SHREE RADHEY COACHING CENTER

SPECIAL SAMPLE PAPER 2

Class 10 - Mathematics

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 π =22/7 wherever required if not stated.

Section A

1. In $\triangle$ ABC, a line XY parallel to BC cuts AB at X and AC at Y. If BY bisects $\angle \mathrm{XYC}$, then **[1]**

   a) BC = CY b) BC = BY

   c) BC $\neq$ BY d) BC $\neq$ CY

2. If α and β are the zeroes of the polynomial ax^2 + bx + c, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is **[1]**

   a) $\frac{b^2-2ac}{ac}$ b) $\frac{b^2}{ac}$

   c) $\frac{a^2}{bc}$ d) $\frac{c^2}{ab}$

3. The system of equations x - 4y = 8, 3x - 12y = 24 **[1]**

   a) has infinitely many solutions b) may or may not have a solution

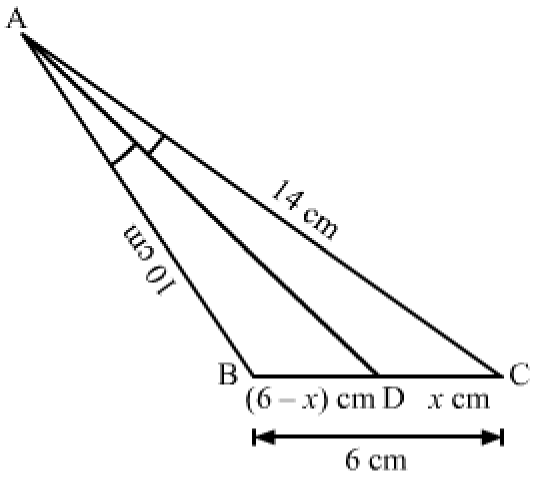
   c) has no solution d) has a unique solution

4. In a cyclic quadrilateral ABCD, if ∠A = (2x - 1)^o, ∠B = (y + 5)^o, ∠C = (2y + 15)^o and ∠D = (4x - 7)^o, then the value of $\angle C$ is **[1]**

   a) 55^o b) 125^o

   c) 65^o d) 115^o

5. In a △ABC, it is given that AD is the internal bisector of ∠A. If AB = 10 cm, AC = 14 cm and BC = 6 cm, the CD = ? **[1]**



a) 3.5 cm

b) 7 cm

c) 4.8 cm

d) 10.5 cm

6. The king, queen and jack of clubs are removed from a deck of 52 cards and the remaining cards are shuffled. A card is drawn from the remaining cards. The probability of getting a king is **[1]**

a) $\frac{4}{52}$

b) $\frac{3}{52}$

c) $\frac{3}{49}$

d) $\frac{4}{49}$

7. If $\sin\theta = \frac{\sqrt{3}}{2}$ then (cosec θ + cot θ) = ? **[1]**

a) $\sqrt{2}$

b) $(2+\sqrt{3})$

c) $2\sqrt{3}$

d) $\sqrt{3}$

8. Mean of a certain number of observations is m. If each observation is divided by x(x $\neq$ 0) and increased by y, then the mean of new observation is: **[1]**

a) $m+\frac{y}{x}$

b) $m+\frac{x}{y}$

c) $\frac{m}{x}$ + y

d) $\frac{m}{y}+x$

9. In $\triangle$ABC and $\triangle$PQR, $\angle$B = $\angle$Q, $\angle$R = $\angle$C and AB = 2QR, then, the triangles are **[1]**

a) Similar but not congruent.

b) Neither congruent nor similar.

c) Congruent as well as similar.

d) Congruent but not similar.

10. ________ is neither prime nor composite. **[1]**

a) 4

b) 1

c) 2

d) 3

11. If a and b can take values 1, 2, 3, 4. Then the number of the equations of the form ax^2 + bx + 1 = 0 having real roots is **[1]**

a) 12

b) 7

c) 10

d) 6

12. The ratio in which the point (1, 3) divides the line segment joining the points (-1, 7) and (4, -3) is **[1]**

a) 2 : 3

b) 7: 2

c) 3 : 2

d) 2 : 7

13. The mean of a discrete frequency distribution $\frac{x_i}{f_i}$; i = 1, 2, ..., n is given by: **[1]**

a) $\frac{\sum f_i x_i}{\sum f_i}$

b) $\frac{1}{n} \sum_{i=1}^{n} f_i x_i$

c) $\frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} i}$

d) $\frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} x_i}$

14. If cos $A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A$ = **[1]**

a) – 1

b) 1

c) 0

d) 2

15. From the top of a building 60m high, the angles of depression of the top and the bottom of a tower are observed to be 30° and 60°. The height of the tower is **[1]**

