

Mathematics-Standard (041)

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. All questions are compulsory.
3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
5. 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.

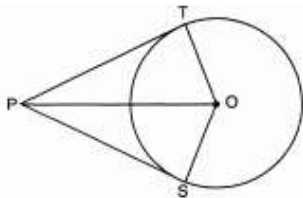
Section A

1. If 10 times the 10th term of an A.P. is equal to 15 times the 15th term, show that 25th term of the A.P. is zero. [2]

OR

Is 302 a term of the A.P. 3,8,13,...?

2. Determine the positive value of 'k' for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real and equal roots. [2]
3. In the given figure, from a point P, two tangents PT and PS are drawn to a circle with centre O such that $\angle SPT = 120^\circ$, Prove that $OP = 2PS$ [2]



4. A golf ball has diameter equal to 4.2 cm. Its surface has 200 dimples each of radius 2 mm. Calculate the total surface area which is exposed to the surroundings assuming that the dimples are hemispherical. [2]
5. The average marks of A, B and C is 33, while the average marks of B, C and D is 37. If A obtains 30 marks, find the marks obtained by D. [2]
6. Find the roots of quadratic equation by the factorisation method: $3x^2 + 5\sqrt{5}x - 10 = 0$ [2]

OR

Find the value of k for the quadratic equation $2x^2+kx+3=0$, so that they have two real equal roots.

Section B

7. Find the median of the following frequency distribution: [3]

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Number of students	6	16	30	9	4

8. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° . [3]

9. Find the mean of the following frequency distribution: [3]

Class interval	10-30	30-50	50-70	70-90	90-110	110-130
Frequency	5	8	12	20	3	2

10. 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

Two ships are there in the sea on either side of a lighthouse in such a way that the ships and the lighthouse are in the same straight line. The angles of depression of two ships are observed from the top of the lighthouse are 60° and 45° respectively. If the height of the lighthouse is 200 m, find the distance between the two ships. (Use $\sqrt{3} = 1.73$)

Section C

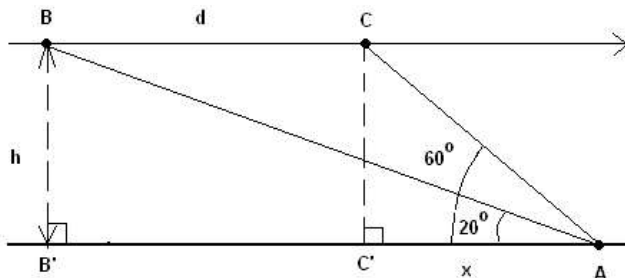
11. A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 104 cm and the radius of each of the hemispherical ends is 7 cm, find the cost of polishing its surface at the rate of ₹10 per dm^2 . [4]

12. Equal circles with centres O and O' touch each other at X. OO' is produced to meet the circle with centre O' at A and AC is a tangent to the circle with centre O. If O'D is perpendicular to AC, find $\frac{DO'}{CO}$ [4]

OR

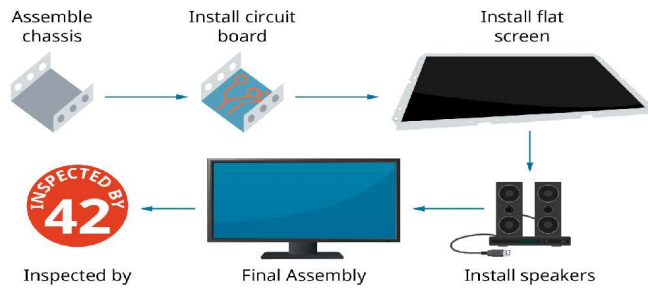
Two circles with centres O and O' of radii 3 cm and 4 cm, respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ.

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. Elpis Technology is a laptop manufacturer. The company works for many branded laptop companies and also provides them with spare parts. Elpis Technology produced 6000 units in 3rd year and 7000 units in the 7th year. [4]



Assuming that production increases uniformly by a fixed number every year, find

- i. the production in the 1st year, (2)
- ii. the production in the 5th year, (1)
- iii. the total production in 7 years. (1)

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