Tenkasi District Common Examinations
Common Half Yearly Examination - December 2022

Standard 9

MATHEMATICS

Time: 3.00 Hrs. Marks: 100

I. Choose the best answer: **14×1=14**

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

2) If $\cup = \{x : x \in N \text{ and } x<10\}$, $A = \{1, 2, 3, 5, 8\}$ and $B = \{2, 5, 6, 7, 9\}$ then $n[(A \cup B)']$ is
a) 1 b) 2 c) 4 d) 8

3) In a city, 40% people like only one fruit, 35% people like only two fruits, 20% people like all the three fruits. How many percentage of people do not like any one of the above three fruits?
a) 5 b) 8 c) 10 d) 15

4) Which one of the following has a terminating decimal expansion?
a) $\frac{5}{64}$ b) $\frac{8}{9}$ c) $\frac{14}{15}$ d) $\frac{1}{12}$

5) When $\left(2\sqrt{5}-\sqrt{2}\right)^2$ is simplified, we get?
a) $4\sqrt{5}+2\sqrt{2}$ b) $22-4\sqrt{10}$ c) $8-4\sqrt{10}$ d) $2\sqrt{10}-2$

6) The root of the polynomial equation $2x+3 = 0$ is
a) $\frac{1}{3}$ b) $\frac{-1}{3}$ c) $\frac{-3}{2}$ d) $\frac{-2}{3}$

7) Degree of the polynomial $(y^3-2)(y^3+1)$ is
a) 9 b) 2 c) 3 d) 6

8) If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ where $a_1x+b_1y+c_1 = 0$ and $a_2x+b_2y+c_2 = 0$ then the given pair of linear equation has _____ solutions.
a) no solution b) two solutions c) unique d) infinite

9) If bisectors of $\angle A$ and $\angle B$ of a quadrilateral ABCD meet at O, then $\angle AOB$ is
a) $\angle C + \angle D$ b) $\frac{1}{2}(\angle C + \angle D)$ c) $\frac{1}{2}\angle C + \frac{1}{2}\angle D$ d) $\frac{1}{3}\angle C + \frac{1}{2}\angle D$

10) AD is a diameter of a circle and AB is a chord. If AD = 30 cm and AB = 24 cm then the distance of AB from the centre of the circle is
a) 10 cm b) 9 cm c) 8 cm d) 6 cm

11) 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)

12) In what ratio does the y-axis divides the line joining the points (-5, 1) and (2, 3) internally
a) 1:3 b) 2:5 c) 3:1 d) 5:2

13) If $\sin 30^\circ = x$ and $\cos 60^\circ = y$, then x^2+y^2 is
a) 1/2 b) 0 c) $\sin 90^\circ$ d) $\cos 90^\circ$

14) The value of $\frac{1-\tan^2 45^\circ}{1+\tan^2 45^\circ}$ is
a) 2 b) 1 c) 0 d) 1/2

II. Answer any 10 questions: (Question No. 28th compulsory) **10×2=20**

15) If $n[P(A)] = 256$, find $n(A)$.

16) If $A = \{6, 7, 8, 9\}$ and $B = \{8, 10, 12\}$ find $A \Delta B$.

17) If $n(A) = 36$, $n(B) = 10$, $n(A \cup B) = 40$ and $n(A') = 27$ find $n(\cup)$ and $n(A \cap B)$.

18) Give any two rational numbers lying between 0.5151151115..... and 0.5353353335.....

19) Simplify: $3\sqrt{75} + 5\sqrt{48} - \sqrt{243}$

20) Find the number of zeros of the polynomials represented by their graphs.

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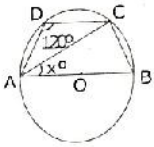
21) Factorise: $2x^2+15x-27$

22) Find the GCD of $35x^2y^3z^4$, $49x^2yz^3$, $14xy^2z^2$.

23) The chord of length 30 cm is drawn at the distance of 8 cm from the centre of the circle. Find the radius of the circle.

24) Find the value of x^0 in the given figure.



25) If (x, 3), (6, y), (8, 2) and (9, 4) are the vertices of a parallelogram taken in order, then find the value of x and y.

26) If the centroid of a triangle is at (4, −2) and two of its vertices are (3, −2) and (5, 2) then find the third vertex of the triangle.

27) If $\cos A = \frac{3}{5}$, then find the value of $\frac{\sin A - \cos A}{2\tan A}$.

28) Find the values of the following:
(cos 0°+sin 45°+sin 30°) (sin 90°−cos 45°+cos 60°)

III. Answer any 10 questions: (Qn.no. 41 is compulsory) **10×5=50**

29) If A = {x:x∈z, −2<x≤4}, B = {x:x∈w, x≤5}, C = {−4, −1, 0, 2, 3, 4}, then verify A∩(B∪C) = (A∩B) ∪ (A∩C).

30) In a group of 100 students, 85 students speak Tamil, 40 students speak in English, 20 students speak French, 32 speak Tamil and English, 13 speak English and French and 10 speak Tamil and French. If each student knows atleast any one of these languages, then find the number of students who speak all these three languages.

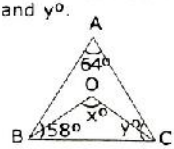
31) Find any five rational numbers between $\frac{1}{4}$ and $\frac{1}{3}$.

32) If $x = \sqrt{5}+2$, then find the value of $x^2 + \frac{1}{x^2}$.

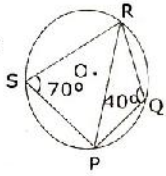
33) Find the value of m. If (x−2) is a factor of the polynomial $2x^3-6x^2+mx+4$.

34) Find the quotient and remainder when (x^3+x^2-7x-3) is divided by$(x-3)$ using synthetic division.

35) In the given figure ∠A = 64°, ∠ABC = 58°. If BO and CO are the bisectors of ∠ABC and ∠ACB respectively of ΔABC find x^0 and y^0.



36) If PQRS is a cyclic quadrilateral in which ∠PSR = 70° and ∠QPR = 40°, then find ∠PRQ.



37) Using section formula, show that the points A(7, −5), B(9, −3) and C(13, 1) are collinear.

38) The vertices of a triangle are (1, 2), (h, −3) and (−4, k). If the centroid of the triangle is at the points (5, −1) then find the value of $\sqrt{(h+k)^2+(h+3k)^2}$.

39) Find the values of tan7° tan23° tan60° tan67° tan83°.

40) Find the area of a right angle triangle whose hypotenuse is 10 cm and one of the acute angle is 24°24''.

41) Solve for x and y, 2x−y = 3; 3x+y = 7 by the method of elimination.

IV. Answer the questions: **2×8=16**

42) Construct the centroid of ΔPQR whose sides are PQ = 8 cm, QR = 6 cm, RP = 7 cm. **(OR)** Construct the circumcentre of the ΔABC with AB = 5 cm, ∠A = 60° and ∠B = 80°. Also the circumcircle and find the circumradius of the ΔABC.

43) Draw the graph for the equation y = 2x. **(OR)**
Use graphical method to solve the equation x+y = 7; x−y = 3.