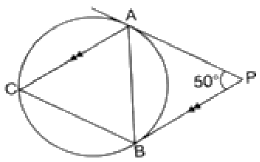
a) 40 m

b) 60 m

c) 45 m

d) 50 m

16. In the given figure, PA and PB are tangents to a circle from an external point P. If $\angle APB = 50^\circ$ and $\mathrm{AC} \mid\mid \mathrm{PB}$, then the measures of angles of triangle ABC are **[1]**



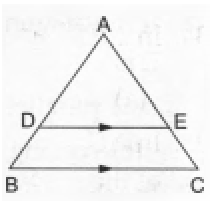
a) 65°, 50°, 65°

b) 50°, 55°, 75°

c) 80°, 60°, 40

d) 50°, 50°, 80°

17. In $\triangle$ABC, DE || BC so that AD = (7x - 4) cm, AE = (5x - 2) cm, DB = (3x + 4) cm and EC = 3x cm. Then, we have **[1]**



a) x = 3

b) x = 5

c) x = 4

d) x = 2.5

18. If 2 is a root of the equation $x^2 + bx + 12 = 0$ and the equation $x^2 + bx + q = 0$ has equal roots, then q = **[1]**

a) 8

b) -16

c) 16

d) -8

19. **Assertion:** If one zero of polynominal p(x) = $(k^2 + 4)x^2 + 13x + 4k$ is reciprocal of other, then k = 2. **[1]**
Reason: If (x - α) is a factor of p(x), then p(α) = 0 i.e, α is a zero of p(x).

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

20. **Assertion (A):** Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the **[1]**

resulting cuboid is 350 cm^2.

Reason (R): Total surface area of a cuboid is 2(lb + bh + hl)

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

21. The length of a rectangular field is three times its breadth. If the area of the field be 147 sq metres, find the length of the field. **[2]**

22. Find the ratio in which the point P(x, 2) divides the join of A(12, 5) and B(4, -3). **[2]**

23. Prove that $\frac{2}{\sqrt{7}}$ is irrational. **[2]**

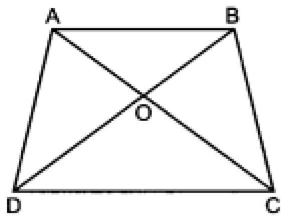
24. If (3 sin θ + 5 cos θ) = 5, prove that (5 sin θ - 3 cos θ) = $\pm$ 3 **[2]**

OR

Prove the trigonometric identity:

$\tan^2 A - \tan^2 B = \frac{\cos^2 B - \cos^2 A}{\cos^2 B \cos^2 A} = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

25. In the given figure, $\frac{AO}{OC} = \frac{BO}{OD} = \frac{1}{2}$ and AB = 4 cm. Find the value of DC. **[2]**



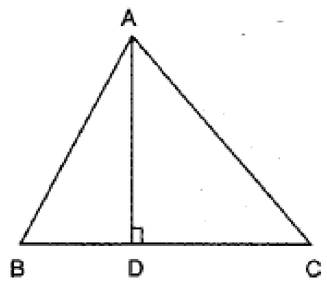
OR

In a ΔABC, D and E are points on the sides AB and AC respectively such that $DE \| BC$. If AD = x, DB = x-2, AE = x + 2 and EC = x - 1, find the value of x.

Section C

26. In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects. **[3]**

27. In Fig. if $AD \perp BC$ and $\frac{BD}{DA} = \frac{DA}{DC}$, Prove that Δ ABC is a right triangle. **[3]**



28. If A (5,-1), B (-3,-2) and C (-1,8) are the vertices of triangle ABC, find the length of median through A and the coordinates of the centroid. **[3]**

OR

In what ratio is the line segment joining the points (-2, -3) and (3, 7) divided by the y-axis? Also, find the coordinates of the point of division.

29. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject. **[3]**

30. The angle of elevation of a jet fighter from point A on ground is 60°. After flying 10 seconds, the angle changes to 30°. If the jet is flying at a speed of 648 km/hour, find the constant height at which the jet is flying. **[3]**

OR

If a tower 30m high, casts a shadow $10\sqrt{3}m$ long on the ground, then what is the angle of elevation of the sun?

