## CODE:1601- AG-4-IIND TERM-21-22

पजियन क्रमांक

**REG.NO:-TMC-D/79/89/36** 

## **General Instructions:**

Read the following instructions very carefully and strictly follow them:

- 1. The question paper consists of 14 questions divided into 3 sections A, B, C.
- 2. All questions are compulsory.
- 3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
- 4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
- 5. Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study based questions.

## **EXAMINATION 2021 -22(IIND TERM)**

Time : 2	2 Hours Maximum Ma	ırks : 40	
CLASS – XII MATHEMATICS			
Sr. No.	SECTION - A (6 X 2=12)	Marks allocated	
Q.1	Evaluate: $\int \frac{dx}{\cos^2 x (1 - \tan^2 x)}$ .	2	
	OR		
	Evaluate: $\int \frac{e^{5\log x} - e^{4\log x}}{e^{3\log x} - e^{2\log x}} dx$ .		
Q.2	Solve the differential equation : $\frac{d^2y}{dx^2} = e^{-2x}$ .	2	
Q.3	If $\vec{a}$ , $\vec{b}$ & $\vec{c}$ are three vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ & $ \vec{a}  = 3$ , $ \vec{b}  = 5$ , $ \vec{c}  = 7$ , find the angle between $\vec{a}$ & $\vec{b}$ .	2	
Q.4	Find the acute angle between the plane $5x - 4y + 7z - 13 = 0$ and the y-axis.	2	

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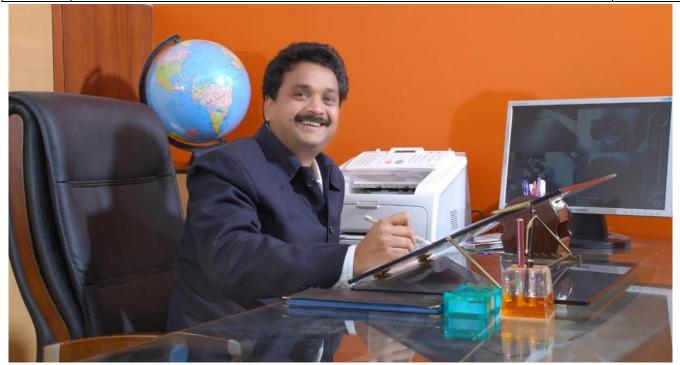
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Q.5	If A and B are two events such that $P(A) = 0.4$ , $P(B) = 0.8 & P(B/A) = 0.6$ , find $P(A/B) & P(A \cup B)$ .	2
Q.6	Three groups of children contain 3 girls and 1 boy; 2 girls and 2 boys; 1 girl and 3 boys respectively. One child is selected at random from each group. Find the chance that the three selected comprise one girl and 2 boys.	2
	SECTION – B $(3 \times 4 = 12)$	
Q.7	Evaluate: $\int \frac{\cos^2 x}{\cos^2 x + 4\sin^2 x} dx.$	3
Q.8	Find the particular solution of the differential equation $(y-\sin x)dx + (\tan x)dy = 0$ satisfying the condition that $y = 0$ when $x = 0$ . OR  Solve the differential equation: $(3xy + y^2)dx + (x^2 + xy)dy = 0$ .	3
Q.9	The scalar product of the vector $\hat{i} + \hat{j} + \hat{k}$ with a unit vector along	3
	the sum of the vectors $2\hat{i} + 4j - 5k$ and $\lambda \hat{i} + 2j + 3k$ is equal to 1.	
	Find the value of $\lambda$ .	
Q.10	Show that the lines $\vec{r} = \vec{a} + \lambda \vec{b}$ & $\vec{r} = \vec{b} + \mu \vec{a}$ are coplanar and the plane containing them is given by $\vec{r} \cdot (\vec{a} \times \vec{b}) = 0$ .	3
	OR	
	Show that the equation of a plane, which meets the axes in A, B and C and the given centroid of the triangle ABC is the point $(\alpha, \beta, \gamma)$ , is $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 3$ . If 3p is distance of plane from origin,	
	show that $\alpha^{-2} + \beta^{-2} + \gamma^{-2} = p^{-2}$ .	
	SECTION - C (4 X 4 = 16)	
Q.11	Evaluate $\int_{-1}^{1} \frac{x^3 +  x  + 1}{x^2 + 2 x  + 1} dx$	4
Q.12	If the area bounded by the parabola $y^2 = 16ax$ and the line $y = 16ax$	4
	$4mx$ is $\frac{a^2}{12}$ sq unit, then using integration find the value of m.	
	OR	
	Find the area of the triangle formed by positive x-axis,	
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	and the normal and tangent to the circle	
	$ x^2 + y^2  = 4$ at $(1, \sqrt{3})$ using integration.	
Q.13	Find the points on the lines $\frac{x-6}{3} = -(y-7) = (z-4)$ and	4
	$\frac{x}{-3} = \frac{y+9}{2} = \frac{z-2}{4}$ which are nearest to each other. Hence find the	
	shortest distance between the given lines.	
Q.14	Suppose a girl throws a die . If she gets a 1 or 2 , she tosses a coin three times and note the number of heads . If she gets a 3 , 4, 5 or 6 , she tosses a coin once and notes whether a heads or tail is obtained . If she obtained exactly one head ;what is the	4
	probability that she threw 3, 4, 5 or 6 with the die.	
	"साधन नहीं संकल्प होनी चाहिए कुछ कर गुज़रने के लिए।"	



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