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M.A. M.Sc. B.Ed

SLM

QUARTERLY EXAMINATION - 2019

9 - STD **MATHS** GGHS, Konganapuram.

Time : 2.30 hrs. SALEM. (DT) cell No: 9003450856 Marks : 100

PART - A

Answer all the questions. Choose the correct answer. $14 \times 1 = 14$

1. If $A = \{x, y, z\}$ then the number of non empty subsets of A is
   a) 8 b) 5 c) 6 d) 7

2. If $A \cup B = A \cap B$ then a) $A \neq B$ b) $A = B$ c) $A \subset B$ d) $B \subset A$

3. The number of proper subsets of a set with m elements is
   a) 2^m b) $2^m - 1$ c) $2^m - 1$ d) $m^2 - 1$

4. Which of the following is not true?
   a) Every rational number is a real number b) Every integer is a rational number
   c) Every real number is an irrational number d) Every natural number is a whole number

5. $4\sqrt{7} \times 2\sqrt{3} = \dots$ a) $6\sqrt{10}$ b) $8\sqrt{21}$ c) $8\sqrt{10}$ d) $6\sqrt{21}$

6. If $\sqrt{9^x} = \sqrt[3]{9^2}$ then x = ... a) $\frac{2}{3}$ b) $\frac{4}{3}$ c) $\frac{1}{3}$ d) $\frac{5}{3}$

7. A rational number is a fraction indicating the .... of two integers excluding division by zero.
   a) zero b) remainder c) quotient d) none

8. The degree of the polynomial $x^3 (x^2 + x)$ is
   a) 6 b) 3 c) 2 d) 5

9. If p(x) is divided by (ax - b) then the remainder is ....
   a) $p\left(-\frac{a}{b}\right)$ b) $p\left(-\frac{b}{a}\right)$ c) $p\left(\frac{b}{a}\right)$ d) $p\left(\frac{a}{b}\right)$

10. The supplementary angle of 70° is
    a) 20° b) 90° c) 110° d) 180°

11. The exterior angle of a triangle is equal to the sum of two ....
    a) exterior angles b) interior opposite angles c) alternate angles d) interior angles

12. The point whose ordinate is 4 and which lies on the y - axis is
    a) (4, 0) b) (0,4) c) (1,4) d) (4,2)

13. If the points A (2,0), B (-6,0) and C (3,a - 3) lies on the x axis then the value of a is
    a) 0 b) 2 c) 3 d) -6

14. The number of diagonals of a polygon of 7 sides is
    a) 7 b) 49 c) 14 d) 21

PART - B

Answer any 10 of the following questions. Qn. No. 28 is compulsory. $10 \times 2 = 20$

15. Find the power set of the set $H = \{1,2,3\}$.

16. If $A = \{b,e,f,g\}$ and $B = \{c,e,g,h\}$ then verify the commutative property for union of sets.

17. If n(A) = 300, $n(A \cup B) = 500$, $n(A \cap B) = 50$, then find n(B).

18. Draw the Venn diagram for $A - (B \cap C)$.

19. Express $0.\overline{24}$ as rational number.

20. Simplify : $(7\sqrt{a} - 5\sqrt{b})(7\sqrt{a} + 5\sqrt{b})$.

21. Represent $(300000)^3$ in scientific notation.

22. Simplify $\sqrt{63} - \sqrt{175} + \sqrt{28}$.

23. The length of a rectangle is $(3x + 2)$ units and its breadth is $(3x - 2)$ units. Find its area in terms of x. What will be the area if $x = 20$

24. Find the value of K such that $P(x) = 2x^3 - Kx^2 + 3x + 10 \cdot 0$ is exactly divisible by $(x - 2)$.

25. If AB || CD then find the value of x.

26. Calculate the distance between the points A (7, 3) and B which lies on the x - axis whose abscissa is 11.

27. Check whether the points (7, - 2), (5, 1), (3, 4) are collinear or not.

28. If $n[P(A)] = 1024$ then find $n(A)$.

PART - C

Answer any 10 of the following questions. Qn. No. 42 is compulsory.   10 X 5 = 50

29. Draw the Venn diagram for $(A \cup B)' = A' \cap B'$.

30. If $A = \{b,c,e,g,h\}$, $B = \{a,c,d,g,i\}$ and $C = \{a,d,e,g,h\}$ then verify that $A - (B \cap C) = (A - B) \cup (A - C)$.

