Class: IX
SESSION : 2022-2023
SUBJECT: Mathematics
SAMPLE QUESTION PAPER - 10
with SOLUTION

Time Allowed: 3 hours   **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Section A

1. The value of k if x = 3 and y = -2 is a solution of the equation 2x - 13y = k is   [1]

   a) 31   b) 23

   c) 32   d) 30

2. If $\sqrt{2} = 1.41$ then $\frac{1}{\sqrt{2}} = ?$ [1]

   a) 0.709   b) 7.05

   c) 0.75   d) 0.075

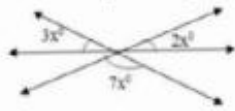3. The co-ordinates of a point below the x-axis lying on y-axis at a distance of 4 units are   [1]

   a) (-4, 0)   b) (0, 4)

   c) (0, -4)   d) (4, 0)

4. Express y in terms of x in the equation 5y - 3x - 10 = 0.   [1]

   a) $y = \frac{3-10x}{5}$ b) $y = \frac{3+10x}{5}$

   c) $y = \frac{3x-10}{5}$ d) $y = \frac{3x+10}{5}$

5. In the given graph, the number of students who scored 60 or more marks is   [1]
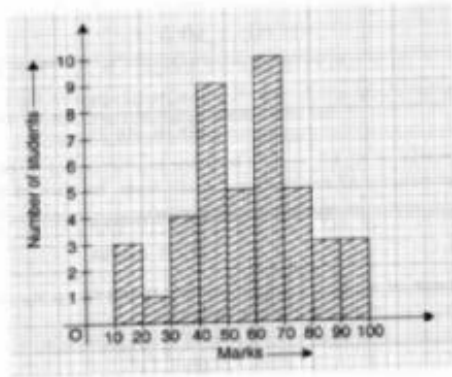
a) 22

b) 20

c) 21

d) 19

6. In the adjoining figure, the value of x is: [1]

a) 15°

b) 10°

c) 12°

d) 18°

7. If a straight line falling on two straight lines makes the interior angles on the   [1]
    same side of it taken together less than 180°, then the two straight lines, if
    produced indefinitely, meet on that side on which the angles taken together are

a) $< 180^\circ$

b) $= 180^\circ$

c) $> 180^\circ$

d) None of these

8. In $\triangle ABC$, E is the mid-point of median AD such that BE produced meets AC at   [1]
    F. If $AC = 10.5$ cm, then $AF =$

a) 2.5 cm

b) 5 cm

c) 3 cm

d) 3.5 cm

9. How many lines pass through one point?   [1]

a) one

b) three

c) two

d) many

10. When $p(x) = x^3 + ax^2 + 2x + a$ is divided by $x + a$, the remainder is   [1]

a) a

b) 0

c) 1

d) -a

11. In the adjoining figure, $BC = AC$. If $\angle ACD = 115^\circ$, the $\angle A$ is   [1]

a) $50°$

b) $65°$

c) $57.5°$

d) $70°$

12. E and F are the mid-points of the sides AB and AC of a $\triangle ABC$. If AB = 6cm, BC = 5cm and AC = 6cm, Then EF is equal to   **[1]**

a) 4 cm

b) 3 cm

c) 2.5 cm

d) None of these

13. If $x = 3 + 2\sqrt{2}$, then the value of $x + \frac{1}{x}$ is   **[1]**

a) 0

b) 3

c) 1

d) 6

14. In the given figure, ABCD is a cyclic quadrilateral, $\angle CBQ = 48°$ and a = 2b. Then, b is equal to   **[1]**

a) $48°$

b) $18°$

c) $38°$

d) $28°$

15. The factors of $x^3 - 1 + y^3 + 3xy$ are   **[1]**

a) $3(x + y - 1)(x^2 + y^2 - 1)$

b) $(x - 1 + y)(x^2 - 1 - y^2 + x + y + xy)$

c) $(x + y + 1)(x^2 + y^2 + 1 - xy - x - y)$

d) $(x - 1 + y)(x^2 + 1 + y^2 + x + y - xy)$

16. The cost of turfing a triangular field at the rate of Rs. 45 per 100 m^2 is Rs. 900. If   **[1]**

the double the base of the triangle is 5 times its height, then its height is

a) 40 m

b) 42 m

c) 32 m

d) 44 m

17. Which of the following is a binomial?

[1]

a) $x + 3 + \frac{1}{x}$

b) $x^2 + 4$

c) $2x^2$

d) $x^2 + x + 3$

18. **Assertion (A):** The perimeter of a right angled triangle is 60 cm and its hypotenuse is 26 cm. The other sides of the triangle are 10 cm and 24 cm. Also, area of the triangle is 120 cm^2.

