$	1
	Getting $x=\frac{3y-2}{y-1}\in A, \therefore f\ is\ on\ to$	1
	Writing $\therefore f\ is\ both\ one-one\ and\ onto$	1
53.	Writing $f(x)=y=4x+3\ x\in R\ and\ getting\ x=\frac{y-3}{4}=g(y)$ OR $f(x_1)=f(x_2)\Longrightarrow 4x_1+3=4x_2+3$	1
	Showing $g\circ f(x)=g(4x+3)=\frac{4x+3-3}{4}=x$ OR Proving $x_1=x_2 \therefore f\ is\ one-one$	1
	Showing $f\circ g(y)=f(\frac{y-3}{4})=4(\frac{y-3}{3})+3=y$ OR $For\ all\ y\in R\ ,there\ exists\ x=\frac{y-3}{4}\in R$	1
	Writing $g\circ f=I_R\ and\ f\circ g=I_R$ OR Showing $f(x)=4x+3=4(\frac{y-3}{4})+3=y$ $\therefore f\ is\ on\ to$	1
	Writing f is invertible and getting $f^{-1}(x)=\frac{x-3}{4}$	1

54.	Getting $A+B=\begin{bmatrix}4 & 1 & -1\\ 9 & 2 & 7\\ 3 & -1 & 4\end{bmatrix}$	1
	Getting $B-C=\begin{bmatrix}-1 & -2 & 0\\ 4 & -1 & 3\\ 1 & 2 & 0\end{bmatrix}$	1
	$(A+B)-C=\begin{bmatrix}0 & 0 & -3\\ 9 & -1 & 5\\ 2 & 1 & 1\end{bmatrix}$	1
	$A+(B-C)=\begin{bmatrix}0 & 0 & -3\\ 9 & -1 & 5\\ 2 & 1 & 1\end{bmatrix}$	1
	Conclusion: $(A+B)-C=A+(B-C)$	1
55.	Writing $A=\begin{bmatrix}1 & 1 & 1\\ 0 & 1 & 3\\ 1 & -2 & 1\end{bmatrix}, X=\begin{bmatrix}x\\ y\\ z\end{bmatrix}$ and $B=\begin{bmatrix}6\\ 11\\ 0\end{bmatrix}$	1
	Writing $AdjA=\begin{bmatrix}7 & -3 & 2\\ 3 & 0 & -3\\ -1 & 3 & 1\end{bmatrix}$ Note : If any 4 Co-factors are correct award 1 mark	2
	Getting $a^{-1}=\frac{1}{\lvert A\rvert}(adjA);\ A^{-1}=\frac{1}{9}\begin{bmatrix}7 & -3 & 2\\ 3 & 0 & -3\\ -1 & 3 & 1\end{bmatrix}$	1
	Getting $x=1, y=2, z=3$	1
56.	Writing $y=3e^{2x}+2e^{3x}$	1
	Getting $\frac{dy}{dx}=6e^{2x}+6e^{3x}$	1
	Getting $\frac{d^2y}{d^2x}=12e^{2x}+18e^{3x}$	1
	Getting $(12e^{2x}+18e^{3x})-5(6e^{2x}+6e^{3x})+6(3e^{2x}+2e^{3x})$	1
	Getting $12e^{2x}+18e^{3x}-30e^{2x}+30e^{3x}+18e^{2x}+12e^{3x}=0$	1
57.	Writing $\frac{dy}{dt}=-5cm/minute \quad \Rightarrow \frac{dy}{dt}=4cm/minute$	1
	Writing $P=2(x+y)$ OR $\frac{dp}{dt}=2\left(\frac{dx}{dt}+\frac{dy}{dt}\right)$	1
	Writing $\frac{dp}{dt}=2(-5+4)=-2\ cm/minute$	1
	Getting $A=xy$ OR $\frac{dA}{dt}=x\frac{dy}{dt}+y\frac{dx}{dt}$	1
	Getting $\frac{dA}{dt}=(8)(4)+(6)(-5)=2\ cm^2/minute$	1