31. In class of 50 students each one come to school by bus or by bicycle or on foot. 25 by bus, 20 by bicycle, 30 on foot and 10 students by all three. Now how many students come to school exactly by two modes of transport?

32. If $U = \{0,1,2,3,4,5,6,7\}$, $A = \{1,3,5,7\}$ and $B = \{0,2,3,5,7\}$ then find   i) A' ii) B' iii) $A' \cap B'$ iv) $(A \cup B)'$ v) $(B')'$

33. If $\dfrac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7} + b$ then find the value of a & b.

34. Express $(4000000)^3 \div (0.00002)^4$ - in scientific notation.

35. If $x = \sqrt{3} - 2$ then find the value of $x^2 + \dfrac{1}{x^2}$.

36. Find the value of m, if $(x + 3)$ is the factor of $x^3 - 3x^2 - mx + 24$.

37. If two polynomials $2x^3 + ax^2 + 4x - 12$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by $(x - 3)$, find the value of a and also find the remainder.

38. The angles of a quadrilateral are in the ratio $2 : 4 : 5 : 7$. Find all the angles.

39. In a parallelogram ABCD the bisectors of the consecutive angles $\angle A$ and $\angle B$ intersect at P. Show that $\angle APB = 90°$.

40. A (-1, 1), B(1,3) and C (3,a) are points and if AB = BC, then find a.

41. Show that (4,3) is the centre of the circle passing through the points (9, 3), (7, -1), (-1,3). Also find its radius.

42. Arrange the surdes in ascending and descending order. $\sqrt[3]{5}, \sqrt[9]{4}, \sqrt[6]{3}$.

PART - D

Answer the following questions.   2 X 8 = 16

43. Draw the $\triangle ABC$ where AB = 6cm, $\angle B = 110°$ and AC = 9cm and construct the centroid. (OR) Draw an equilateral D of sides 6.5cm and locate its orthocentre.

44. Draw the graph of $y = 4x - 1$. (OR) Solve graphically : $x + y = 7$; $x - y = 3$.

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PART-A

1. d) 7
2. b) A = B
3. b) $2^m - 1$
4. c) Every real number is an irrational number
5. b) $8\sqrt{21}$
6. b) $\frac{4}{3}$
7. c) quotient.
8. d) 5
9. c) $P\left(\frac{b}{a}\right)$
10. c) $110°$
11. b) interior opposite angles
12. b) $(0,4)$
13. c) 3
14. c) 14.

Part B.

15. $H = \{\{1\}, \{2\}, \{3\}, \{1,2\},$
    $\{1,3\}, \{2,3\}, \{1,2,3\}, \{ \}\}$

16. Commutative prop Union set
    $A \cup B = B \cup A$.
    $A \cup B = \{b, c, e, f, g, h\}$

17. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
    $500 = 300 + n(B) - 50$
    $n(B) = 250$

18. A

B∩C   A∼(B∩C)

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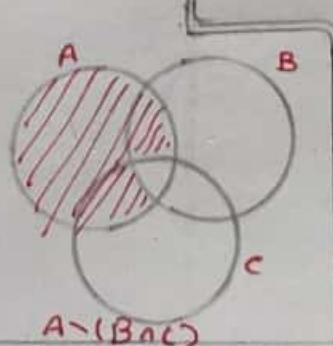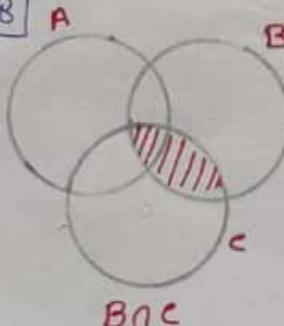
19. $x = 0.\overline{24}$
    $x = 0.2424 \cdots$ ——①
    ×100 $100x = 24.2424 \cdots$
    ① ⇒ $x = 0.2424 \cdots$ (—)
    ───────────────
    $99x = 24$
    $x = \frac{24}{99}$

20. $(7\sqrt{a} - 5\sqrt{b})(7\sqrt{a} - 5\sqrt{b})$
    $= (7\sqrt{a})^2 - (5\sqrt{b})^2$
    $= 49a - 25b$.

