



COMMON THIRD REVISION TEST – 2023

Standard X

Reg.No. :

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MATHEMATICS

Time: 3.00 hrs.

Part - I

Marks : 100

14 x 1 = 14

I. Choose the correct answer:

1. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is
a) 8 b) 20 c) 12 d) 16
2. If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
a) $(-1, 2)$ b) $(2, -1)$ c) $(-1, -2)$ d) $(1, 2)$
3. 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) $\frac{1}{81}$
4. $a^b = b^a$, then the value of a and b is
a) 2, 3 b) 2, 4 c) 4, -2 d) 2, -4
5. Which of the following should be added to make $x^4 + 64$ a perfect square?
a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$
6. Graph of a linear polynomial is a :
a) straight line b) circle c) parabola d) hyperbola
7. If $\triangle ABC$ 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. In a $\triangle ABC$, AD is the bisector of $\angle BAC$. If $AB = 8$ cm, $BD = 6$ cm and $DC = 3$ cm. The length of the side AC is
a) 6 cm b) 4 cm c) 3 cm d) 8 cm
9. The point of intersection of $3x - y = 4$ and $x + y = 8$ is
a) (5, 3) b) (2, 4) c) (3, 5) d) (4, 4)
10. The slope of the straight line $7x - \frac{3}{17} = 0$ is
a) 7 b) $-\frac{3}{17}$ c) 0 d) Undefined
11. The value of $\sin^2 \theta + \frac{1}{1 + \tan^2 \theta}$ is equal to
a) $\tan^2 \theta$ b) 1 c) $\cot^2 \theta$ d) 0
12. A tower is 60 m high. Its shadow is x metres shorter when the sun's altitude is 45° than when it has been 30° , then x is equal to
a) 41.92 m b) 43.92 m c) 43 m d) 45.6 m
13. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
a) 2:1 b) 1:2 c) 4:1 d) 1:4
14. The range of the data 8, 8, 8, 8, 8... 8 is
a) 0 b) 1 c) 8 d) 3

(2)
Part - II

10 x 2 = 20

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

15. 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?
16. Find the value of k , such that $f \circ g = g \circ f$ for the following: $f(x) = 2x - k$, $g(x) = 4x + 5$
17. Find the next 3 terms of the sequence: 5, 2, -1, -4,
18. Using Euclid's Division Lemma, find the LCM of 24 and 42.
19. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.
20. Find the values of x, y and z from the following equation:

$$\begin{pmatrix} x + y + z \\ x + z \\ y + z \end{pmatrix} = \begin{pmatrix} 9 \\ 5 \\ 7 \end{pmatrix}$$
21. 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?
22. Find the value of 'a', if the line through $(-2, 3)$ and $(8, 5)$ is perpendicular to $y = ax + 2$.
23. Prove that $\frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$
24. A kite is flying at a height of 75m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string.
25. Find the diameter of a sphere whose surface area is 154 m^2
26. Find the volume of the iron used to make a hollow cylinder of height 9 cm and whose internal and external radii are 21cm and 28cm respectively.
27. If the mean and coefficient of variation of data are 15 and 48 respectively, then find the value of standard deviation.
28. In a two children family, find the probability that there is at least one girl in a family

Part - III

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

10 x 5 = 50

29. Let $A = \{x \in \mathbb{N} / 1 < x < 4\}$, $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} / x < 3\}$. Then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by $t(C) = F$ where $F = \frac{9}{5}C + 32$. Find
(i) $t(0)$ (ii) $t(28)$ (iii) $t(-10)$ (iv) the value of C when $t(C) = 212$
(v) the temperature when the Celsius value is equal to the Fahrenheit value
31. Determine the general term of an AP. whose 7th term is -1 and 16th term is 17
32. Find the sum to n terms of the series: $0.4 + 0.44 + 0.444 + \dots$ to n terms
33. If $A = \frac{2x+1}{2x-1}$, $B = \frac{2x-1}{2x+1}$, find $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$



(3)

X Maths

34. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$, show that $(AB)^T = B^T A^T$
35. State and prove Basic Proportionality theorem
36. Find the value of k , if the area of a quadrilateral is 79 sq. units, whose vertices are taken in order $(8, 6)$, $(5, 11)$, $(-5, 12)$ and $(-4, k)$
37. You are downloading a song. The percent y (in decimal form) of mega bytes remaining to get downloaded in x seconds is given by $y = -0.1x + 1$
- Find the total MB of the song.
 - After how many seconds will 75% of the song gets downloaded?
 - After how many seconds the song will be downloaded completely?
38. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meter and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.
39. If the radii of the circular ends of a frustum which is 45 cm high are 28cm and 7cm, find the volume of the frustum
40. Find the variance and standard deviation of the wages of 9 workers given below: Rs. 310, Rs. 290, Rs. 320, Rs. 280, Rs. 300, Rs. 290, Rs. 320, Rs. 310, Rs. 280
41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.
42. Find the square root of $289x^4 - 612x^3 + 970x^2 - 684x + 361$

Part - IV

IV. Answer all the questions.

2 x 8 = 16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (scale factor $\frac{3}{5} < 1$)
- (OR)**
- b) Draw a circle of radius 4.5cm. Take a point on the circle. Draw the tangent at that point using the alternate-segment theorem.
44. a) Graph the following linear function $y = \frac{1}{2}x$. Identify the constant of variation and verify it with the graph. Also
- find y when $x = 9$
 - find x when $y = 7.5$
- (OR)**
- b) Graph the following quadratic equation and state its nature of solutions:
 $x^2 - 9x + 20 = 0$
