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| **HY/MA/1119B 19/11/2019** | | | | | | | |
| **HALF YEARLY EXAMINATION (2019 - 20)** | | | | | | | |
| **SUBJECT: MATHEMATICS**  **GRADE: XI** | | | | MAX. MARKS: 80TIME: 3 Hrs | | | |
| **General Instructions**   * *This question paper consists of 3 printed pages.* * *All questions should be written in the answer sheet provided.* * *Section A consists of 20 questions of 1 mark each.* * *Section B consists of 6 questions of 2 marks each.* * *Section C consists of 6 questions of 4 marks each.* * *Section D consists of 4 questions of 6 marks each.* | | | | | | | |
| **SECTION A** | | | | | | | |
| 1. | If A and B are disjoint sets then is equal to | | | | | | |
|  | (a) | (b) | | | (c) | | (d) |
| 2. | Two finite sets have m and n elements. The number of elements in the power set of first set is 48 more than the number of elements in the power set of the second. The values of m and n are: | | | | | | |
|  | (a) 7 , 6 | | (b) 6 , 3 | | (c) 6 , 4 | (d) 7 , 4 | |
| 3. | If R is a relation from a finite set A having m elements to a finite set B with n elements, then number of relations from A to B is | | | | | | |
|  | (a) | | (b) | | (c) | (d) | |
| 4. | The value of is | | | | | | |
|  | (a) | | (b) | | (c) 1 | (d) 0 | |
| 5. | The value of | | | | | | |
|  | (a) 2 | | (b) 0 | | (c) 1 | (d) | |
| 6. | There are 12 points in a plane. The number of straight lines joining any two of them when 3 of them are collinear is | | | | | | |
|  | (a) 62 | | (b) 63 | | (c) 64 | (d) 65 | |
| 7. | If the coefficients of and terms in the expansion of are equal, r is equal to | | | | | | |
|  | (a) 5 | | (b) 6 | | (c) 4 | (d) 3 | |
| 8. | The value of | | | | | | |
|  | (a) 1 | | (b) 3 | | (c) 9 | (d) 27 | |
| 9. | The angle between the lines and | | | | | | |
|  | (a) | | (b) | | (c) | (d) | |
|  |  | | | | | | |
| 10. | The eccentricity of the hyperbola whose latus rectum is half of its transverse axis is | | | | | | |
|  | (a) | | (b) | | (c) | (d) | |
| 11. | The arithmetic and geometric means of 2 numbers are 25 and 20 respectively. The numbers are \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | |
| 12. | If , and both *A* and *B* are in the second quadrant, then = \_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | |
| 13. | If , then the value of is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | |
| 14. | The number of terms in the expansion of is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | |
| 15. | The sum of the focal distances (PF1 + PF2) of any point *P* on the ellipse is \_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | |
| 16. | Find the center of the circle which passes through the origin and cuts off intercepts of length 6 and 8 from the axes. | | | | | | |
| 17. | Find the distance between the parallel lines and | | | | | | |
| 18. | The first term of a G.P is 1. The sum of the third and fifth terms is 90. Find the common ratio of the G.P. | | | | | | |
| 19. | The marks scored by Rohit in two tests were 65 and 70. Find the minimum he should score in the third test to have an average of at least 65 marks. | | | | | | |
| 20. | Find the standard form of the complex number | | | | | | |
| **SECTION B** | | | | | | | |
| 21. | Find the domain and range of the function, | | | | | | |
| 22. | If and and , show that *z* is purely real. | | | | | | |
| 23. | In how many ways can 5 boys and 3 girls be seated in a row so that no two girls are together? | | | | | | |
| 24. | Find the value of *a* so that the term independent of *x* in is 405.  **OR**  Find the coefficient of in the expansion . | | | | | | |
| 25. | Find the sum of the following series: 0.7 + 0.77 + 0.777 + …………………………….. to *n* terms.  **OR**  The sum of *n* terms of two arithmetic progressions are in the ratio (3n+8) : (7n+5).Find the ratio of their 12th terms. | | | | | | |
| 26. | Find the equation of the ellipse whose axes are along the coordinate axes, foci at and eccentricity . | | | | | | |
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| **SECTION C** | | | | | | | |
| 27. | In a survey of 100 students, the number of students studying various languages were found to be: English only 18, English but not Hindi 23, English and Sanskrit 8, English 26, Sanskrit 48, Sanskrit and Hindi 8, no language 24. Find   1. How many students were studying Hindi? 2. How many students were studying English and Hindi? | | | | | | |
| 28. | Prove the following by the principle of mathematical induction, is divisible by 25 for all *n* . | | | | | | |
| 29. | Graphically solve the system of linear inequalities: | | | | | | |
| 30. | How many words can be formed by taking 4 letters at a time out of the letters of the word MATHEMATICS.  **OR**  A number of four different digits is formed with the help of the digits 1, 2, 3, 4, 5, 6 in all possible ways. Find:  (a) how many of these are even?  (b) how many of these are exactly divisible by 4?  (c) how many of these are exactly divisible by 25? | | | | | | |
| 31. | Find the distance of the line, from the point (1, 2) along the line . | | | | | | |
| 32. | Find the equation of a circle passing through (4,1) and (6,5) and whose center is on the line .  **OR**  The cable of a uniformly loaded suspension bridge hangs in the form of a parabola. The roadway which is horizontal and *100m* long is supported by vertical wires attached to the cable, the longest wire being *30m* and the shortest being *6m*. Find the length of the supporting wire attached to the roadway *18m* from the middle. | | | | | | |
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| **SECTION D** | | | | | | | |
| 33. | Find the image of the point (1, 2)in assuming the line to be a plane mirror.  **OR**  If *p*, *q* are lengths of perpendiculars from the origin to the lines: and respectively. Prove that | | | | | | |
| 34. | Show that, .  Hence find the general solution of . | | | | | | |
| 35. | Find the sum of first *n* terms of the series: 3 + 7 + 13 + 21 + 31 + …………………….. to n terms. | | | | | | |
| 36. | The second, third and fourth terms of the expansion of are 240, 720 and 1080. Find the values of *x*, *a*  and *n*. | | | | | | |

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