21. $(3,00,000)^3$
    $= (3.0 \times 10^5)^3$
    $= 27.0 \times 10^{15}$
    $= 2.7 \times 10^{16}$.

22. $\sqrt{63} - \sqrt{175} + \sqrt{28}$
    $= 3\sqrt{7} - 5\sqrt{7} + 2\sqrt{7}$
    $= 5\sqrt{7} - 5\sqrt{7}$
    $= 0$

23. Area of rectangle
    $= length \times breadth$
    $= (3x+2)(3x-2)$
    $= (9x^2 - 4)$ sq. units
    If $x = 20$.
    $= 9(20)^2 - 4$
    $= 3596$ sq. units

24. $P(2) = 0$
    $2(2^3) - k(2)^2 + 3(2) + 10 = 0$
    $16 - 4k + 6 + 10 = 0$
    $-4k = -32$
    $k = 2$

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25.
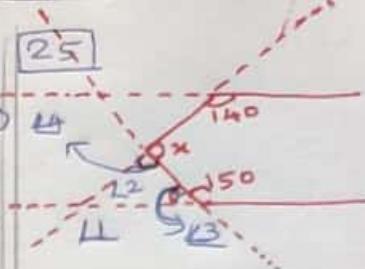
Corresponding angles are equal
$∠1 = 140$
$∠1 + ∠2 = 180$
$∠2 = 40$
$∠3 + 150 = 180$
$∠3 = 30°$
$∠2 + ∠3 + ∠4 = 180$
$∠4 = 110°$
$∠4 + ∠x = 180$
$∠x = 70°$

26. A(7,3) B(11,0)
    $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
    $= \sqrt{(11-7)^2 + (0-3)^2}$
    $= \sqrt{16+9} = \sqrt{25}$
    $d = 5$

27. A(7,-2). B(5,1) C(3,4)
    $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
    $AB = \sqrt{13}$
    $BC = \sqrt{13}$
    $CA = 2\sqrt{13}$
    $AB + BC = \sqrt{13} + \sqrt{13}$
    $= 2\sqrt{13}$
    $= CA$.
   Hence the points are Collinear.

28. $n[P(A)] = 1024$
 $2^m = 2^{10}$
    $m = 10$

    2 | 1024
    2 | 512
    2 | 256
    2 | 128
    2 | 64
    2 | 32
    2 | 16
    2 | 8
    2 | 4
    2 | 2
      | 1

29

① A∪B
②
③ A∪B
④ (A∪B)'
⑤ A'∩B'

30

$B\cap C = \{a, d, g\}$

$A\setminus(B\cap C) = \{b, c, e, h\}$ →①

$A\setminus B = \{b, e, h\}$

$A\setminus C = \{b, c\}$

$(A\setminus B)\cup(A\setminus C) = \{b, c, e, h\}$ →②

From ① = ②

31
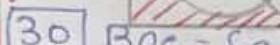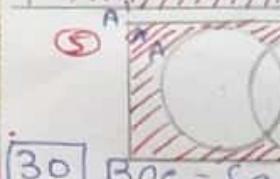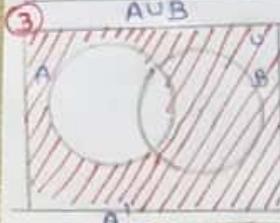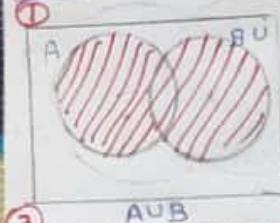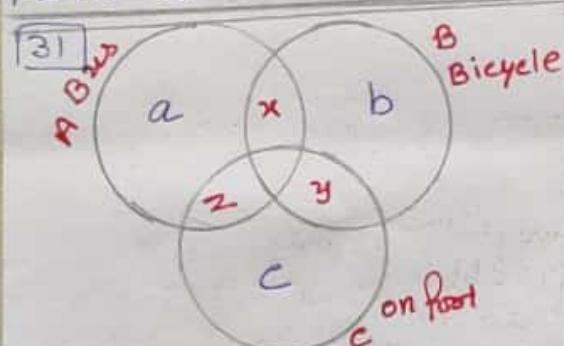
$n(A) = 25 \quad n(B) = 20 \quad n(C) = 30$

