

ILAHI ORIENTAL ARABIC HIGH SCHOOL, CUMBUM
GOVERNMENT COMMON QUARTERLY EXAM QUESTION
XTH MATHS (2019-2020)

Time : ¼ min + 2 ½ hrs

Marks : 100

PART – I

Note: (i) Answer all the 14 questions.

(14x1=14)

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

- 1) If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is
(1) 3 (2) 2 (3) 4 (4) 8
- 2) Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f: A \rightarrow B$ given by $f = \{(1,4), (2, 8), (3, 9), (4, 10)\}$ is a
(1) Many – one function (2) Identify function
(3) One to one function (4) Into function
- 3) Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
(1) 0, 1, 8 (2) 1, 4, 8 (3) 0, 1, 3 (4) 1, 3, 5
- 4) An A.P consists of 31 terms. If its 16th term is m, then the sum of all the terms of this A.P is
(1) 16m (2) 62m (3) 31m (4) 3 ½ m
- 5) If $(x-6)$ is the HCF of $x^2-2x-24$ and x^2-kx-6 then the value of K is
(1) 3 (2) 5 (3) 6 (4) 8
- 6) The values of a and b if $4x^4 - 24x^3 + 76x^2 + 9x + b$ is a perfect square are
(1) 100, 120 (2) 10, 12 (3) -120, 100 (4) 12, 10
- 7) If in ΔABC and EDF , $AB/DE = BC/FD$ then they will be similar when
(1) $\angle B = \angle E$ (2) $\angle A = \angle D$ (3) $\angle B = \angle D$ (4) $\angle A = \angle F$
- 8) The perimeters of two similar triangles ΔABC and ΔPQR are 36cm and 24cm respectively. If $PQ = 10$ cm, then the length of AB is:
(1) $6 \frac{2}{3}$ cm (2) $10\sqrt{6} / 3$ cm (3) $66 \frac{2}{3}$ cm (4) 15cm
- 9) If slope of the line PQ is $1/\sqrt{3}$ then slope of the perpendicular bisector of PQ is
(1) $\sqrt{3}$ (2) $-\sqrt{3}$ (3) $1/\sqrt{3}$ (4) 0
- 10) When proving that a quadrilateral is a trapezium it is necessary to show
(1) Two sides are parallel (2) Two parallel and two non-parallel sides
(3) Opposite sides are parallel (3) All sides are of equal length

- 11) The value of $\sin^2\theta + 1 / 1 + \tan^2\theta$ is equal to
 (1) $\tan^2\theta$ (2) 1 (3) $\cot^2\theta$ (4) 0
- 12) $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta)$ is equal to
 (1) 0 (2) 1 (3) 2 (4) -1
- 13) Variance of first 20 natural number is
 (1) 32.25 (2) 44.25 (3) 33.25 (4) 30
- 14) If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is
 (1) 3.5 (2) 3 (3) 4.5 (4) 2.5

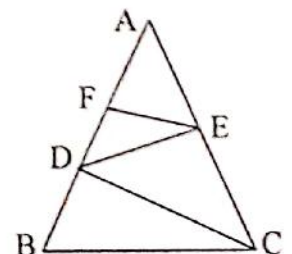
PART – II

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

(10x2=20)

- 15) Let $f(x) = 2x+5$, if $x \neq 0$ then find $\frac{f(x+2) - f(2)}{x}$
- 16) The distance S and object travels under the influence of gravity in time 't' seconds is given by $S(t) = \frac{1}{2}gt^2 + at + b$ where, (g is the acceleration due to gravity), a, b , are constants. Check if the function $S(t)$ is one – one
- 17) Solve $8x \equiv 1 \pmod{11}$
- 18) Find the sum of first 15 terms of A.P.
 $8, 7 \frac{1}{4}, 6 \frac{1}{2}, 5 \frac{3}{4}, \dots\dots\dots$
- 19) Find the excluded values of the following expressions. $\frac{x^2+6x+8}{x^2+x-2}$
- 20) Determine the quadratic equations, whose sum and products of roots are $-3/2, -1$
- 21) Solve $2x^2 - 3x - 3 = 0$ by formula method
- 22) If $\Delta ABC \sim \Delta DEF$ such that area of ΔABC is 9cm^2 and the area of ΔDEF is 16cm^2 and $BC = 2.1\text{cm}$. Find the length of EF .

