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## COMMON FIRST REVISION TEST - 2020

Standard X  
MATHEMATICSReg.No.: 

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Marks: 100

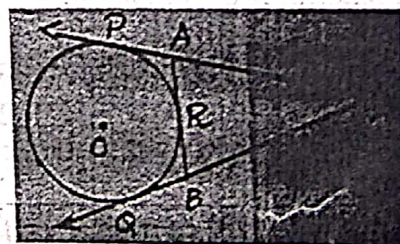
Time: 3.00 hours.

Part - I

14 x 1 = 14

## I. Choose the correct answer:

1. If the ordered pairs  $(a+2, 4)$  and  $(5, 2a+b)$  are equal, then  $(a, b)$  is  
 a)  $(2, -2)$       b)  $(5, 1)$       c)  $(2, 3)$       d)  $(3, -2)$
2. If  $f: A \rightarrow B$  is a bijective function and if  $n(B) = 7$ , then  $n(A)$  is equal to  
 a) 7      b) 49      c) 1      d) 14
3. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is  
 a) 2025      b) 5220      c) 5025      d) 2520
4. The next term of the sequence  $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$  is  
 a)  $\frac{1}{24}$       b)  $\frac{1}{27}$       c)  $\frac{2}{3}$       d)  $\frac{1}{81}$
5.  $y^2 + \frac{1}{y^2}$  is not equal to  
 a)  $\frac{y^4+1}{y^2}$       b)  $(y + \frac{1}{y})^2$       c)  $(y - \frac{1}{y})^2 + 2$       d)  $(y + \frac{1}{y})^2 - 2$
6. If the number of columns and rows are not equal in a matrix, then it is said to be a  
 a) diagonal matrix      b) rectangular matrix  
 c) square matrix      d) identity matrix
7. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?  
 a) 13 m      b) 14 m      c) 15 m      d) 12.8 m
8. In figure, CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If  $CP = 11$  cm and  $BC = 7$  cm, then the length of BR is  
 a) 6 cm      b) 5 cm  
 c) 8 cm      d) 4 cm



9. If slope of the line PQ is  $\frac{1}{\sqrt{3}}$ , then the slope of the perpendicular bisector of PQ is  
 a)  $\sqrt{3}$       b)  $-\sqrt{3}$       c)  $\frac{1}{\sqrt{3}}$       d) 0

10. If the given line  $\frac{y}{2} = x - p$  passes through the point  $(-4, 4)$ , then value of p is

a) -4      b) -6      c) 0      d) 8

11. If  $(\sin\alpha + \operatorname{cosec}\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$ , then the value of k is equal to

a) 9      b) 7      c) 5      d) 3

12. The relationship between the height and radius of the hemisphere is \_\_\_\_\_  
 a) equal      b) unequal      c) increasing      d) decreasing

13. If a letter is chosen at random from the English alphabets (a,b,...,z), then the probability that the letter chosen precedes x
- a)  $\frac{12}{13}$       b)  $\frac{1}{13}$       c)  $\frac{23}{26}$       d)  $\frac{3}{26}$
14. If S is the standard deviation of values p,q,r then standard deviation of p-3, q-3, r-3 is \_\_\_\_\_.
- a) 3S      b) S + 3      c) S - 3      d) S

## Part - II

II. Answer any 10 questions: (Ques.No.28 is compulsory)

10 x 2 = 20

15. Let  $A = \{1, 2, 3\}$  and  $B = \{x / x \text{ is a prime number less than } 10\}$ . Find  $B \times A$ .
16. If  $13824 = 2^a \times 3^b$ , then find a and b
17. Prove that  $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$
18. A relation 'f' is defined by  $f(x) = x^2 - 2$ , where  $x \in \{-2, -1, 0, 3\}$   
i) List the elements of f    ii) Is 'f' a function?
19. Find the number of terms in the A.P: 3, 6, 9, 12, ..... 111
20. If  $\Delta ABC$  is similar to  $\Delta DEF$  such that  $BC = 3$  cm,  $EF = 4$  cm and area of  $\Delta ABC = 54$  cm<sup>2</sup>, find the area of  $\Delta DEF$ .
21. Show that the points P(-1.5, 3), Q(6, -2), R(-3, 4) are collinear.
22. If the total surface area of a cone of radius 7 cm is 704 cm<sup>2</sup>, then find its slant height.
23. If A and B are two mutually exclusive events of a random experiment and  $P(\text{not } A) = 0.45$ ,  $P(A \cup B) = 0.65$ , then find  $P(B)$ .
24. If the ratio of radii of two spheres is 4 : 7, find the ratio of their volumes.
25. The equation of a straight line is  $2(x - y) + 5 = 0$ . Find its slope, inclination and intercept on the y-axis.
26. Find the average of first 100 natural numbers.
27. Find the LCM of the following polynomials:  $p^2 - 3p + 2$ ,  $p^2 - 4$
28. Consider the given information regarding the number of men and women workers in three factories I, II and III.  
Represent the given information in the form of a matrix. What does the entry in the second row and first column represent.