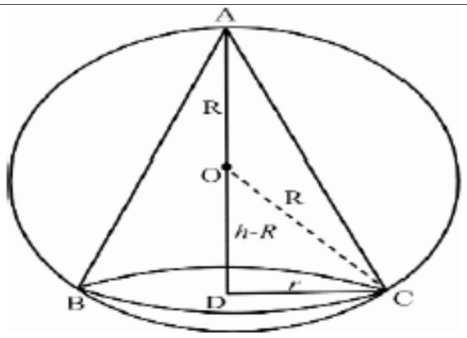
58.	Writing $\int \frac{1}{x^2-a^2}dx = \frac{1}{2a}\int \frac{2a}{x^2-a^2}dx$	1
	Writing $\frac{1}{2a}\int \frac{(x+a)-(x-a)}{x^2-a^2}dx$ $\quad OR \quad$ $\frac{1}{2a}\int \frac{1}{(x-a)} - \frac{1}{(x+a)}dx$	1
	Getting $\frac{1}{2a} log \left\|\frac{x-a}{x+a}\right\| + c$	1
	Getting $\int \frac{1}{(x-4)^2-\left(\sqrt{11}\right)^2}dx$	1
	Getting $\frac{2}{2\sqrt{11}} log \left\|\frac{(x-4)-\sqrt{11}}{(x-4)+\sqrt{11}}\right\| + c$	1
59.		1
	Writing $Area\ of\ Cirlc = 4\int_0^a ydx$ $\quad$ OR $\quad 4\int_0^a \sqrt{a^2-x^2}dx$	1
	Getting $4\left[\frac{x}{2}.\sqrt{a^2-x^2} + \frac{a^2}{2}sin^{-1}\left(\frac{x}{a}\right)\right]_0^a$	1
	Getting $4\left[\left(0 + \frac{a^2}{2}sin^{-1}1\right) - (0+0)\right]$	1
	Getting $4\left[\frac{a^2}{2}.\frac{\pi}{2}\right] = \pi a^2\ Sq.Units.$	1
60.	Writing $\frac{dy}{dx} + \frac{1}{x} \times y = x^2 \Rightarrow \frac{dy}{dx} + Py = Q$	1
	Writing $Where\ P = \frac{1}{x}\ and\ Q = x^2$	1
	Writing $I.F. = e^{\int P dx} = e^{\int \frac{1}{x}dx} = e^{\log(x)} = x$	1
	Getting $y(I.F.) = \int Q(I.F.)dx + c$ OR $yx = \int x^2.x.dx + c$	1
	Getting $\int x^3 dx + c = \frac{x^4}{4} + c$	1

61.		1
	Writing $\overrightarrow{AP} = \lambda\overrightarrow{AB}$ $\overrightarrow{OP} - \overrightarrow{OA} = \lambda(\overrightarrow{OB} - \overrightarrow{OA})$	1
	Writing $\vec{r} - \vec{a} = \lambda(\vec{b} - \vec{a})$ OR $\vec{r} - \vec{a} = \lambda(\vec{b} - \vec{a})$	1
	Getting $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ $\vec{a} = x_1\hat{\imath} + y_1\hat{\jmath} + z_1\hat{k}$ $\vec{b} = x_2\hat{\imath} + y_2\hat{\jmath} + z_2\hat{k}$	1
	Getting $\frac{x-x_1}{x_2-x_1} = \frac{y-y_1}{y_2-y_1} = \frac{z-z_1}{z_2-z_1}$	1
62.	Writing $P(B) = \frac{10}{18}, \quad P(R) = \frac{8}{18}$	1
	Writing $P(RR) = P(R)P(R) = \frac{8}{18} \times \frac{8}{18} = \frac{4}{9} \times \frac{4}{9} = \frac{16}{81}$	1
	Writing $P(BR) = P(B).P(R) = \frac{10}{18} \times \frac{8}{18} = \frac{5}{9} \times \frac{4}{9} = \frac{20}{81}$	1
	Getting $P(BR) + P(RB)$ OR $P(B).P(R) + P(R).P(B)$	1
	Getting $\frac{10}{18} \times \frac{8}{18} + \frac{10}{18} \times \frac{8}{18} = \frac{40}{81}$	1
63.	Writing $n = 10,\ success : p = 5\% = \frac{5}{100} = \frac{1}{20},\ failure : q = 1 - \frac{1}{20} = \frac{19}{20}$	1
	Writing By binomial distribution $P(X = x) = {}^{n}C_x p^x q^{n-x}$	1
	Getting $P(X = x) = {}^{10}C_x \left(\frac{1}{20}\right)^x \left(\frac{19}{20}\right)^{10-x}$	1
	Getting $P(X \leq 1) = P(X = 0) + P(X = 1)$ ${}^{10}C_0 \left(\frac{1}{20}\right)^0 \left(\frac{19}{20}\right)^{10} + {}^{10}C_1 \left(\frac{1}{20}\right)^1 \left(\frac{19}{20}\right)^9$	1
	Getting $\left(\frac{19}{20}\right)^{10} + \left(\frac{10}{20}\right) \left(\frac{19}{20}\right)^9 = \frac{29}{20}\left(\frac{19}{20}\right)^9$	1