[1]

Reason (R): $(Base)^2 + (Perpendicular)^2 = (Hypotenuse)^2$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. A right triangle with sides 3 cm, 4 cm and 5 cm is rotated about the side of 3 cm to form a cone. The volume of the cone so formed is

[1]

a) $12\pi \ cm^3$

b) $20\pi \ cm^3$

c) $16\pi \ cm^3$

d) $15\pi \ cm^3$

20. **Assertion (A):** There are infinite number of lines which passes through (2, 14).

[1]

Reason (R): A linear equation in two variables has infinitely many solutions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

[2]

21. Factorize: $6ab - b^2 + 12ac - 2bc$

22. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

[2]

23. What must be added to $2x^2 - 5x + 6$ to get $x^3 - 3x^2 + 3x - 5$?

[2]

OR

Find whether polynomial g(x) is a factor of polynomial f(x) or not: $f(x) = x^3 - 6x^2 - 19x + 84$, $g(x) = x - 7$

24. The height of a cone is 15 cm. If its volume is 1570 cm^3. Find the radius of the base. **[2]**

25. Write the linear equation represented by line AB and PQ. Also find the co-ordinate of intersection of line AB and PQ. **[2]**
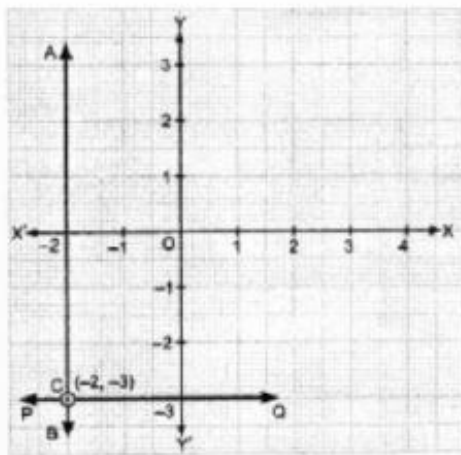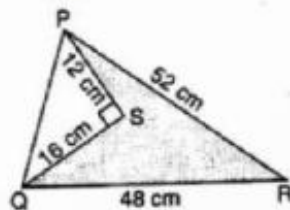

OR

Express x in terms of y for the linear equation $\frac{2}{3}x + 4y = -7$.

Section C

26. Locate $\sqrt{3}$ on the number line. **[3]**
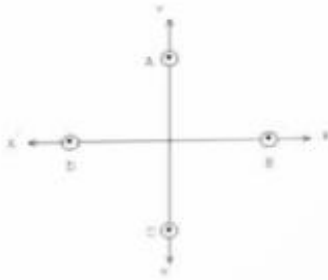
27. Find the area of the shaded region in figure. **[3]**

OR

The perimeter of a triangle is 480 meters and its sides are in the ratio of 1:2:3. Find the area of the triangle?

28. Find at least 3 solutions for the linear equation $2x - 3y + 7 = 0$. **[3]**

29. Without actually calculating the cubes, find the value of $(-12)^3 + (7)^3 + (5)^3$ **[3]**

30. In fig. write the Co-ordinates of the points and if we join the points write the name of fig. formed. Also write Co-ordinate of intersection point of AC and BD. **[3]**

31. ABCD is a square and DEC is an equilateral triangle. Prove that AE = BE. **[3]**

OR

In $\triangle ABC$, if $\angle A + \angle B = 125°$ and $\angle A + \angle C = 113°$, find $\angle A, \angle B, \angle C$.

Section D

32. Visualize the representation of $5.\overline{37}$ on the number line upto 5 decimal places, that is, up to 5.37777. **[5]**
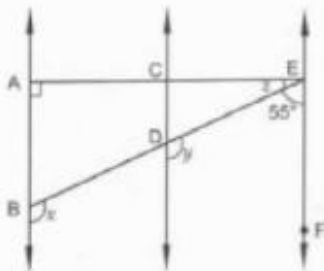
OR

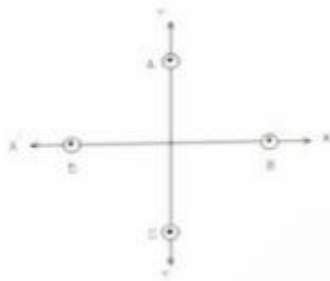If $x = 2 - \sqrt{3}$, find the value of $\left(x - \frac{1}{x}\right)^3$.

33. If two lines intersect, prove that the vertically opposite angles are equal. **[5]**

OR

Fig., AB || CD and CD || EF. Also, EA ⊥ AB. If $\angle BEF = 55°$, find the values of x, y, and z.

