SAMPLE PAPER

TERM – I EXAMINATION, 2019-20

CLASS – XI

MATHEMATICS

Time allowed: 3 hrs. **Max. Marks: 80**

General Instructions:

a) All the questions are compulsory.
b) The question paper consists of 36 questions, divided into four sections A, B, C and D.
c) Section A comprises of 20 questions of 1 mark each.
d) Section B comprises of 6 questions of 2 marks each.
e) Section C comprises of 6 questions of 4 marks each.
f) Section D consists of 4 questions of 6 marks each.
g) There is no overall choice. However, an internal choice is given in 2 questions of section B, 2 questions of section C and 2 questions of section D. Do only one out of them.

(SECTION – A)

Question numbers 1 to 20 carry 1 mark each

Answer the following as directed.

Mark the correct alternative in each of the following:

1) The number of subsets of a set containing 2n element is
(a) **2**n **(b)** 2^{2n}-1 **(c)** **2**n^2 **(d)** $\mathbf{2}^{2n}$

2) For any two sets A and B, the value of A – B is
(a) $A \cap B'$ **(b)** $A \cap B$ **(c)** $A' \cap B$ **(d)** $A \cup B'$

3) For any set A, the value of $(A')'$
(a) A' **(b)** ϕ **(c)** U **(d) A**

4) If a set A has p elements and another set B has q elements, then the number of elements in A x B is
(a) pq **(b)** p^q **(c)** 2^{pq} **(d)** p + q

5) If f : $f : R \to R$ *given by* $f(x) = \dfrac{2^x}{2^x - 8}$, then the value of f(2) is
(a) 1 **(b)** -1 **(c)** 2 **(d) -2**

6) If cosA = 4/5, then the value of tan A is
(a) 5/4 **(b)** 5/3 **(c)** 4/3 **(d) 3/4**

7) What is the value of $\sin 240^0$.

(a) -1/2 **(b)** 1/2 **(c)** $\frac{\sqrt{3}}{2}$ **(d)** $\frac{-\sqrt{3}}{2}$

8) If $z = 1 + i$, then the value of z^2 is

(a) $1 - i$ **(b)** i-1 **(c)** $2i$ **(d)** $-2i$

9) The value of ${}^{100}C_{25}$ is

(a) ${}^{100}C_{75}$ **(b)** ${}^{100}C_{50}$ **(c)** 2500 **(d)** None

10) If ${}^{n}C_8 = {}^{n}C_5$, then the value of n is

(a) 8 **(b)** 3 **(c)** 13 **(d)** None of these

Fill in the blanks:

11) Find the r^{th} term in the expansion of $\left(x + \frac{1}{x}\right)^{2r}$.

12) How many numbers are there between 99 and 1000 having 7 in the units place?

13) If -32x -2 < -3, then find the value of x.

14) What is the value of $\cos\frac{2\pi}{3}$

15) What is the domain and range of tangent function.

Solve each of the following:

16) Solve for x: $3(6x - 3) - 10 \leq 6(2x - 1)$.

17) How many diagonals can be drawn through 19 points on a circle?

18) Find the 17^{th} term from the end in the expansion of $\left(13x^2 - \frac{1}{2x^2}\right)^{27}$.

19) Find the middle term in the expansion of $\left(2x - \frac{3}{2x}\right)^{2n+1}$.

20) Find the coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$.

(SECTION – B)

Question numbers 21 to 26 carry 2 marks each

21) If U = { a, b, c, d, e, f }, A = { a, b, c }, B = { c, d, e, f }, C = { c, d, e } , and D = { d, e, f }, tabulate the following:

a) $(U \cap D)'$

b) $A \cap (B \cap C)$.

22) If A = { a, b}, B = { 2, 3, 5, 6, 7 } and C = { 5, 6, 7, 8, 9 }, find $A \times (B \cap C)$.

23) Find the value of $\tan 315^0 \cot(-405^0) + \cot 495^0 \tan(-585^0)$.

24) Find the modulus and argument of the given complex number.
$Z = -\ 3i$

25) Solve the inequality for real x: $-15 < \frac{3(x-2)}{5} \leq 0$.

26) A three digit number is formed using the digits 0, 1, 2, …….. 9. Find the number of odd numbers out of these three digit numbers.

(SECTION – C)

Question numbers 27 to 32 carry 4 marks each

27) Solve: $\sin 2x + \sin 4x = 2 \sin 3x$

OR

Solve $2 \sin^2 x + \sin^2 2x = 2$

28) Show that: $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)$

29) Prove that $n^3 + 3n^2 + 5n + 3$ is divisible by 3, for all $n \in N$.

30) If α *and* β *are different complex nimber with* $|\beta| = 1$, *then find* $\left|\frac{\beta - \alpha}{1 - \bar{\alpha}\beta}\right|$.

OR

Express the given complex number in the form of a + ib, where a, b $\in$ R

$$\frac{1}{1+\cos\theta - i\sin\theta}$$

31) How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

32) There are 10 points on a circle. Find out how many chords, triangles, quadrilaterals and pentagons can be drawn by joining points on the circle.

OR

A polygon has 44 diagonals. Find the number of its sides.

(SECTION – D)

Question numbers 33 to 36 carry 6 marks each

33) In a class, 22 students offered Mathematics, 18 students offered Chemistry and 24 students offered Physics. All of them have to offer at least one of the three subjects. Of these, 11 are in both Mathematics and Chemistry, 13 in Chemistry and Physics and 7 have offered all the three subjects. Find,

a) How many students are there in the class?
b) How many students offered only Mathematics?

34) Which of the following relations are functions? Give reasons. If it is a function, determine its domain and range.

a) {(2, 1), (5, 1), (8, 1), (11, 1), (14, 1), (17, 1)}
b) {(2, 1), (4, 2), (6, 3), (8, 4), (10, 5), (12, 6), (14, 7)}

Also, find the domain and range of the following functions:

a) $\frac{x^2-1}{x-1}$ b) $\sqrt{9-x^2}$

OR

Draw the graphs of Absolute value function and greatest integer function. Also, write domain and range of them.

35) Prove that: $\cos\frac{\pi}{7}\cos\frac{2\pi}{7}\cos\frac{4\pi}{7}=\frac{-1}{8}$

OR

Prove that:

$$\frac{\sin 11\theta\sin\theta+\sin 7\theta\sin 3\theta}{\cos 11\theta\sin\theta+\cos 7\theta\sin 3\theta}=\tan 8\theta$$

36) The letters of the word ZENITH are written in all possible orders. How many words are possible if all these words are written out as in a dictionary? What is the rank of the word ZENITH?