



CODE:0101-AG-003-IIND TERM-21-22

पञ्चम 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 Hours

Maximum Marks : 40

CLASS – XII

MATHEMATICS

Sr. No.	SECTION – A (6 X 2=12)	Marks allocated
Q.1	Evaluate: $\int e^x(1 + \tan x) \sec x \, dx$. OR Evaluate: $\int \frac{\sin^{-1} x}{(1-x^2)^{3/2}} dx$.	2
Q.2	Find the sum of the degree and the order for the following differential equation $\frac{d}{dx} \left[\left(\frac{d^2 y}{dx^2} \right)^4 \right] = 0$.	2
Q.3	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, find $(\vec{r} \times \hat{i}) \cdot (\vec{r} \times \hat{j}) + xy$.	2
Q.4	The Cartesian equations of a line are $6x - 2 = 3y + 1 = 2z - 2$. Find its direction ratios and also write vector equation of line .	2

Q.5	A die whose faces are marked 1,2,3 in red and 4,5,6 in green, is tossed. Let A be the event “number obtained is even” and B be the event “number obtained is red”. Find if A and B are independent events.	2
Q.6	Two person A and B throw a die alternately till one of them gets a ‘six’ and wins the game. Find their respectively probabilities of winning , if A begins.	2
SECTION – B (3 X 4 = 12)		
Q.7	Evaluate: $\int e^{-2x} \sin 3x dx$.	3
Q.8	Solve the following differential equation: $\sqrt{1+x^2+y^2+x^2y^2} + x$ $y \frac{dy}{dx} = 0$ OR Solve the differential equation: $\frac{dy}{dx} + \frac{y}{x} = \sin x$.	3
Q.9	If $\vec{a}, \vec{b}, \vec{c}$ are vectors such that $\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c}, \vec{a} \times \vec{b} = \vec{a} \times \vec{c} \ \& \ \vec{a} \neq \vec{0}$, then prove that $\vec{b} = \vec{c}$.	3
Q.10	Find the co-ordinates of the foot of perpendicular drawn from the origin to the line joining the points $(-9, 4, 5)$ and $(10, 0, -1)$. OR Find the direction ratios of the normal to the plane, which passes through the points $(1, 0, 0)$ and $(0, 1, 0)$ and makes angle $\frac{\pi}{4}$ which the plane $x + y = 3$. Also find the equation of the plane.	3
SECTION – C (4 X 4 = 16)		
Q.11	Evaluate:	4
Q.12	Make a rough sketch of the region given below and find its area using integration. $\{(x, y) : 0 \leq y \leq x^2 + 3; 0 \leq y \leq 2x + 3; 0 \leq x \leq 3\}$. OR Using the method of integration, find the area of the triangle ABC, coordinates of whose vertices are A $(1, 3)$, B $(2,5)$. C $(3,4)$.	4
Q.13	Find the image p’ of the point P having position vector	4

	$\hat{i} + 3\hat{j} + 4\hat{k}$ in the plane $\vec{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) + 3 = 0$. Hence find the length of PP'.	
Q.14	CASE – STUDY A bag contains 6 white and 9 black balls. Four balls are drawn at a time. Find the probability for the first draw to give 4 white balls and second draw to give 4 black balls in each of the following cases : (i) the balls are replaced before the second draw (ii) the balls are not replaced before the second draw.	4
	सपने वो नहीं है जो हम नींद में देखते हैं, सपने वो है जो हमको नींद नहीं आने देते।	