34. In the adjoining figure, name: **[5]**
    i. Six points
    ii. Five line segments
    iii. Four rays
    iv. Four lines

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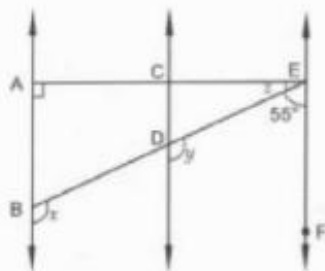
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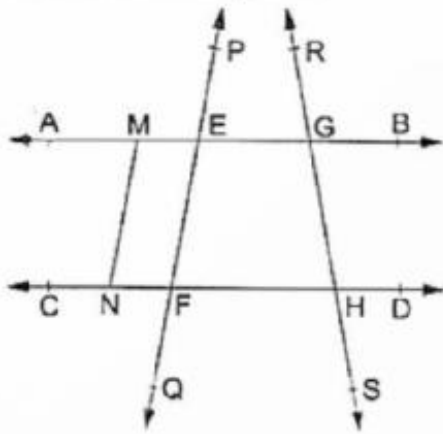33. If two lines intersect, prove that the vertically opposite angles are equal. **[5]**

OR

Fig., AB $\|$ CD and CD $\|$ EF. Also, EA $\perp$ AB. If $\angle BEF = 55°$, find the values of x, y, and z.

34. In the adjoining figure, name: **[5]**

   i. Six points
   ii. Five line segments
   iii. Four rays
   iv. Four lines

v. Four collinear points

35. In a study of diabetic patients in a village, the following observations were noted: [5]

Age in years	10-20	20-30	30-40	40-50	50-60	60-70
Number of patients	2	5	12	19	9	4

Represent the above data by a frequency polygon.

Section E

36. **Read the text carefully and answer the questions:** [4]

The front compound wall of a house is decorated by wooden spheres of diameter 21 cm, placed on small supports as shown in figure. 25 such spheres are used for this purpose and are to be painted silver. Each support is a cylinder and is to be painted black.
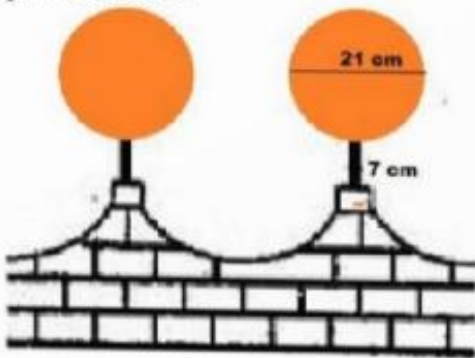
(i) what will be the total surface area of the spheres all around the wall?

(ii) Find the cost of orange paint required if this paint costs 20 paise per cm^2.

OR

What will be the volume of total spheres all around the wall?

(iii) How much orange paint in liters is required for painting the supports if the paint required is 3 ml per cm^2?

37. **Read the text carefully and answer the questions:** [4]

Sanjay and his mother visited in a mall. He observes that three shops are situated at P, Q, R as shown in the figure from where they have to purchase things according to their need. Distance between shop P and Q is 8 m and between shop P and R is 6 m.

Considering O as the center of the circles.
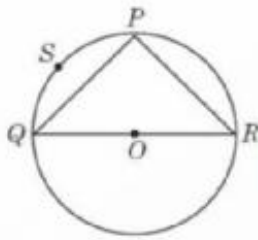
(i)   Find the Measure of ∠QPR.

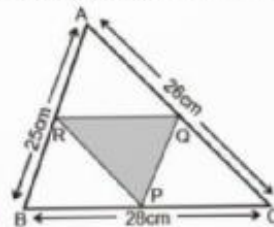(ii) Find the radius of the circle.

(iii) Find the Measure of ∠QSR.

OR

Find the area of △PQR.

38. **Read the text carefully and answer the questions:**   [4]

There is a Diwali celebration in the DPS school Janakpuri New Delhi. Girls are asked to prepare Rangoli in a triangular shape. They made a rangoli in the shape of triangle ABC. Dimensions of △ABC are 26 cm, 28 cm, 25 cm.

(i)   In fig R and Q are mid-points of AB and AC respectively. Find the length of RQ.

(ii) Find the length of Garland which is to be placed along the side of △QPR.

OR

R, P, Q are the mid-points of corresponding sides AB, BC, CA in △ABC, then name the figure so obtained BPQR.

(iii) R, P and Q are the mid-points of AB, BC, and AC respectively. Then find the relation between area of △PQR and area of △ABC.