**GRADE 12**

**FIRST TERM EXAMINATION (2021-2022)**

TIME: 90 minutes MARKS: 40

|  |  |  |  |  |  |  |  |  |  |
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| ***Section – A***  ***In this section, attempt any 16 questions out of 1 – 20.***  ***Each Question is of 1 mark weightage.*** | | | | | | | | | |
|  | | | | | | | | | |
| **1.** | If A={a,b,c} and B = {4,5,6}, then the number of functions from A to B is | | | | | | | | |
|  | 1. 9 | | | 1. 27 | 1. 18 | | | | 1. 81 |
| **2.** | An optimization problem may involve finding: | | | | | | | | |
|  | 1. Maximum profit | | | 1. Minimum cost | 1. Minimum use of resources | | | | 1. All of the above |
| **3.** | Which of the following corresponds to the principal value branch of ? | | | | | | | | |
|  |  | | |  |  | | | |  |
| **4.** | If two matrices A and B are of order & respectively, can be subtracted only if | | | | | | | | |
|  | 1. p = q | | | 1. p = q , r = s | 1. P = r, q = s | | | | 1. None of these |
| **5.** | For the set A = {1,2,3}, define a relation R in the set A as follows  R = {(1,1), (2,2) , (3,3) , (1,3)}  Then the ordered pair to be added to r to make it the smallest equivalence relation is: | | | | | | | | |
|  | 1. (1,3) | | | 1. (3,1) | 1. (2,1) | | | | 1. (1,2) |
| **6.** | If , the value of is: | | | | | | | | |
|  |  | | |  |  | | | |  |
| **7.** | The interval in which the function ‘f’ given by is strictly increasing, is | | | | | | | | |
|  |  | | |  |  | | | |  |
| **8.** | If then X is equal to | | | | | | | | |
|  |  | | |  |  | | | | 1. None of these |
| **9.** | Which one of the following is not true? | | | | | | | | |
|  | 1. Matrix addition is commutative | | | 1. Matrix addition is associative | 1. Matrix multiplication is commutative | | | | 1. Matrix multiplication is associative |
| **10.** |  | | | | | | | | |
|  | 1. [-1] | | |  |  | | | | 1. Not defined |
| **11.** | The function given by is | | | | | | | | |
|  | 1. Continuous & differentiable at x=1 | | | 1. Discontinuous but differentiable at x=1 | 1. Continuous but not differentiable at x=1 | | | | 1. Neither continuous nor differentiable at x=1 |
| **12.** | If AB = C, the orders of matrices A,B,C are | | | | | | | | |
|  |  | | |  |  | | | |  |
| **13.** | If then is equal to | | | | | | | | |
|  |  | | |  |  | | | |  |
| **14.** | The function defined by is discontinuous at: | | | | | | | | |
|  | 1. All rational points | | | 1. All irrational points | 1. All integral points | | | | 1. None of the above |
| **15.** | If then is equal to: | | | | | | | | |
|  |  | | |  |  | | | |  |
| **16.** | The condition are called | | | | | | | | |
|  | 1. Restrictions only | | | 1. Negative restrictions | 1. Non-negative restrictions | | | | 1. None of the above |
| **17.** | The function is : | | | | | | | | |
|  | 1. Continuous everywhere but not differentiable at x = 0 | | | 1. Continuous & differentiable everywhere | 1. Not continuous at x=0 | | | | 1. None of the above |
| **18.** | The differential coefficient of w.r.t ‘x’ is | | | | | | | | |
|  |  | | | b) | c) | | | | d) |
| **19.** | The absolute minimum value of is | | | | | | | | |
|  | 1. 0 | | | 1. -2 | 1. 2 | | | | 1. 1 |
| **20.** | The function f(x) = tan x- x | | | | | | | | |
|  | 1. Always increases | | | 1. Always decreases | 1. Never increases | | | | 1. Sometimes increases & sometimes decreases |
|  | ***Section B***  ***In this section, attempt any 16 questions out of the questions 21 – 40.***  ***Each Question is of 1 mark weightage.*** | | | | | | | | |
| **21.** | If are 2 functions from defined as then for x<0 is | | | | | | | | |
|  | 1. 4x | | | 1. 2x | 1. 0 | | | | 1. -4x |
| **22.** | The maximum value of slope of the curve is | | | | | | | | |
|  | 1. 0 | | | 1. 12 | 1. 16 | | | | 1. 32 |
| **23.** | If | | | | | | | | |
|  |  | | |  |  | | | |  |
| **24.** | If and then ‘a’ is equal to | | | | | | | | |
|  | 1. 1 | | | 1. -1 | 1. -i | | | | 1. i |
| **25.** | The curves | | | | | | | | |