23) In figure $DE \parallel BC$ and $CD \parallel EF$. Prove that $AD^2 = AB \times AF$



24) 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.

25) Prove that $\frac{\sqrt{1+\cos\theta}}{\sqrt{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$

26) A wall clock strikes the bell once at 1'o clock, 2 times at 2'o clock, 3 times at 3'o clock and so on. How many times will it strike in a particular day.

27) If $n=5, \bar{x}=6, \sum x^2 = 765$, then calculate the co-efficient of variation.

28) Find the equation of a straight line perpendicular to the line $y = \frac{4}{3}x - 7$ and passing through the point (7, -1).

PART – III

III. Answer only 10 questions.

(10x5=50)

(Q. No. 42 is compulsory)

29) If $X = \{-5, 1, 3, 4\}$ and $Y = \{a, b, c\}$ then which of the following relations are functions from X to Y?

- (i) $R_1 = \{(-5, a), (1, a), (3, b)\}$ (ii) $R_2 = \{(-5, b), (1, b), (3, a), (4, c)\}$
 (iii) $R_3 = \{(-5, a), (1, a), (3, b), (4, c), (1, b)\}$

30) In electrical circuit theory, a circuit C (t) is called a linear circuit if it satisfies the superposition principle given by $C(at_1 + bt_2) = aC(t_1) + bC(t_2)$, where a, b are constants. Show that the circuit $C(t) = 3t$ is linear.

31) If $S_1, S_2, S_3, \dots, S_m$ are the sum of n terms of m A.P.s whose first terms are 1, 2, 3, ..., m and whose common differences are 1, 3, 5, ..., (2m-1) respectively, the show that

$$S_1 + S_2 + S_3 + \dots + S_m = \frac{1}{2} mn (mn+1)$$

32) Find the sum to n terms of the series $0.4+0.44+0.444+\dots$ to n terms

33) The sum of the digits of a three digit numbers is 11. If the digits are reversed, the new number is 46 more than five times the former number. If the hundreds digit plus twice the tens digit is equal to the unit digit, then find the original three digit number?

34) If $A = \frac{x}{x+1}$, $B = \frac{1}{x+1}$ prove that

$$\frac{(A+B)^2 + (A-B)^2}{A \div B} = \frac{2(x^2+1)}{x(x+1)^2}$$

35) Find the values of m and n if the following expressions are perfect square

$$\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$$

36) A girl looks the reflection of the top of the lamp post on the mirror which is 66m away from the foot of the lamppost. The girl whose height is 12.5m is standing 2.5m away from the mirror. Assuming the mirror is placed on the ground facing the sky and the girl, mirror and the lamp post are in a same line, find the height of the lamp post.

37) A line makes positive intercepts on co-ordinate axes whose sum is 7 and it passes through (-3,8).find its equation.

38) A(-3,0), B(10,-2) And C(12,3) are vertices of ΔABC , Find the equation of the altitude through A and B.

39) If $\frac{\cos^2\theta}{\sin\theta} = p$ and $\frac{\sin^2\theta}{\cos\theta} = q$ then prove that $p^2q^2(p^2+q^2+3)=1$

40) The mean and standard deviation of 15 observations are found to be 10 and 5 respectively. On rechecking it was found that one of the observation with values 8 was incorrect. calculate the correct mean and standard deviation .If the correction observation value was 23.

41) Find the coefficient of variation of 24, 26, 33, 37, 29, 31

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

PART – IV
(MARKS : 16)

IV Answer Both questions:

2x8=16

43) (a) 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 (Scale factor $\frac{7}{3}$)

(or)

(b) Construct a triangle ΔPQR such that $QR=5\text{cm}$, $\angle P=30^\circ$ and the altitude from P to QR is of length 4.2cm.

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

(or)

(b) If α and β are the roots of the polynomial $f(x)=x^2-2x+3$, find the polynomial whose roots are (i) $\frac{\alpha-1}{\alpha+1}$, $\frac{\beta-1}{\beta+1}$ (ii) $\alpha+2$, $\beta+2$

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