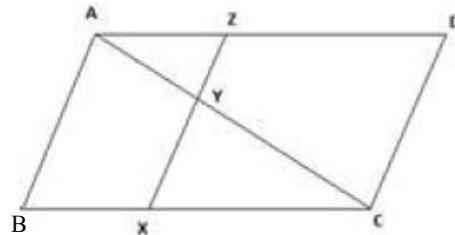


SECTION A

Section A consists of 20 questions of 1 mark each.

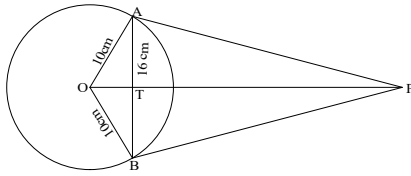
1. Three farmers have 490 kg, 588 kg and 882 kg of wheat respectively. Find the maximum capacity of a bag so that the wheat can be packed in exact number of bags.
a) 98 kg b) 290 kg
c) 200 kg d) 350 kg
2. If one of the zeroes of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3 , then the value of k is
a) $\frac{4}{3}$ b) $-\frac{4}{3}$
c) $\frac{2}{3}$ d) $-\frac{2}{3}$
3. Graphically, the pair of equations $7x - y = 5$; $21x - 3y = 10$ represents two lines which are
a) intersecting at one point
b) parallel
c) intersecting at two points
d) coincident
4. If the lines given by $2x + ky = 1$ and $3x - 5y = 7$ are parallel, then the value of k is
a) $-\frac{10}{3}$ b) $\frac{10}{3}$

- c) -13 d) $-Z$
5. The 10th term from the end of the A.P. $-5, -10, -15, \dots, -1000$ is
a) -955 b) -945
c) -950 d) -965
6. Find the distance of the point $(-6, 8)$ from the origin.
a) 8 b) 11
c) 10 d) 9
7. Find the ratio in which the line joining the points $(6, 4)$ and $(1, -7)$ is divided by x -axis.
a) $1 : 3$ b) $2 : 7$
c) $4 : 7$ d) $6 : 7$
8. ABCD is a parallelogram with diagonal AC. If a line XY is drawn such that $XY \parallel AB$.
 $\frac{BX}{XC} = ?$

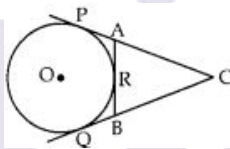


- a) $\left(\frac{AY}{AC}\right)$ b) $\left(\frac{DZ}{AZ}\right)$
- c) $\left(\frac{AZ}{ZD}\right)$ d) $\left(\frac{AC}{AY}\right)$

9. In the figure, AB is a chord of length 16 cm, of a circle of radius 10 cm. The tangents at A and B intersect at a point P. Find the length of PA.



- a) $\frac{20}{5}$ cm b) $\frac{40}{5}$ cm
 c) $\frac{20}{3}$ cm d) $\frac{40}{3}$ cm
10. In given figure, CP and CQ are tangents to a circle with centre O. ARB is another tangent touching the circle at R. If CP = 11 cm and BC = 6 cm then the length of BR is



- a) 6 cm b) 5 cm
 c) 4 cm d) 3 cm
11. If $\sin A + \sin^2 A = 1$, then $\cos^2 A + \cos^4 A = ?$
- a) 1 b) 0
 c) 2 d) 4

12. If a pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then the sun's elevation is
- a) 60° b) 45°
 c) 30° d) 90°

13. If $\sec \theta + \tan \theta = x$, then $\tan \theta$ is:
- a) $\frac{(x^2 - 1)}{2x}$ b) $\frac{(x^2 + 1)}{2x}$
 c) $\frac{(x^2 - 1)}{x}$ d) $\frac{(x^2 + 1)}{x}$

14. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then :
- a) $R_1 + R_2 = R$ b) $R_1 + R_2 > R$
 c) $R_1 + R_2 < R$
 d) Nothing definite can be said about the relation among R_1 , R_2 and R

15. The diameter of a sphere is 6 cm. then find its total surface area.
- a) $12\pi \text{ cm}^2$ b) $18\pi \text{ cm}^2$
 c) $36\pi \text{ cm}^2$ d) $72\pi \text{ cm}^2$

16. One of the method for determining mode is
- a) Mode = 2 Median – 3 Mean
 b) Mode = 3 Median – 2 Mean
 c) Mode = 2 Mean – 3 Median
 d) Mode = 3 Mean – 2 Median

17. Which of the following cannot be the probability of an event ?
- a) $\frac{1}{3}$ b) 0.1
 c) 3% d) $\frac{17}{16}$

18. The probability of getting a consonant from the word MAHIR is
- a) $\frac{2}{5}$ b) $\frac{3}{5}$
 c) $\frac{4}{5}$ d) 1

Direction : In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
 b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

- c) If Assertion is correct but Reason is incorrect.
 d) If Assertion is incorrect but Reason is correct.

19. **Assertion:** If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then the value of k is 2.

Reason: The quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has almost two roots.

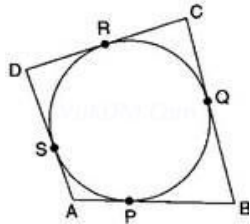
20. **Assertion:** Perimeter of a semi circle is $(\pi r + d)$ units.

Reason: Area of circle is (πr^2)

SECTION B

Section B consists of 5 questions of 2 marks each.

