Mathematics (Code-041) Term – 2   <u>SET NO. - 2 / 2022</u>
CHOUDHARY'S Sample Question Paper <u>CLASS: XII</u>
Session: 2021-22

Time Allowed : 2 hours	Maximum Marks: 40

General Instructions:

1. This question paper contains **three sections – A, B and C**. Each part is compulsory.
2. **Section – A** has 6 **short answer type (SA1) questions** of 2 marks each.
3. **Section – B** has 4 **short answer type (SA2) questions** of 3 marks each.
4. **Section – C** has 4 **long answer type questions (LA)** of 4 marks each.
5. There is an **internal choice** in some of the questions.
6. **Q14** is a **case-based problem** having 2 sub parts of 2 marks each.

<u>SECTION – A</u>

1.	Evaluate: $\int \left(\frac{\cos x}{(1-\sin x)(2-\sin x)} \right) dx.$	**2**
2.	Solve the differential equation: $x^2 \frac{dy}{dx} = x^2 + xy + y^2$.	**2**
3.	If $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $\vec{b} = 2\hat{\imath} - \hat{\jmath} + 3\hat{k}$ and $\vec{c} = \hat{\imath} - 2\hat{\jmath} + \hat{k},$ find a unit vector parallel to the vector $2\vec{a} - \vec{b} + 3\vec{c}$. **OR** Find λ, where projection of $\vec{a} = \lambda \hat{\imath} + \hat{\jmath} + 4\hat{k}$ on $\vec{b} = 2\hat{\imath} + 6\hat{\jmath} + 3\hat{k}$ is 4 unit.	**2**
4.	Write the vector equations of a line passing through the point $(1, -1, 2)$ and parallel to the line $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z+1}{-2}$.	**2**
5.	In a college, 30% students fail in Physics, 25% fail in Mathematics and 10% fail in both. One student is chosen at random. Find the probability that she fails in Physics if she has failed in Mathematics.	**2**

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| 6. | If P (A) = $\frac{2}{5}$, P(B)= $\frac{3}{10}$ and P(A ∩ B)= $\frac{1}{5}$, then find the value of P(A′│B′) . | **2** |

SECTION – B

7.	Evaluate: $\int \sqrt{\frac{1-\sqrt{x}}{1+\sqrt{x}}}$ dx. **OR** Evaluate $\int(\frac{x^2+9}{x^4-2x^2+81}$ dx.	**3**
8.	Find a unit vector perpendicular to each one of the vectors $\vec{a} =$ $4 \hat{\imath} -\hat{\jmath} +3\hat{k}$ and $\vec{b} = 2 \hat{\imath} + \widehat{2\jmath} - \hat{k}$.	**3**
9.	Solve the differential equation: $cos\, x.\frac{dy}{dx}$ + y = sin x.	**3**
10.	Find the equation of the plane passing through the points (2, 3, 4) , (5,6,7) and (1,0,0). **OR** Find the shortest distance between the lines: $\vec{r} = \hat{\imath} + \hat{\jmath} + \lambda(2\hat{\imath} - \hat{\jmath} + \hat{k})$ and $\vec{r} = 2\hat{\imath} + \hat{\jmath} - \hat{k} + \mu(3\hat{\imath} -5\hat{\jmath} +2\hat{k})$.	**3**

SECTION – C

11.	Evaluate: $\int_{-1}^{1} \frac{x^3+	x	+1}{x^2+2	x	+1}$ dx.	**4**
12.	Find the area of the region$[(x,y): x^2 \le y \le	x	]$. **OR** Find the area of the region bounded by the line y= 3x + 2, the x-axis and the ordinates x = -1 and x =1.	**4**
13.	Find the foot of the perpendicular drawn from the point (-1,3,-6) to the plane 2x +y-2z+5=0. Also find the equation and length of the perpendicular.	**4**

14.	**CASE STUDY BASED/ DATA- BASED** In an office three employees Rajarshi, Tamanna and Ashlesha process incoming copies of a certain form. Rajarshi process 50% of the forms, Tamanna processes 20% and Ashlesha the remaining 30% of the forms. Rajarshi has an error rate of 0.06, Tamanna has an error rate of 0.04 and Ashlesha has an error rate of 0.03. Based on the above information answer the following:	
	i) Find the total probability of committing an error in processing the form.	**2**
	ii) The manager of the company wants to do a quality check. During inspection he selects a form at random from the days output of processed forms. If the form selected at random has an error, find the probability that the form is NOT processed by Rajarshi.	**2**

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