INTERNATIONAL INDIAN SCHOOL BURAIDAH

TERM EXAMINATION (2019 –20)

SUBJECT: MATHEMATICS   SET: B   CLASS: XI

Duration: 3Hours   Max. Marks: 80

SECTION A

(Questions number 1 to 20 carry 1 mark each)

1. Find the value of , i^{-35}.

2. If P = {1, 2} , form the set P X P X P.

3. List all the subsets of the set {-1, 0, 1}.

4. The Cartesian product A X A has 9 elements among which are found (-1, 0) and (0, 1). Find the set A.

5. Find the value of , $\dfrac{\cos(\frac{\pi}{2}+x)\,\sin(\pi-x)}{\tan(\pi+x)\,\cot(\frac{3\pi}{2}+x)}$.

6. In how many ways four cards belong to four different suits can choose from a pack of 52 playing cards.

7. In any triangle ABC, if a = 18, b= 24, c= 30, find $\cos A$.

8. Find the multiplicative inverse of 2-3i .

9. Find the degree measure of the angle subtended at the centre of a circle of radius 100cm by an arc of length 22cm.

10. Find the value of , $\csc(-1410^0)$.

11. If **R** is the set of real numbers and **Q** is the set of rational numbers, then what is $R-Q$.

12. Solve, $\sqrt{5}\,x^2 + x + \sqrt{5} = 0$.

13. Find the principle solution of , $\operatorname{cosec} x = -2$.

14. Show the graph of the solution of $5x - 3 \geq 3x - 5$, on a number line.

15. If $\ ^nC_9 = {}^nC_8$, find $\ ^nC_{17}$.

16. X and Y are two sets such that X has 40 elements. $X \cup Y$ has 60 elements and $X \cap Y$ has 10 elements, how many elements does Y have?

17. Solve $5x - 7 < 3$, when x is an integer.

18. Find the value of , $\sin(n+1)x \sin(n+2)x + \cos(n+1)x \cos(n+2)x$.

19. If A and B are two disjoint sets, then what is $A \cap B$.

20. A function f is defined by f(x) = 2x- 5, find the value of x, when f(x) = 11.

SECTION B

(Questions number 21 to 26 carry 2 marks each)

21. Find the conjugate of, $\dfrac{2+3i}{2-i}$.   **OR**

Find the number of non-zero integral solutions of the equation $\left|1 - i\right|^{x} = 2^x$.

22. Find r, if $\ ^5P_r = 2\ ^6P_{r-1}$.

23. Draw the graph of the function, f(x) =($-x$).

24. Prove that; $\dfrac{\tan(\frac{\pi}{4}+x)}{\tan(\frac{\pi}{4}-x)} = \left(\dfrac{1+tanx}{1-tanx}\right)^2$.

25. Using properties of sets show that , $A \cup (A \cap B) = A$.   **OR**

Draw appropriate Venn diagram representing $A' \cap B'$.

26. Prove that; $\cos(\frac{\pi}{4} + x) + \cos(\frac{\pi}{4} - x) = \sqrt{2}\cos x$.

SECTION C

(Questions number 27 to 32 carry 4 marks each)

27. Find the number of different 8-letter arrangements that can be made from the letters of the word **DAUGHTER** so that all vowels do not occur together.

OR

How many numbers greater than 1000000 can be used by using the digits 1, 2, 0, 2, 4, 2, 4 ?

28. Solve ; $\sin 2x - \sin 4x + \sin 6x = 0$.

29. A = { 1, 2,3, 5} , and B = {4, 6, 9}. Define a relation R from A to B by

R = {(x, y): the difference between x and y is odd ; $x \in A$, $y \in B$ }. Depict this relation using roster form and arrow diagram. Write the domain and range.

30. If $\sin x = \frac{1}{4}$, ; $\frac{\pi}{2} < x < \pi$, find the values of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$.

31. Convert the complex number $\frac{1+7i}{(2-i)^2}$ *in the polar form.*   **OR**

If, $x + iy = \frac{a+ib}{a-ib}$, *prove that* $x^2 + y^2 = 1$.

32. Let A = {x: x is an odd natural number}, B = {x: x is not a multiple of 3},

C = {x: x is not divisible by 5} are subsets of the universal set U = {x: $x \in N$,$x \le 10$ }, then find (i) $A \cap (B \cup C)'$ (ii) $(B - A) \cup (A - C)$.

SECTION D

(Questions number 33 to 36 carry 6 marks)

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 14 in Mathematics and Physics and 7 have offered all the three subjects. Find (i)How many students offered only Mathematics ? (ii)How many

students offered exactly two of the three subjects?   (iii) How many students are there in the class?

34. Find the square root of, **1+i.**

35. Solve graphically; $2x + y \geq 6$; $3x + 4y \leq 12$; $y \geq -1$.

36. In triangle ABC , prove that; $(b + c)\cos\dfrac{B+C}{2} = a\cos\dfrac{B-C}{2}$.   **OR**

Prove that ; $\tan 4x = \dfrac{4\tan x(1-\tan^2 x)}{1-6\tan^2 x+\tan^4 x}$.

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