INDIAN SCHOOL SOHAR
PRE-BOARD II EXAMINATION (2021-22)
MATHEMATICS (041)

CLASS: XII **MAX. MARKS: 40**

DATE: 05/04/2022 **TIME ALLOWED: 2 HOURS**

General Instructions:

1. The 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 **Short Answer Type (LA)** questions of 4 marks each
5. There is an **internal choice** in some of the questions
6. Q 14 is a **case based problem** having 2 sub parts of 2 marks each

	SECTION A	
1	Evaluate $\int \frac{e^{2x}-1}{e^{2x}+1}dx$ **[OR]** Evaluate $\int \frac{cosx-sinx}{1+sin2x}dx$	2
2	Solve $\frac{dy}{dx}$ = y tan x : y = 1 and x = 0	2
3	If $\vec{a} = 2\,\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$, $\vec{b} = -\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ and $\vec{c} = 3\,\hat{\imath} + \hat{\jmath}$ are such that $\vec{a} + \alpha\,\vec{b}$ is perpendicular to $\vec{c}$, then find the value of α	2
4	Show that the line through the points (4, 7, 8), (2, 3, 4) is parallel to the line through the points (-1, -2, 1) , (1, 2, 5)	2
5	A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is six. Find the probability that it is actually six	2
6	A die is thrown twice and the sum of the numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once?	2
	SECTION B	
7	Evaluate $\int e^{2x}\ sinx\ dx$	3
8	Solve ; $x\,dy - y\,dx = \sqrt{x^2+y^2}$ dx **[OR]** $Solve\ ;\ \frac{dy}{dx} - 3y\,cotx = sin2x\ ;\ y = 2\ when\ x = \frac{\pi}{2}$	3
9	If $\hat{\imath} + \hat{\jmath} + \hat{k}$. $2\,\hat{\imath} + 5\hat{\jmath}$, $3\,\hat{\imath} + 2\hat{\jmath} - 5\hat{k}$ and $\hat{\imath} - 6\hat{\jmath} - \hat{k}$ are the position vectors of A , B , C and D respectively , then find the angle between $\overrightarrow{AB}$ and $\overrightarrow{CD}$. Deduce that $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are collinear	3

10	Find the equation of the plane passing through the intersection of the planes x +y + z = 6 and 2x + 3y + 4z – 5 = 0 , and the point (1,1,1) [OR] Find the coordinates of the point where the line through (3 , -4, -5) and (2 3 , -1) crosses the plane 2x + y + z = 7	3
	SECTION C	
11	Evaluate $\int_{-1}^{\frac{3}{2}} \lvert x \ \sin(\pi x) \rvert \ dx$	4
12	Find the area of the region in the first quadrant enclosed by the x axis the line y = x and the circle $x^2 + y^2 = 32$ **[OR]** Find the area of the smaller part of the circle $x^2 + y^2 = a^2$ cutoff by the line $\frac{a}{\sqrt{2}}$	4
13	Find the distance between the point P (6 , 5, 9) and the plane determined by the points A(3 , -1, 2) , B (5 , 2, 4) and C (-1 , -1 , 6)	4
	CASE BASED QUESTION 	
14	A doctor is to visit a patient. From the past experience it is known that the probabilities he will come by rain , bus , scooter or by other means of transport are respectively $\frac{3}{10}, \frac{1}{5}, \frac{1}{10}, and\ \frac{2}{5}$. The probabilities he will be late are $\frac{1}{4}, \frac{1}{3}, and\ \frac{1}{12}$, if he comes by train , bus and scooter respectively , but if he comes by other means of transport , then he will not be late. When he arrives , he is late . Based on the above situation answer the following	
	What is the probability he comes by train	2
	What is the probability he comes by scooter	2