**SINDHI HIGH SCHOOL, HEBBAL**

**Half Yearly Examination [2024-25]**

**SUB: MATHEMATICS-041**

**Class: 11 Max Marks: 80**

**Date: 30.09.2024 Reading Time: 8:10 a.m-8:25a.m**

**No of Sides: 03 Writing Time: 8:25 a.m-11:25a.m**

**GENERAL INSTRUCTIONS:**

* This Question Paper has 5 Sections A, B, C, D and E.
* **Section A** has 18 MCQs and 02 Assertion and Reason based questions carrying 1 mark each
* **Section B** has 5 questions carrying 02 marks each.
* **Section C** has 6 questions carrying 03 marks each.
* **Section D** has 4question carrying 05 marks each.
* **Section E** has of 3 source based/case based/passage based/integrated units of assessment

(4 marks each) with sub parts.

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|  | **Section A** |  |
|  | **Section A consists of 20 questions of 1 mark each.** |  |
| 1 | Let T ={x: }.Is T an  a)empty set b)singleton set c)infinite set d)none of these. | 1 |
| 2 | Let S = {x:x ,P={x:x is a prime number <20}  Then n(S)+n(P) is  (a)33 ( b)41 ( c)40 ( d)42 | 1 |
| 3 | Let n(A) =m,(B)=n then total number of non empty relations that can be  defined from A to B is  (a) ( b)-1 ( c)mn-1 ( d) | 1 |
| 4 | Given relation then range of the relation contains  (a) 2 elements (b) 4 elements (c) 3 elements (d) 1 element | 1 |
| 5 | The value of sin( is equal to | 1 |
| 6 | The domain of the function f defined by f(x)= + is equal to  a)(- b)  c) d) | 1 |
| 7 | The value of tan is  (a) (b) (c) (d) | 1 |
| 8 | The complex number lying on y axis is  (a) 2i (b) 4-3i (c) 5 (d)1+i | 1 |
| 9 | The conjugate of  (a) (b) (c)(d) | 1 |
| 10 | A wheel makes 270 revolutions in one minute. The number of radians it turns in one second is  (a) (b) (c) (d) | 1 |
| 11 | If (2x,y-x) = (y+3,0) then value of y is  (a)-3 ( b)3 (c)x ( d)-x | 1 |
| 12 | The multiplicative inverse of 4-3i is  (a) (b) ( c) (d) | 1 |
| 13 | The quadratic equation whose A.M is 10 and G.M is 6 is  (a) (b)  (c)0 (d)0 | 1 |
| 14 | .For a sequence whose nth term ,the 5th term is  a)32 b)16 c)-16 d)-32 | 1 |
| 15 | The value of is  a)1/2 b)0 c)1 d)-1 | .  1 |
| 16 | Derivative of tan5x with respect to x is  a)5tan5x b)5cot5x c)5 d) | 1 |
| 17 | If f(x)= then  a) b) c)1 d)1 | 1 |
| 18 | The value of is  a)-1 b)3 c)-3 d)1 | 1 |
| 19 | **In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.**  (a) Both A and R are true and R is the correct explanation of A.  (b) Both A and R are true but R is not the correct explanation of A.  (c) A is true but R is false.  (d) A is false but R is true.  **Assertion**: are in G.P is 1 only  **Reason**: If x,y,z is in G.P then =xz | 1 |
| 20 | **Assertion**: Derivative of with respect to x is 2sinxcosx  **Reason**: For derivative of with respect to ‘x’, we can use chain rule i.e.,  . | 1 |
|  | **Section B**  **(consists of 5 questions of 2 marks each)** |  |
| 21 | Find the modulus of z = | 2 |
| 22 | Find the value of p,if sum to infinity for G.P p,1,1/p……. is | 2 |
| 23 | Solve: | 2 |
| 24 | Prove that cos+cos +cos 125+cos 204+cos300 = | 2 |
| 25 | Evaluate: | 2 |
|  | **Section C**  **(consists of 6 questions of 3 marks each)** |  |
| 26 | Let  .   1. Draw a Venn diagram to represent the relationship between the sets. 2. Hence, list the elements of the following sets:   a) b) c) Is | 3 |
| 27 | Find the domain and range of | 3 |
| 28 | Solve for real x: ; . Represent the same on the number line. | 3 |
| 29 | Prove that i)cos4x = 1-8 | 3 |
| 30 | Find the least value of n for which 1+3+……+n terms is greater than 7000? | 3 |
| 31 | Find the real values of x and y if (x-iy)(3+5i) is the conjugate of -6-24i | 3 |
|  | **Section D**  **(consists of 4 questions of 5 marks each)** |  |
| 32 | Prove that | 5 |
| 33 | Find three numbers in G.P whose sum is 52 and sum of the products in pairs is 624. | 5 |
| 34 | Find the value of ‘k’ if exists for the following function f(x) defined by  f(x) = | 5 |
| 35 | Calculate variance and standard deviation for the following   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | classes | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | | frequency | 5 | 8 | 15 | 16 | 6 | | 5 |
|  | **Section E**  **(consists of three case base study questions of 4 marks each)** |  |
| 36 | A relation f from non empty set A to non empty set B is said to be a function,if every element of set A has one and only one image in set B.  If f is a function from set A to set B then we write  f:A and it is read as f is a function from set A to set B.  Let A= {2,3,4,5,6,7,8,9}.  Let R be a relation on A defined by R= {(x,y):x divides y and x  Based on the above information,,answer the following  i).Draw an arrow diagram of R  .ii).Is R a function? Justify.  iii)a).Find the domain and range of R and Write R in Roster form.  OR  iii)b)Sketch the graph of modulus function and write its domain and range. | 4 |
| 37 | A complex number z is pure real if and only if =z and is purely imaginary if and only if =-z  Based on the above information,,answer the following  i) if (1+i)z =(1-i) then then prove that = -z  ii)Find the conjugate of  iii)a)If x and y are real numbers and the complex number  **+** is pure real,then find relation between x and y.  OR  iii)b)The number of bacteria in a certain culture doubles every hour..If there were 30 bacteria present in the culture originally, How many bacteria will be present at the end of 2nd hour,4th hour, and nth hour. | 4 |
| 38 | After explaining the operations on sets, the teacher wrote these sets A={2,3,4,5} B={6,7,8}C={x: x is a prime number less than 10}.She asked the students to do the following operations.  i)Find (A and represent it in Venn diagram.  ii)Find(A and represent it in Venn diagram. | 4 |