31. Find the mean marks per student, using assumed-mean method: **[3]**

Marks	0 -10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of students	12	18	27	20	17	6

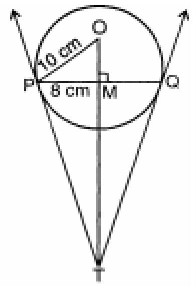
Section D

32. Romila went to a stationary stall and purchased 2 pencils and 3 erasers for Rs.9. Her friend Sonali saw the new variety of pencils and erasers with Romila, and she also bought 4 pencils and 6 erasers of the same kind for Rs.18. Represent this situation algebraically and graphically. **[5]**

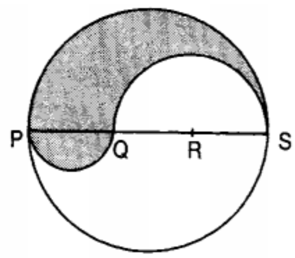
OR

Is the pair of linear equation consistent/ inconsistent? If consistent, obtain the solution graphically: 2x + y - 6 = 0; 4x - 2y - 4 = 0.

33. In figure, PQ is a chord of length 16 cm, of a circle of radius 10 cm. The tangents at P and Q intersect at a point T. Find the length of TP **[5]**



34. PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semi-circles are drawn on PQ and QS as diameters as shown in Fig. Find the perimeter and area of the shaded region **[5]**



OR

Two circular beads of different sizes are joined together such that the distance between their centres is 14 cm. The sum of their areas is 130π cm^2. Find the radius each bead.

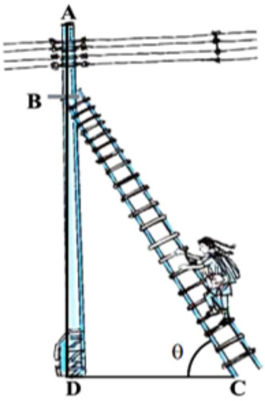
35. From a deck of 52 playing cards, Jacks and kings of red colour and Queen and Aces of black colour are removed. The remaining cards are mixed and a card is drown at random. Find the probability that the drawn card is **[5]**

i. A black Queen
ii. A card of red colour
iii. A Jack of black colour
iv. A face card

Section E

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

In a village, group of people complained about an electric fault in their area. On their complaint, an electrician reached village to repair an electric fault on a pole of height 10 m. She needs to reach a point 1.5 m below the top of the pole to undertake the repair work (see the adjoining figure). She used ladder, inclined at an angle of θ to the horizontal such that $\cos\theta = \frac{\sqrt{3}}{2}$, to reach the required position.



(i) Find the length BD?

(ii) Find the length of ladder.

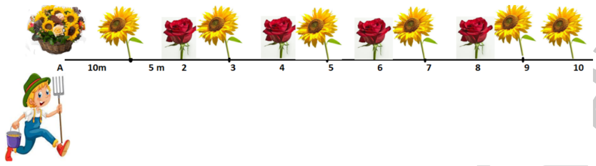
(iii) How far from the foot of the pole should she place the foot of the ladder?

OR

If the height of pole and distance BD is doubled, then what will be the length of the ladder?

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

In a school garden, Dinesh was given two types of plants viz. sunflower and rose flower as shown in the following figure.



The distance between two plants is to be 5m, a basket filled with plants is kept at point A which is 10 m from the first plant. Dinesh has to take one plant from the basket and then he will have to plant it in a row as shown in the figure and then he has to return to the basket to collect another plant. He continues in the same way until all the flower plants in the basket. Dinesh has to plant ten numbers of flower plants.

(i) Write the above information in the progression and find first term and common difference.

(ii) Find the distance covered by Dinesh to plant the first 5 plants and return to basket.

OR

If the speed of Dinesh is 10 m/min and he takes 15 minutes to plant a flower plant then find the total time taken by Dinesh to plant 10 plants.

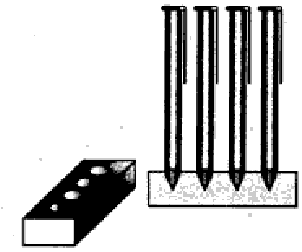
(iii) Find the distance covered by Dinesh to plant all 10 plants and return to basket.

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

A carpenter in the small town of Bareilly used to make and sell different kinds of wood items like a rectangular box, cylindrical pen stand, and cuboidal pen stand. One day a student came to his shop and asked him to make a pen stand with the dimensions as follows:

A pen stand should be in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid should be 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4

cm.



(i) The volume of the cuboidal part.

(ii) The volume of wood in the entire stand.

OR

If the cost of wood used is ₹10 per cm^3, then the total cost of making the pen stand.

(iii) Total volume of conical depression.