Session : 2021-2022

Math_XII | Sample Mock Paper Class 12th SA2 (Paper 3)

Name : ..... **Date : 05-03-2022**

Time : 120 Mins **M.M. : 40**

General Instructions:

1. Question 1 to 6 Short answer type (SA1) questions of 2 Mark each.
2. Question 7 to 10 Short answer type (SA2) questions of 3 Mark each.
3. Question 11 to 14 Long answer type (LA) questions of 4 Mark each.

Q1 Solve the following differential equation: **2**

$$\frac{dy}{dx} = (4x + y + 1)^2$$

Q2 Evaluate **2**

$$\int_0^1 \frac{\log(1+x)}{1+x^2} dx$$

Q3 Verify the following: $\int \frac{(\cos 5x + \cos 4x)}{1 - 2\cos 3x} dx$. **2**

Q4 Write all unit vectors of *XY*-plane. **2**

Q5 Find shortest distance between lines **2**

$$\vec{r} = (1+\lambda)\hat{i} + (2-\lambda)\hat{j} + (\lambda+1)\hat{k}$$

$$\vec{r} = \left(2\hat{i} - \hat{j} - \hat{k}\right) + \mu\left(2\hat{i} + \hat{j} + 2\hat{k}\right).$$

Q6 *P* speaks truth in 70% of the cases and *Q* in 80% of the cases. In what percent of cases are they likely to agree in stating the same fact? **2**

Do you think, when they agree, means both are speaking truth?

Q7 The scalar product of vector $\hat{i} + \hat{j} + \hat{k}$ with the unit vector along the sum of vectors $2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\lambda\hat{i} + 2\hat{j} + 3\hat{k}$ is equal to one. Find the value of λ. **3**

Q8 Evaluate $\int \frac{1}{\sqrt[4]{(x-1)^3 (x+2)^5}} dx$ **3**

Q9 Sketch the region $\{(x, 0) : y = \sqrt{4 - x^2}\}$ and *X*-axis. Find the area of the region using integration. **3**

Q10 Solve the following differential equation **3**

$$x\frac{dy}{dx} = y - x\tan\left(\frac{y}{x}\right)$$

Q11 Evaluate $\int_{-1}^{2}(7x-5)\,dx$ as a limit of sums. **4**

Q12 In a factory, machines *A*, *B* and *C* produce 40%, 40% and 20% items respectively. Of their output 1%, 1% and 3% items are defective. An item is drawn at random from the total production and is found to be defective. Find the probability that this item is produced by the machine *C*. **4**

Q13 Find the equation of plane passing through the line of intersection of planes $\vec{r}\cdot\left(\hat{i}+\hat{j}+\hat{k}\right) = 1$ and $\vec{r}\cdot\left(2\hat{i}+3\hat{j}-\hat{k}\right) + 4 = 0$ and parallel to *x*-axis. **4**

Q14 A manufacturing company makes two types of television sets; one is black and white and the other is colour. The company has resources to make at most 300 sets a week. It takes Rs. 1800 to make a black and white set and Rs. 2700 to make a coloured set. The company can spend not more than Rs. 648000 a week to make television sets. If it makes a profit of Rs. 50 per black and white set and Rs. 675 per coloured set, how many sets of each type should be produced so that the company has maximum profit? Solve the LPP. **4**