

## SECOND REVISION EXAMINATION - FEBRUARY - 2020

## X STANDARD

Reg. No. 

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Time: 3.00 Hours

Mathematics

Marks: 100

Instructions: (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately  
(2) Use Blue or Black ink to write and pencil or draw diagrams.

Note:- This question paper contains four parts.

## Part - A

Note: (i) Answer all the 14 questions.

14×1=14

(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.

- 1) Let  $n(A) = m$  and  $n(B) = n$ , then the total number of non-empty relations that can be defined from A to B is
  - a)  $m^n$
  - b)  $n^m$
  - c)  $2^{mn} - 1$
  - d)  $2^{mn}$
- 2)  $f(x) = (x+1)^3 - (x-1)^3$  represents a function which is
  - a) linear
  - b) Cubic
  - c) reciprocal
  - d) quadratic
- 3) Using Euclid's division lemma, if the cube of any positive integer is divided by 9, then the possible remainders are
  - a) 0, 1, 8
  - b) 1, 4, 8
  - c) 0, 1, 3
  - d) 1, 3, 5
- 4) The value of  $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$  is
  - a) 14400
  - b) 14200
  - c) 14280
  - d) 14520
- 5) The solution of  $(2x-1)^2 = 9$  is equal to
  - a) -1
  - b) 2
  - c) -1, 2
  - d) None of these
- 6) Find the value of x if  $(4 \ 3 \ 2) \begin{pmatrix} 1 \\ -2 \\ x \end{pmatrix} = (6)$ 
  - a) -4
  - b) 3
  - c) 2
  - d) 1
- 7) If  $\Delta ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5$  cm, then AB is
  - a) 2.5 cm
  - b) 5 cm
  - c) 10 cm
  - d)  $5\sqrt{2}$  cm
- 8) If  $(5, 7)$ ,  $(3, p)$  and  $(6, 6)$  are collinear, then the value of p is
  - a) 3
  - b) 6
  - c) 9
  - d) 12

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- 9) When proving that a quadrilateral is a trapezoid, it is necessary to show.
- 1) two lines are parallel
  - 2) two parallel and two non-parallel sides.
  - 3) opposite sides are parallel
  - 4) all sides are of equal length.
- 10)  $(\tan 45^\circ + \cot 45^\circ) + (\sec 45^\circ \operatorname{cosec} 45^\circ) = \underline{\hspace{2cm}}$
- a) 1
  - b) 2
  - c) 3
  - d) 4
- 11)  $a \cot \theta + b \operatorname{cosec} \theta = p$  and  $b \cot \theta + a \operatorname{cosec} \theta = q$ , then  $p^2 - q^2$  is equal to
- a)  $a^2 - b^2$
  - b)  $b^2 - a^2$
  - c)  $a^2 + b^2$
  - d)  $b - a$
- 12) If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is
- a) 3.5
  - b) 3
  - c) 4.5
  - d) 2.5
- 13) The probability that a non leap year will have 53 Saturdays is
- 
- a)  $1/7$
  - b)  $2/53$
  - c)  $2/7$
  - d)  $1/53$
- 14) If the radius of the base of a cone is tripled and the height is doubled then the volume is
- a) made 6 times
  - b) made 18 times
  - c) made 12 times
  - d) unchanged

## Part - II

Note: (i) Answer any Ten questions:

(ii) Question No. 28 is compulsory

10×2=20

15) Find the least positive value of  $x$  such that  $67 + x \equiv 1 \pmod{4}$

16) Find the excluded values, if any, in the expression  $\frac{x^2 + 6x + 8}{x^2 + x - 2}$

17) If  $A = \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix}$ ,  $B = \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$ , find  $2A + B$

18) Let  $X = \{3, 4, 6, 8\}$  Determine whether the relation  $R = \{x, f(x) / x \in X, f(x) = x^2 + 1\}$  is a function from  $X$  to  $N$ ?

19) If  $3 + k$ ,  $18 - k$ ,  $5k + 1$  are in A.P, then find  $k$ .

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- 20) Represent the function  $f(x) = \sqrt{2x^2 - 5x + 3}$  as a composition of two functions.
- 21) Check whether the given lines are parallel or perpendicular.  
 $5x + 23y + 14 = 0$  and  $23x - 5y + 9 = 0$
- 22) From the top of a rock  $50\sqrt{3}$  m high, the angle of depression of a car on the ground is observed to be  $30^\circ$ . Find the distance of the car from the rock.
- 23) Find the equation of a line passing through the point (3, -4) and having slope  $-5/7$ .
- 24) A coin is tossed thrice, What is the probability of getting two consecutive tails?
- 25) The length of the tangent to a circle from a point p, which is 25 cm away from the centre is 24 cm. What is the radius of the circle.
- 26) Find the diameter of a sphere whose surface area is  $154 \text{ m}^2$ .
- 27) Find the range and Coefficient of range of the following data:  
 25, 67, 48, 53, 18, 39, 44.
- 28) Find the nature of the roots for the quadratic equation:  $x^2 - 16 = 0$ .

## Part - III

Note: (i) Answer any Ten questions:

(ii) Question No. 42 is compulsory.

10×5=50

- 29) Find the sum of  $9^3 + 10^3 + \dots + 21^3$ .
- 30) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.
- 31) If  $f(x) = x - 4$ ,  $g(x) = x^2$ ,  $h(x) = 3x - 5$ . Show that  $(f \circ g) \circ h = f \circ (g \circ h)$
- 32) Let  $A = \{1, 2, 3, 4\}$ ,  $B = \{2, 5, 8, 11, 14\}$  be two sets. Let  $f: A \rightarrow B$  be a function given by  $f(x) = 3x - 1$  Represent the function  
 (i) by arrow diagram (ii) in a tablee form  
 (iii) as a set of orderd pairs (iv) in a graphical form.
- 33) If  $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$  Show that  $A^2 - 5A + 7I_2 = 0$
- 34) Find the values of m and n if  $x^4 - 8x^3 + mx^2 + nx + 16$  is a perfect square.
- 35) A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through (-3, 8). Find its equation.
- 36) If the points A(-3, 9), B(a, b), C(4, -5) are collinear and if  $a + b = 1$ , then only a and b.

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- 37) From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are  $45^\circ$  and  $30^\circ$  respectively. Find the height of the second tree ( $\sqrt{3} = 1.732$ )
- 38) A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.
- 39) 4 persons live in a conical tent whose slant height is 19 cm. If each person require  $22 \text{ cm}^2$  of the floor area, then find the height of the tent.
- 40) The marks scored by the students in a slip test are given as follows. Find the standard deviation of their marks.
- |   |   |   |   |    |    |
|---|---|---|---|----|----|
| x | 4 | 6 | 8 | 10 | 12 |
| f | 7 | 3 | 5 | 9  | 5  |
- 41) Two dice are rolled once. Find the probability getting an even number on the first die or a total of face sum 8.
- 42) State and prove Pythagoras theorem.

## Part - IV

Answer all the questions:

2×8=16

- 43) a) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

[or]

- b) Construct a triangle similar to a given triangle PQR with its sides equal to  $\frac{7}{4}$  of the corresponding sides of the triangle PQR.  
(Scale factor  $\frac{7}{4} > 1$ )

- 44) a) Draw the graph of  $y = 2x^2$  and hence Solve  $2x^2 - x + 6 = 0$ .

(or)

- b) Graph the following quadratic equation and state their nature of solutions.  $x^2 + 4x + 4 = 0$

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