|  | 1. touch each other | | | 1. cut at right angle | 1. cut at an angle | | | | 1. cut at an angle |
| **26.** | The function is strictly | | | | | | | | |
|  | 1. increasing in | | | 1. decreasing in | 1. decreasing in | | | | 1. decreasing in |
| **27.** | The function has a stationary point at: | | | | | | | | |
|  | 1. x = e | | | 1. x = | 1. x = 1 | | | | 1. x = |
| **28.** | Corner points of the feasible region for an LPP are (0,2), (3,0), (6,0), (6,8) and (0,5).  Let F = 4x + 6y be the objective function. The minimum value of F occurs at: | | | | | | | | |
|  | 1. (0,2) only | | | 1. (3,0) only | 1. The midpoint on the line segment joining the points (0,2) & (3,0) only | | | | 1. Any point on the line segment joining the points (0,2) and (3,0) |
| **29.** | For real numbers x and y, define xRy iff is an irrational number. Then the relation R is | | | | | | | | |
|  | 1. Reflexive | | | 1. Symmetric | 1. Transitive | | | | 1. None of these |
| **30.** | Let , where is equal to | | | | | | | | |
|  |  | | |  | | |  | | 1. None of these |
| **31.** | If is equal to | | | | | | | | |
|  | 1. 0 | | | 1. 1 | | | 1. 2 | | 1. 3 |
| **32.** | If  is continuous at x= 0, then k is equal to: | | | | | | | | |
|  | 1. -4 | | | 1. -3 | | | 1. -2 | | 1. -1 |
| **33.** | If then the value of is | | | | | | | | |
|  | 1. a3 | | | 1. a6 | | | 1. a9 | | 1. a23 |
| **34.** | If & then the expression which is not defined is | | | | | | | | |
|  |  | | |  | | |  | | 1. AB |
| **35.** | If , then is equal to: | | | | | | | | |
|  |  | | | b) | | | c) | | d)None of these |
| **36.** | The derivative of with respect to is: | | | | | | | | |
|  | a) | | b) | | | c) | | d) None of these | |
| **37.** | If , then the value of in terms of y | | | | | | | | |
|  |  | |  | | |  | | 1. None of these | |
| **38.** | Let A be an invertible matrix. Which of the following is not true? | | | | | | | | |
|  | a) | | b) | | |  | |  | |
| **39.** | The value of is | | | | | | | | |
|  | 1. 0 |  | | | |  | |  | |
| **40.** | The value of is | | | | | | | | |
|  |  |  | | | |  | |  | |
|  | ***Section C***  ***In this section, attempt any 8 questions out of the questions.***  ***Each Question is of 1 mark weightage.***  ***Questions 46- 50 are based on case study*** | | | | | | | | |
| **41.** | If then = | | | | | | | | |
|  |  | | |  |  | | | |  |
| **42.** | If then is equal to: | | | | | | | | |
|  |  |  | | | |  | |  | |
| **43.** | The domain of the function is | | | | | | | | |
|  | 1. [0,1] | 1. [-1,1] | | | | 1. (-1,1) | | 1. [0, | |
| **44.** |  | | | | The feasible region for an LPP is shown in the figure. Then the maximum value of **Z= 5x + 7y** | | | | |
|  | 1. 47 | | | 1. 43 | | | 1. 45 | | 1. 49 |
| **45.** | Let be defined by then ‘f’ is | | | | | | | | |
|  | 1. One-one but not onto | 1. One- one & onto | | | | 1. Onto but not one-one | | 1. Neither one-one nor onto | |
|  | **CASE STUDY** | | | | | | | | |
|  | A man has a square shape piece of golden board of size 24 cm which is to be made into a box without top by cutting from each corner and folding the flaps to form a box.  Use the figure given to answer the following questions: | | | |  | | | | |
| **46.** | Volume of the open box formed by folding up the flap is given by  a)  b)  c)  d) | | | | | | | | |
| **47.** | In the first derivative test, if changes its sign from positive to negative as x increases through C1 then function attains  a) Local maxima at x = C1  b) Local minima at x = C1  c) Neither maxima nor minima at x = C1  d) none of these | | | | | | | | |
| **48.** | What should be the side of the square piece to be cut from each corner of the board to hold maximum volume?  a) 14 cm  b) 12 cm  c) 4 cm  d) 5 cm | | | | | | | | |
| **49.** | What should be the maximum volume of open box?  a) 1034  b) 1024  c) 1204  d) 4021 | | | | | | | | |
| **50.** | The cost of the box if the rate of making the box is Rs 5 per cm, when the volume is maximum is  a) Rs 2560  b) Rs 2840  c) Rs 3840  d) Rs 2040 | | | | | | | | |

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