



PRACTICE PAPER- 3
Mathematics-Basic (241)
CLASS X
Session: 2021-22
TERM II

Time Allowed: 2 hours

Maximum Marks: 40

General Instructions:

1. The question paper consists of 14 questions divided into 3 sections A, B, C.
2. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
3. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
4. Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study-based questions.

Section A

1. Find the values of k for which the following equation have real roots: $x^2 - 4kx + k = 0$ [2]

OR

Solve for x :

$$\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}; x \neq 1, -2, 2$$

2. Three cubes whose edges measure 3 cm, 4 cm and 5 cm respectively to form a single cube. [2]
Find its edge. Also, find the surface area of the new cube.
3. A survey was conducted by a group of students as a part of their environmental awareness [2]
programme, in which they collected the following data regarding the number of plants in 20
houses in a locality. Find the mean number of plants per house.

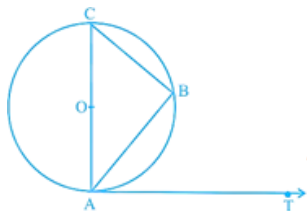
Number of plants	0-2	2-4	4-6	6-8	8-10	10-12	12-14
Number of houses	1	2	1	5	6	2	3

Which method did you use for finding the mean, and why?

4. Show that the sequence 9, 12, 15, 18, ... is an A.P. Find its 16th term and the general term. [2]
5. Write the median class for the following frequency distribution: [2]

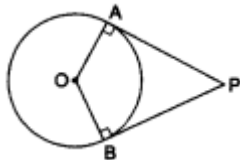
Class Interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency	5	8	7	12	28	20	10	10

6. If AB is a chord of a circle with centre O. AOC is a diameter and AT is the tangent at A as [2]
shown in figure. Prove that $\angle BAT = \angle ACB$.



OR

PA and PB are tangents to the circle with centre O from an external point P, touching the circle at A and B respectively. Show that the quadrilateral AOBP is cyclic.



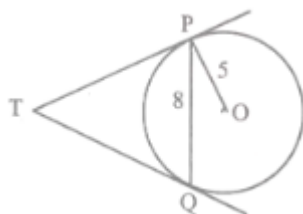
Section B

7. How many terms are there in the A.P. $-1, -\frac{5}{6}, -\frac{2}{3}, -\frac{1}{2}, \dots, \frac{10}{3}$ [3]
8. As observed from the top of a 150 m tall light house, the angles of depression of two ships approaching it are 30° and 45° . If one ship is directly behind the other, find the distance between the two ships. [3]

OR

If the altitude of the Sun is 60° , what is the height of a tower which casts a shadow of length 30 m?

9. In the given figure, PQ is a chord of length 8 cm of a circle of radius 5 cm and centre O. The tangents at P and Q intersect at point T. Find the length of TP. [3]



10. Solve the quadratic equation by factorization: [3]
 $(a+b)^2x^2 - 4abx - (a-b)^2 = 0.$

Section C

11. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. [4]

OR

Let ABC be a right triangle in which $AB = 6\text{cm}$, $BC = 8\text{cm}$ and $\angle B = 90^\circ$. BD is the perpendicular from B on AC. The circle through B, C and D is drawn construct the tangents from A to this circle.

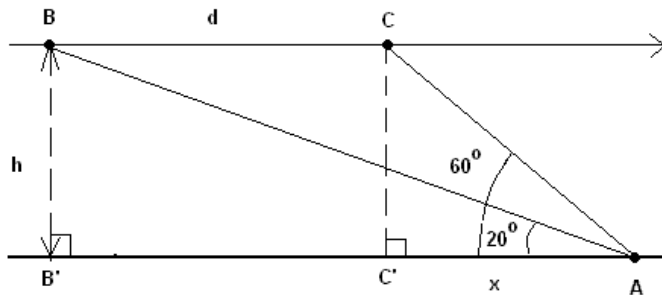
12. The following table gives the distribution of the life time of 400 neon lamps: [4]

Lite time (in hours)	Number of lamps
1500-2000	14
2000-2500	56
2500-3000	60
3000-3500	86

3500-4000	74
4000-4500	62
4500-5000	48

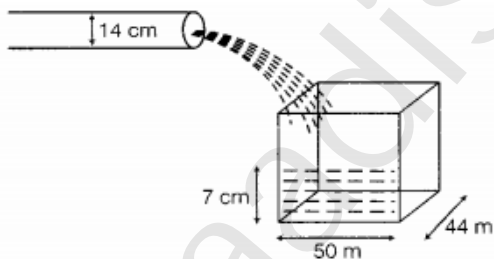
Find the median life time of a lamp.

13. Mr. Vinod is a pilot in Air India. During the Covid-19 pandemic, many Indian passengers were stuck at Dubai Airport. The government of India sent special aircraft to take them. Mr. Vinod was leading this operation. He is flying from Dubai to New Delhi with these passengers. His airplane is approaching point A along a straight line and at a constant altitude h . At 10:00 am, the angle of elevation of the airplane is 20° and at 10:01 am, it is 60° . [4]



- What is the distance 'd' is covered by the airplane from 10:00 am to 10:01 am if the speed of the airplane is constant and equal to 600 miles/hour?
 - What is the altitude 'h' of the airplane? (round answer to 2 decimal places).
14. A farmer used to irrigate his land during summer on a regular basis to grow his crops and save them from dry weather. To irrigate his land he built a tube well in his field. The tube well has a rectangular tank and a pipe that is used to fill this tank. The dimensions of this tube well system are: [4]

Water is flowing at the rate of 5 km/hr through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide.



After reading the above given information, answer the following questions:

- The volume of the water flowing through the cylindrical pipe in x hours.
- Determine the time in which the level of the water in the tank will rise by 7 cm.