

Sample Paper – 2007

Class – XII

Mathematics

Max Marks: 100

Time allowed 3 hours

General Instructions:

1. The question paper consists of three sections A, B and C.
Section A is compulsory for all students. In addition to Section A, every student has to attempt either Section B or Section C.
2. For Section A, Question numbers 1 to 8 are of 3 marks each
Question numbers 9 to 15 are of 4 marks each
Question numbers 16 to 18 are of 6 marks each
3. For Section B / Section C
Question numbers 19 to 22 are of 3 marks each
Question numbers 23 to 25 are of 3 marks each
Question numbers 26 is of 6 marks.
4. All the questions are compulsory.¹
5. Internal choices have been provided in some questions. You have to attempt only one of the choices in such questions.
6. Use of Calculator is not permitted. However, you may ask for logarithmic and statistical tables, if required.

SECTION A

6. If $A = \begin{pmatrix} 6 & -4 \\ -2 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 3 \\ 3 & -1 \end{pmatrix}$, find $(AB)^{-1}$.

7. Using properties of determinants, prove that

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc \left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$$

8. There are 4 positive integers and 3 negative integers, other than zero. If 2 integers are selected at random, find the probability that their product is positive.

Or

If four one digit whole numbers are taken at random and are multiplied together,
find the probability that the last digit in the product is 1, 3, 7 or 9?

1. An integer is chosen at random from the numbers ranging from 1 to 50. What is the probability that the integer chosen is a multiple of 2 or 3 or 5 ?

2. Evaluate: $\int \frac{2 \sin x + 3 \cos x}{4 \cos x + 5 \sin x} dx$

3. Evaluate: $\int \frac{dx}{x + \sqrt{x^2 - 1}}$

4. Solve the differential equation:
given $y(0) = 1$ $\frac{\cos^2 y}{x} + \frac{\cos^2 x}{y} \frac{dx}{dy} = 0$

or

Verify the $y = (P+Qx) e^{4x}$ is a solution of the differential equation $\frac{d^2 y}{dx^2} - 8 \frac{dy}{dx} + 16y = 0$

5. Solve the differential equation : $x \log x \frac{dy}{dx} + y = \frac{2}{x} \log x$

9 Evaluate $\lim_{y \rightarrow 0} \frac{(x+y)^2 \sin(x+y) - x^2 \sin x}{y}$