$n(A\cap B\cap C) = 10$

$n(A\cup B\cup C) = n(A) + n(B) + n(C)$
$\qquad - n(A\cap B) - n(B\cap C) - n(A\cap C)$
$\qquad + n(A\cap B\cap C)$

$50 = 25 + 20 + 30 - (100+x)$
$\qquad - (100+y) - (100+z) + 10$

$50 = 55 - (x+y+z)$

$x+y+z = 5$

32

$A' = \{0, 2, 4, 6\}$

$B' = \{1, 4, 6\}$

$A'\cap B' = \{4, 6\}$

$(A\cup B)' = \{4, 6\}$

$(B)' = \{0, 2, 3, 5, 7\}$

33

$a = -\dfrac{4}{3} \qquad b = \dfrac{11}{3}$

34

$= \dfrac{(4.0\times10^6)^3}{(2.0\times10^{-5})^4}$

$= \dfrac{64.0\times10^{18}}{16.0\times10^{-20}}$

$= 4.0\times10^{38}$

35

$x = \sqrt{3} - 2$

$x^2 = (\sqrt{3}-2)^2$

$\qquad = 3 + 4 - 4\sqrt{3}$

$x^2 = 7 - 4\sqrt{3}$

$\dfrac{1}{x^2} = 7 + 4\sqrt{3}$

$x^2 + \dfrac{1}{x^2} = 7 - 4\sqrt{3} + 7 + 4\sqrt{3}$

$x^2 + \dfrac{1}{x^2} = 14$

36

$P(-3) = 0$

$(-3)^3 - 3(-3)^2 - m(-3) + 24 = 0$

$3m = 30$

$\boxed{m = 10}$

37

$f(3) = 2(3)^3 + a(3)^2 + 4(3) - 12$

$f(3) = 9a + 54$

$g(3) = (3)^3 + (3)^2 - 2(3) + a$

$g(3) = a + 30$

Gn $f(3) = g(3)$

$\boxed{a = -3}$

$f(3) = 9(-3) + 54$

Re: $\boxed{f(3) = 27}$

38

$2x + 4x + 5x + 7x = 360$

$18x = 360$

$A = 2x = 40°$

$B = 4x = 80° \qquad \boxed{x = 20}$

$C = 5x = 100°$

$D = 7x = 140°$

39

$\angle A + \angle B = 180°$

$\dfrac{1}{2}\angle A + \dfrac{1}{2}\angle B = \dfrac{180}{2}$

$\angle PAB + \angle DBA = 90$ →①

In $\triangle APB$:

$\angle PAB + \angle AAB + \angle PBA = 180$

$\angle APB = 180 - 90$ [by ①]

$APB = 90°$

40

$A = (-1, 1)$
$B = (1, 3)$
$C = (3, a)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Gn $AB = BC$

$\sqrt{8} = \sqrt{a^2 - 6a + 13}$

$a^2 - 6a + 5 = 0$

$(a-1)(a-5) = 0$

$\boxed{a = 1, 5}$

41

$P(4,3) \qquad A(9,3)$
$B(7,-1) \qquad C(-1,3)$

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$PA = 5 \quad PB = 5 \quad PC = 5$

$PA = PB = PC = 5$

Radius $= 5$

42

L.C.M $(3, 6, 9) = 18$

A.O : $16^{1/18} < (27)^{1/18} < (5625)^{1/18}$

$\sqrt[9]{4} < \sqrt[6]{3} < \sqrt[3]{5}$

D.O : $\sqrt[3]{5} > \sqrt[6]{3} > \sqrt[9]{4}$

Part D.

43

44
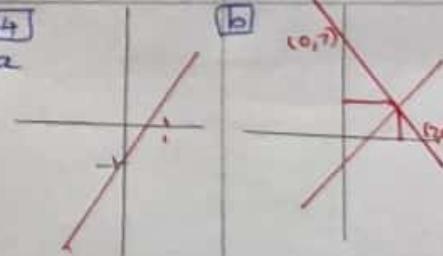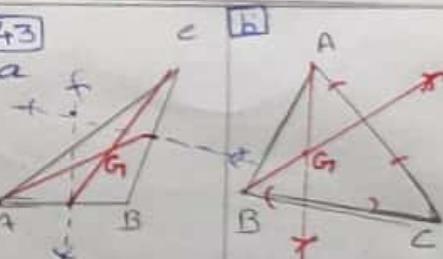
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