Factory	Men	Women
I	23	18
II	47	36
III	15	16

## Part - III

III. Answer any 10 questions: (Ques.No.42 is compulsory)

10 x 5 = 50

29. Let  $A = \{x \in W / x < 2\}$ ,  $B = \{x \in N / 1 < x \leq 4\}$ ,  $C = \{3, 5\}$ . Verify that  $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. If the function  $f : R \rightarrow R$  is defined by

$$f(x) = \begin{cases} 2x+7, & x < -2 \\ x^2-2, & -2 \leq x < 3 \\ 3x-2, & x \geq 3 \end{cases}$$

-3, -4, -5, 3  
-2, -1, 1, 2  
3, 4, 5  
find the values of

- i)  $f(4)$     ii)  $f(-2)$     iii)  $f(4) + 2f(1)$     iv)  $\frac{f(1)-3f(4)}{f(-3)}$

Ans: R.T.E. p.16

31. If  $A = \begin{pmatrix} 1 & 1 \\ -1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 2 \\ -4 & 2 \end{pmatrix}$ ,  $C = \begin{pmatrix} -7 & 6 \\ 3 & 2 \end{pmatrix}$ , verify that  $A(B + C) = AB + AC$

32. Find the sum of the series :  $6^2 + 7^2 + 8^2 + \dots + 21^2$

33. Find the area of the quadrilateral whose vertices are at  $(-9, -2)$ ,  $(4, a)$  and  $(6, -3)$   $(1, -3)$

34. P and Q are the mid-points of the sides CA and CB respectively of a  $\Delta ABC$ ,  $\therefore$  angled at C. Prove that  $4(AQ^2 + BP^2) = 5AB^2$

35. Find the sum to n series  $5 + 55 + 555 + \dots$

36. Simplify :  $\frac{1}{x^2 - 5x + 6} + \frac{1}{x^2 - 3x + 2} - \frac{1}{x^2 - 8x + 15}$

37. If  $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$  and  $x \sin \theta = y \cos \theta$ , then prove that  $x^2 + y^2 = 1$

38. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter.

39. If A, B, C are any three events such that the probability of B is twice as that of probability of A and probability of C is thrice as that probability of A and if  $P(A \cap B) = \frac{1}{8}$ ,

$P(B \cap C) = \frac{1}{4}$ ,  $P(A \cap C) = \frac{1}{8}$ ,  $P(A \cup B \cup C) = \frac{9}{10}$ ,  $P(A \cap B \cap C) = \frac{1}{15}$ , then find  $P(A)$ ,  $P(B)$  and  $P(C)$

40. The time taken (in minutes) to complete a home work by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the coefficient of variation.

41. If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, find the volume of the frustum.

42. Find the square root of the following polynomial by division method:

$37x^2 - 28x^3 + 4x^4 + 42x + 9$

### Part - IV

#### IV. Answer all the questions:

$2 \times 8 = 16$

43. a) Draw a triangle ABC of base  $BC = 8$  cm,  $\angle A = 60^\circ$  and the bisector of  $\angle A$  meets BC at D such that  $BD = 6$  cm.

(or)

b) Take a point which is 11 cm away from the centre of a circle of diameter 6 cm. Also measure the lengths of the tangents.

44. a) Discuss the nature of the solutions of the following quadratic equation.

$x^2 - 8x + 16 = 0$

(or)

b) Draw the graph of  $y = x^2 - 5x - 6 = 0$  and hence solve  $x^2 - 5x - 14 = 0$

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$B^2$   
 $16$   
 $64$   
 $16$   
 $82$

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