CBSE EXAMINATION PAPER-2022

MATHEMATICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 48

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **18 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 1** are case based questions

iv. **Section B** – questions number **2 to 8** are very short answer

v. **Section C** – questions number **9 to 14** are short answer

vi. **Section D** – questions number **15 to 18** are long answer

vii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

viii. Use of calculator is NOT allowed.

Section A

Question 1. At the start of a cricket match, a coin is tossed and the team winning the toss has the opportunity to choose to bat or bowl. Such a coin is unbiased with equal probabilities of getting head and tail.

(1)

If such a coin is tossed 2 times, then find the probability distribution of number of tails.

[2 Marks]

(2)

Find the probability of getting at least one head in three tosses of such a coin.

[2 Marks]

Section B

Question 2.

Find the product of the order and the degree of the differential equation $\left[\frac{d}{dx}(xy^2)\right].\frac{dy}{dx} + y = 0$.

[2 Marks]

Question 3.

Find: $\int \sin 3x / \sin x \, dx$

[2 Marks]

Question 4.

Evaluate :

[2 Marks]

Question 5.

□□and □□are two-unit vectors such that |2□□+3□□|=|3□□2□□|Find the angle between □□and □□

[2 Marks]

Question 6.

A pair of dice is thrown. It is given that the sum of numbers appearing on both dice is an even number. Find the probability that the number appearing on at least one die is 3.

[2 Marks]

Question 7.

Probabilities of A and B solving a specific problem are 2/3 and 3/5, respectively. If both of them try independently to solve the problem, then find the probability that the problem is

solved.

[2 Marks]

Question 8.

Write the cartesian equation of the line PQ passing through points P(2, 2, 1) and Q(5, 1, -2). Hence, find the y-coordinate of the point on the line PQ whose z-coordinate is 2.

[2 Marks]

Section C

Question 9.

ABCD is a parallelogram such that $A\square\square=\hat{i}+\hat{j}$ and $B\square\square=2\hat{i}+\hat{j}+\hat{k}$. Find $A\square\square$ and $A\square\square$ Also, find the area of the parallelogram ABCD.

[3 Marks]

Question 10.

Evaluate:

[3 Marks]

Question 11.

Find: $\int 2x/\ x^2+ 3x+2\ dx$

[3 Marks]

Question 12.

Find the particular solution of the differential equation $(y + 3x^2)\ dx/dy = x$, given that y = 1, when x = 1.

[3 Marks]

Question 13.

Find the equation of the plane passing through points (2, 1, 0), (3,- 2,- 2) and (1, 1, -7). Also, obtain its distance from the origin.

[3 Marks]

Question 14.

Find the distance between the lines represented by equations: $x= y-1/2 = z-2/3$ and $x+1$ $y+2/2 = z-1/3$.

[3 Marks]

Section D

Question 15.

Find the distance of the point (-1, -5, -10) from the point of intersection of the line $x-2/3=y+1/4=z-2/12$

and the plane $x - y + z = 5$

[4 Marks]

Question 16.

Evaluate

[4 Marks]

Question 17.

Using integration, find the area of the smaller region enclosed by the curve $4x^2+ 4y^2 = 9$ and the line $2x + 2y = 3$.

[4 Marks]

Question 18.

If the area of the region bounded by the curve $y^2 = 4ax$ and the line $x = 4a$ is $256/3$ sq. units, then using integration, find the value of a, where $a > 0$.

[4 Marks]