PART-E

<table>
<tr><td>64. (a)</td><td>Getting the Points (0,4), (4,0), (2,3), (0,0)</td><td>1</td></tr>
<tr><td></td><td> 
</td><td>2</td></tr>
<tr><td></td><td><table>
<tr><th>Sl.No.</th><th>Corner Points</th><th>Corresponding Value of $z = -3x + 4y$</th></tr>
<tr><td>1.</td><td>O (0,0)</td><td>0</td></tr>
<tr><td>2.</td><td>A (0,4)</td><td>16</td></tr>
<tr><td>3.</td><td>E (2,3)</td><td>6</td></tr>
<tr><td>4.</td><td>D (4,0)</td><td>-12 ← $Minimum$</td></tr>
</table></td><td>2</td></tr>
<tr><td></td><td>Writing $Minimum\ value\ of\ z\ is - 12\ at\ the\ point\ (4,0)$</td><td>1</td></tr>
<tr><td>64.(b)</td><td>Writing $7IA^{-1} = -A^2A^{-1} + 5AA^{-1}$</td><td>1</td></tr>
<tr><td></td><td>Writing $7IA^{-1} = -AI + 5I$</td><td>1</td></tr>
<tr><td></td><td>Writing $7A^{-1} = 5I - A$</td><td>1</td></tr>
<tr><td></td><td>Getting $7A^{-1} = \begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$ OR $A^{-1} = \left[\frac{1}{7}\right]\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$</td><td>1</td></tr>
</table>

<table>
<tr><td>65. (a)</td><td>Writing $x = a - 1,\ then\ dx = -dt$
$Also\ \ x = 0, then\ 0 = a - t\ \Rightarrow t = a\ and\ x = a, then\ a = a - t \Rightarrow t = 0$</td><td>1</td></tr>
<tr><td></td><td>Writing $I = \int_a^0 f(a-t)(-dt)$</td><td>1</td></tr>
<tr><td></td><td>Getting $I = \int_0^a f(a-x)dx$</td><td>1</td></tr>
<tr><td></td><td>Getting $I = \int_0^{\pi/2} \frac{\sqrt{\sin\left(\frac{\pi}{2}-x\right)}}{\sqrt{\sin\left(\frac{\pi}{2}-x\right)}+\sqrt{\cos\left(\frac{\pi}{2}-x\right)}}dx$</td><td>1</td></tr>
<tr><td></td><td>Getting $2I = \int_0^{\pi/2} 1dx$</td><td>1</td></tr>
<tr><td></td><td>Getting $\therefore I = \frac{\pi}{4}$</td><td>1</td></tr>
<tr><td>65.(b)</td><td>Writing $f(5) = 5k + 1$</td><td>1</td></tr>
<tr><td></td><td>Writing $LHL = RHL = f(5)$</td><td>1</td></tr>
<tr><td></td><td>Getting $5k + 1 = 10$</td><td>1</td></tr>
<tr><td></td><td>Getting $k = \frac{9}{5}$</td><td>1</td></tr>
</table>

66. (a)		1
	Writing $V = \frac{1}{3}\pi r^2 h \qquad V = \frac{\pi}{3}(2h^2R - h^3)$	1
	Writing $\frac{dV}{dh} = \frac{\pi}{3}(4hR - 3h^2)$	1
	Getting $4hR - 3h^2 = 0 \quad OR \quad h = \frac{4R}{3} \ \because h > 0$	1
	Getting $V_{max} = \frac{\pi}{3}\left(2 \times \frac{16R^2}{9} \times R - \frac{64R^3}{27}\right)$	1
	Getting $\frac{8}{27} \times \frac{4}{3}\pi R^3 = \frac{8}{27} \times Volume\ of\ a\ Sphere$	1
66.(b)	Writing $R_2 \to R_2 - R_1 \ and \ R_3 \to R_3 - R_1$	1
	Writing $\begin{vmatrix} 1 & a & a^2 \\ 0 & b-a & b^2-a^2 \\ 0 & c-a & c^2-a^2 \end{vmatrix}$	1
	Getting $(b-a)(c-a)\begin{vmatrix} 1 & a & a^2 \\ 0 & 1 & (b+a) \\ 0 & 1 & (c+a) \end{vmatrix}$	1
	Getting $(b-a)(c-a)(c-b) = (a-b)(b-c)(c-a) = RHS$	1