21. Prove that $\sqrt{5}$ is irrational.
 22. X and Y are points on the sides AB and AC respectively of a triangle ABC such that $AX:AB = 1:4$, $AY = 2$ cm and $YC = 6$ cm. Find whether $XY \parallel BC$ or not.
 23. A quadrilateral ABCD is drawn to circumscribe a circle (see figure). Prove that: $AB + CD = AD + BC$



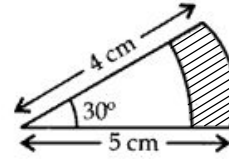
24. $\sin(A + B) = 1$ and $\sin(A - B) = \frac{1}{2}$;
 $0^\circ < (A + B) \leq 90^\circ$; ($\angle A > \angle B$). Find $\angle A$ and $\angle B$.

OR

If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that \tan

$$\tan \theta + \cot \theta = 1.$$

25. In Figure, find the area of the shaded region.



SECTION C

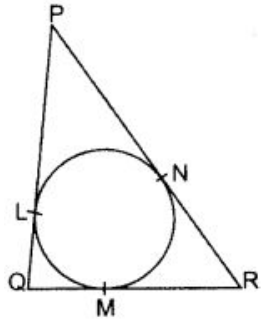
Section C consists of 6 questions of 3 marks each.

26. The length, breadth, and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.
 27. Three alarm clocks ring at intervals of 4, 12 and 20 minutes respectively. If they start ringing together, after how much time will they next ring together?
 28. A and B each have a certain number of oranges. A says to B, "if you give me 10 of your oranges, I will have twice the number of oranges left with you." B replies, "if you give me 10 of your oranges, I will have the same number of oranges as left with you. Find the number of oranges with A and B separately.

OR

Yash scored 40 marks in a test, receiving 3 marks for each correct answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Yash would have scored 50 marks. How many questions were there in the test?

29. In the figure, a circle is inscribed in a triangle PQR with $PQ = 10$ cm, $QR = 8$ cm and $PR = 12$ cm. Find the lengths of QM, RN and PL.



OR

Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

30. Prove that:

$$\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta} + \frac{\sin \theta + \cos \theta}{\sin \theta - \cos \theta} = \frac{2}{2 \sin^2 \theta - 1}$$

31. If the mean of the following distribution is 50, find the value of p:

Class	Frequency
0 – 20	17
20 – 40	p
40 – 60	32
60 – 80	24
80 – 100	19

SECTION D

Section D consists of 4 questions of 5 marks each.

32. Due to heavy floods in a State, thousands were rendered homeless. 50 schools collectively offered to the State Government to provide place and the canvas for 1,500 tents to be fixed by the Government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of height 2.1 m. If the canvas used to make the tents costs ₹ 120 per sq. m, find the amount shared by each school

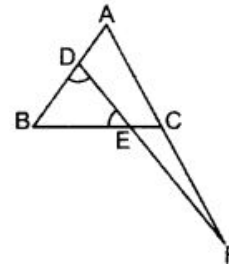
to set up the tents.

OR

A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. [Use $\pi = 227$]

33. In the figure, $\angle BED = \angle BDE$ & E divides BC in the ratio 2 : 1.

Prove that $AF \times BE = 2 AD \times CF$.



34. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed?

OR

Solve the following for x:

$$\frac{1}{2a + b + 2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

35. Find the values of x and y if the median for the following data is 31.

Class	Frequency
0 – 10	5
10 – 20	x
20 – 30	6
30 – 40	y
40 – 50	6
50 – 60	5
Total	40

SECTION E

Case study based questions are compulsory.

36. Balloon Elevation from Windows

Suppose, there are two windows in a house. A window of the house is at a height of 1.5 m above the ground and the other window is 3 m vertically above the lower window.



Amit and Manjeet are sitting in the two windows. At an instant, the angles of elevation of a balloon from these windows are observed as 45° and 30° , respectively.

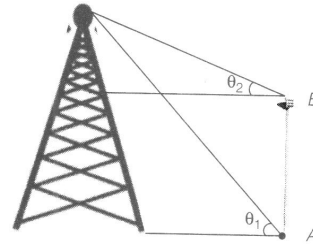
On the basis of above information, answer the following questions.

- i) Find the height of the balloon from the ground. 2

OR

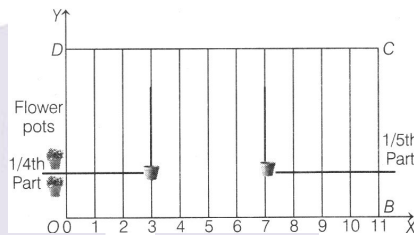
Find the distance between Manjeet and balloon.

- ii) If the height of any tower is double and the distance between the observer and foot of the tower is also doubled, then what is the angle of elevation. 1
- iii) Suppose a tower and a pole is standing on the ground and angle of elevation from bottom of pole is θ_1 and elevation from top of pole to the top of tower is θ_2 , then show that $\theta_1 > \theta_2$. 1



37. Sports Day Activity in School

In sports day activities of Delhi Public School, the lines have been drawn with chalk powder in rectangular shaped field OBCD. Each line is $\frac{1}{2}$ m apart from each other. 60 flower pots have been placed at a distance of $\frac{1}{2}$ m from each other along OD. Yamini runs $\frac{1}{4}$ th of the distance OD on the 3rd line and plants a red flower. Kamla runs $\frac{1}{5}$ th of the distance OD on the 7th line and plants a yellow flower.



Based on the above information, answer the following questions

- i) Find the distance between red and yellow flowers. 1
- ii) Find the area of rectangular field. 2

OR

Find the length of the diagonal of the rectangular field.

- iii) What is the length of the rectangle field? 1

38. India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.



- i) In which year, the production is Rs 29,200. (1)
- ii) Find the production during 8th year. (2)

OR

Find the production during first 3 years.

- iii) Find the difference of the production during 7th year and 4th year. (1)

* * *

PACE
IIT & MEDICAL