



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 Hours

Maximum Marks : 40

CLASS – XII

MATHEMATICS

Sr. No.	SECTION – A (6 X 2=12)	Marks allocated
Q.1	Evaluate: $\int \frac{dx}{\cos^2 x(1 - \tan^2 x)}$. OR Evaluate: $\int \frac{e^{5\log x} - e^{4\log x}}{e^{3\log x} - e^{2\log x}} dx$.	2
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

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 X 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 the sum of the vectors $2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\lambda\hat{i} + 2\hat{j} + 3\hat{k}$ is equal to 1. Find the value of λ .	3
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 $\vec{r} \cdot (\vec{a} \times \vec{b}) = 0$. 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 (α, β, γ) , is $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 3$. If $3p$ is distance of plane from origin, show that $\alpha^{-2} + \beta^{-2} + \gamma^{-2} = p^{-2}$.	3
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 $y = 4mx$ 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,	4

	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 $\frac{x}{-3} = \frac{y+9}{2} = \frac{z-2}{4}$ which are nearest to each other. Hence find the shortest distance between the given lines.	4
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 probability that she threw 3 , 4 , 5 or 6 with the die .	4
	"साधन नहीं संकल्प होनी चाहिए कुछ कर गुज़रने के लिए।"	

