COMMON QUARTERLY EXAMINATION - SEPTEMBER 2019

Standard 10

Reg No. ☐☐☐☐☐☐

Time Allowed: 2.30 Hours **MATHEMATICS** Maximum 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 underline and pencil to draw diagrams.

Note: This question paper contains four parts.

PART - I [MARKS : 14]

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.

iii) Each question carries 1 mark.

1) $f(x) = (x+1)^3-(x-1)^3$ represents a function which is

a) linear b) cubic c) reciprocal d) quadratic

2) If $n(A) = p$ and $n(B) = q$ then $n(A\times B) =$ _____.

a) $p+q$ b) $p-q$ c) $p\times q$ d) $\frac{p}{q}$

3) If $x-6$ is the HCF of $x^2-2x-24$ and x^2-kx-6 then the value of k is

a) 3 b) 5 c) 6 d) 8

4) $y^2+\frac{1}{y^2}$ is not equal to

a) $\frac{y^4+1}{y^2}$ b) $\left(y+\frac{1}{y}\right)^2$ c) $\left(y-\frac{1}{y}\right)^2+2$ d) $\left(y+\frac{1}{y}\right)^2-2$

5) Product of the roots of the quadratic equation $x^2+3x = 0$ is

a) -3 b) 3 c) 0 d) 1

6) $7^{4k} \equiv$ _____ (mod 100)

a) 1 b) 2 c) 3 d) 4

7) The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18},$ _____ is

a) 1/24 b) 1/27 c) 2/3 d) 1/81

8) A sequence is a function defined on the set of _____.

a) Real numbers b) Natural numbers

c) Whole numbers d) Integers

9) In ΔLMN, $\angle L = 60^\circ$, $\angle M = 50^\circ$, if $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
a) 40° b) 70° c) 30° d) 110°

10) If in ΔABC, DE || BC, AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is
a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm

11) The area of triangle formed by the points (−5, 0), (0, −5) and (5, 0) is
a) 0 sq.units b) 25 sq.units c) 5 sq.units d) none of the these

12) The inclination of a line whose slope = 1 is
a) 0° b) 30° c) 45° d) 60°

13) $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ - is equal to
a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$

14) The range of the data 8, 8, 8, 8, 8, ...8 is
a) 0 b) 1 c) 8 d) 3

PART - II [MARKS : 20]

Answer any TEN questions: [Question No. 28 is compulsory] **10×2=20**

Each questions carries 2 marks.

15) If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ find A and B.

16) 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 is a function?

17) Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

18) Which term of an A.P. 16, 11, 6, 1, ... is −54?

19) Reduce the rational expression $\frac{x^2 - 16}{x^2 + 8x + 16}$ to its lowest form.

20) Determine the quadratic equation, whose sum and product of roots are $\frac{-3}{2}$ and −1.

21) If ΔABC is similar to ΔDEF such that BC = 3 cm, EF = 4 cm and area of ΔABC = 54 cm^2. Find the area of ΔDEF.

22) Prove that $\frac{\cos\theta}{1 + \sin\theta} = \sec\theta - \tan\theta$.

23) The standard deviation and mean of a data are 6.5 are 12.5 respectively. Find the co-efficient of variation.

24) What is the slope of a line whose inclination is 30°?

25) The line through the points (−2, a) and (9, 3) has slope $-\frac{1}{2}$, find the value of a.

26) Let A = {1, 2, 3, 4, 5}, B = W and f : A→B is defined by $f(x) = x^2-1$. Find the range of f.

27) If a clock strikes once at 1 O'clock, twice at 2 O'clock, thrice at 3 O'clock and so on, how many times will it strike in a day?

28) Find the zeros of the quadratic expression $x^2+2x-143$.

PART - III [MARKS : 50]

Answer any TEN questions. Question No. 42 is compulsory. **10×5=50**

Each question carries 5 marks.

29) Given A = {1, 2, 3}, B = {2, 3, 5}, C = {3, 4} and D = {1, 3, 5}, check if $(A\cap C)\times(B\cap D) = (A\times B)\cap(C\times D)$ is true?

30) If $f(x) = 3x-2$, $g(x) = 2x+k$ and if f o g = g o f, then find the value of k.

31) The sum of first n, 2n and 3n terms of an A.P are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2-S_1)$.

32) Find the sum of series $6^2+7^2+8^2+.....+21^2$.

33) Find the GCD of the polynomials $3x^4+6x^3-12x^2-24x$, $4x^4+14x^3+8x^2-8x$.

34) Find the square root of the expression $\frac{x^2}{y^2}-\frac{10x}{y}+27-\frac{10y}{x}+\frac{y^2}{x^2}$.

35) State and prove angle bisector theorem.

36) If the points A(−3, 9), B(a, b) and C(4, −5) are collinear and if a+b = 1 then find a and b.

37) Using slope concept, show that the points (1, −4), (2, −3) and (4, −7) form a right angled triangle.

38) If $\sin\theta+\cos\theta = p$ and $\sec\theta+\operatorname{cosec}\theta = q$ then prove that $q(p^2-1) = 2p$.

39) The time taken (in minutes) to complete a homework by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the co-efficient of variation.

40) The number of books read by 8 students during a month are 2, 5, 8, 11, 14, 6, 12 and 10. Calculate the standard deviation of the data.

41) Solve the quadratic equation $5x^2-6x-2 = 0$ by completing the square method.

42) If the 4^{th} and 7^{th} term of Geometric Progression are 54 and 1458 respectively, find the Geometric Progression.

PART - IV [MARKS : 16]

Answer both questions. Each question carries 8 marks. **2×8=16**

43) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR.

(OR)

In ΔABC, if DE || BC, AD = x, DB = x−2, AE = x+2 and EC = x−1 then find the length of the sides AB and AC.

44) Draw the graph of $y = x^2+3x-4$ and hence use it to solve $x^2+3x-4 = 0$.

(OR)

Solve: $\frac{1}{3}(x + y - 5) = y - z = 2x - 11 = 9 - (x + 2z)$

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