Mathematics (Code-041) Term – 2   *SET NO. - 1 / 2022*

CHOUDHARY'S Sample Question Paper CLASS: XII

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.

SECTION – A

1.	Evaluate: $\int \dfrac{dx}{(1+x)^{\frac{1}{2}} - (1+x)^{\frac{1}{3}}}$. **OR** Evaluate: $\int \dfrac{(x^2 - 1)dx}{x(x^4 + 3x^2 + 1)^{\frac{1}{2}}}$.	2
2.	Write the sum of the order an degree of the differential equation: $1 + (\frac{dy}{dx})^4 = 7\,(\frac{d^2y}{dx^2})^4$.	2
3.	The position vectors of points A and B are $\vec{a}\ and\ \vec{b}$ respectively. P divides AB in the ratio 3 : 1 and Q is the mid point of AP. Find the position vector of Q.	2
5.	Probabilities of solving a specific problem independently by A	2

	and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, find that **(i)** the problem is solved **(ii)** exactly one of them solves the problem.	
6.	A die marked 1, 2, 3 in **red** and 4, 5, 6 in **green** is tossed. Let A be the event, "number is even" and B be the event, "number is red". Are A and B independent?	**2**

SECTION – B

7.	Evaluate: $\int \frac{1}{\sqrt{sin^3x \, . \, sin(x+\alpha)}}dx$.	**3**
8.	Solve the differential equation: $\frac{dy}{dx} = (3x + y + 4)^2$ OR Find the particular solution of the differential equation $(x^2+y^2)\frac{dy}{dx}$ = xy, given that y =1 when x = 0.	**3**
9.	If $\vec{a} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $\vec{b} = \hat{\jmath} - \hat{k}$, then find a vector $\vec{c}$ such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a}.\vec{c} = 3$.	**3**
10.	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 $\frac{\Pi}{4}$ with the plane x + y = 3. Also, find the equation of the plane. **OR** Show that the lines: $\vec{r} = \hat{\imath} + \hat{\jmath} + \hat{k} + \lambda \, (\hat{\imath} - \hat{\jmath} + \hat{k})$ and $\vec{r} = 4\hat{\jmath} + 2\hat{k} + \mu(2\hat{\imath} - \hat{\jmath} + 3\hat{k})$ are coplanar	**3**

11.	$\int_0^{\Pi} \dfrac{x}{a^2\cos^2 x + b^2 \sin^2 x}\,dx.$	4
12.	Using integration, find the area of the triangle formed by positive x–axis and tangent and normal to the circle $x^2 + y^2 = 4$ at $(1, \sqrt{3}\,)$. **OR** Indicate the region bounded by the curves $x^2 = y$, $y = x + 2$ and x-axis and obtain the area enclosed by them.	4
13.	A plane which is perpendicular to two planes 2x - 2y + z = 0 and x – y- 2z = 4, passes through (1, -2, 1). Find the distance of the plane from the point (1, 2, 2).	4
14.	**CASE STUDY BASED / DATA- BASED** In a family there are four children. All of them have to work in fields to earn their livelihood at the age of 15. Based on the above information, answer the following questions:	
	i) Find the Probability that all children working in fields are boys if it is given that elder child working in fields	2

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	is a boy.	
	ii) Find the probability that two middle child working in fields are boys if it is given that first child working in fields is a girl.	**2**

PREPARED BY: S. D. CHOUDHARY,7278207830,SET NO.- 1/2022

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