



Math_XII | Sample Mock Paper Class 12th SA 2 (Paper 2)

Name :

Date : 01-03-2022

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.

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- Q1 If \vec{a} and \vec{b} are two vectors such that $|\vec{a} + \vec{b}| = |\vec{a}|$, then prove that vector $2\vec{a} + \vec{b}$ is perpendicular to vector \vec{b} . 2
- Q2 Evaluate $\int \frac{\log\left(1 + \frac{1}{x}\right)}{x(1+x)} dx$ 2
- Q3 Two balls are drawn from an urn containing 2 white 3 red and 4 black balls one by one without replacement. What is the probability that at least one ball is red? 2
- Q4 Find the angle between the following pair of lines 2
- $$\frac{x-2}{3} = \frac{y+1}{-2}, z=2 \quad \text{and} \quad \frac{x-1}{1} = \frac{2y+3}{3} = \frac{z+5}{2}.$$
- Q5 Verify the following: $\int \frac{dx}{x\sqrt{x^4-1}}$ 2
- Q6 Solve the following initial value problem : 2
- $$(x+y+1)^2 dy = dx, \quad y(-1) = 0$$
- Q7 If f and g are continuous on $[0, a]$ and satisfy $f(x) = f(a-x)$ and $g(x) + g(a-x) = 2$, show that 3
- $$\int_0^a f(x)g(x) dx = \int_0^a f(x) dx$$
- Q8 Two bags A and B contain 4 white and 3 black balls and 2 white and 2 black balls respectively. From bag A , two balls are drawn at random and then transferred to bag B . A ball is drawn from bag B and is found to be a black ball. What is the probability that the transferred balls were 1 white and 1 black? 3
- Q9 Find the area of the region bounded by the curves $x = 2y - y^2$ and $y = 2 + x$. 3
- Q10 If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{j} - \hat{k}$, find a vector \vec{c} such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a} \cdot \vec{c} = 3$. 3
- Q11 Evaluate: $\int_0^{\pi/2} \frac{dx}{(a^2 \cos^2 x + b^2 \sin^2 x)^2}$ 4

- Q12 Find the particular solution of the differential equation $(\tan^{-1} y - x)dy = (1 + y^2) dx$, given that when $x = 0, y = 0$ 4
- Q13 Find the equation of plane passing through the line of intersection of planes $2x + y - z = 3$ and $5x - 3y + 4z + 9 = 0$ and parallel to line $\frac{x-1}{2} = \frac{y-3}{4} = \frac{z-5}{5}$. 4
- Q14 A company makes 3 model of calculators; A, B and C at factory I and factory II. The company has orders for atleast 6400 calculators of model A, 4000 calculators of model B and 4800 calculators of model C. At factory I, 50 calculators of model A, 50 of model B and 30 of model C are made everyday; at factory II, 40 calculators of model A, 20 of model B and 40 of model C are made everyday. It costs Rs. 12000 and Rs. 15000 each day to operate factory I and II, respectively. Find the number of days each factory should operate to minimise the operating costs and still meet the demand 4