Sample Question Paper – 1
Mathematics – Standard (041)
Class – X, Session: 2021-2022
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 4questions 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

Q1 (2)

Find the 20th term of the AP whose 7th term is 24 less than the 11th term, first term being 12.

OR

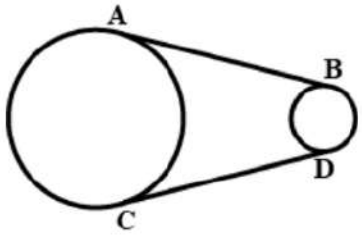
Determine k so that $k^2 + 4k + 8, 2k^2 + 3k + 6, 3k^2 + 4k + 4$ are three consecutive terms of an AP.

Q2 (2)

Find a natural number whose square diminished by 84 is equal, to thrice of 8 more than the given number

Q3 (2)

In figure, AB and CD are common tangents to two circles of unequal radii. Prove that AB = CD



Q4 (2)

Three metallic solid cubes whose edges are 3 cm, 4 cm and 5 cm are melted and formed into a single cube. Find the edge of the cube so formed.

Q5 (2)

Calculate the mean of the following data

Class	4-7	8-11	12-15	16-19
Frequency	5	4	9	10

Q6 (2)

If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than five times her actual age. What is her age now?

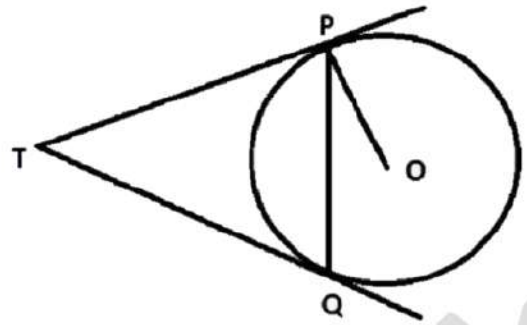
OR

	Find the roots of the quadratic equations by using the quadratic formula in each of the following: (i) $2x^2 - 3x - 5 = 0$ (ii) $x^2 - 3\sqrt{5}\,x + 10 = 0$	

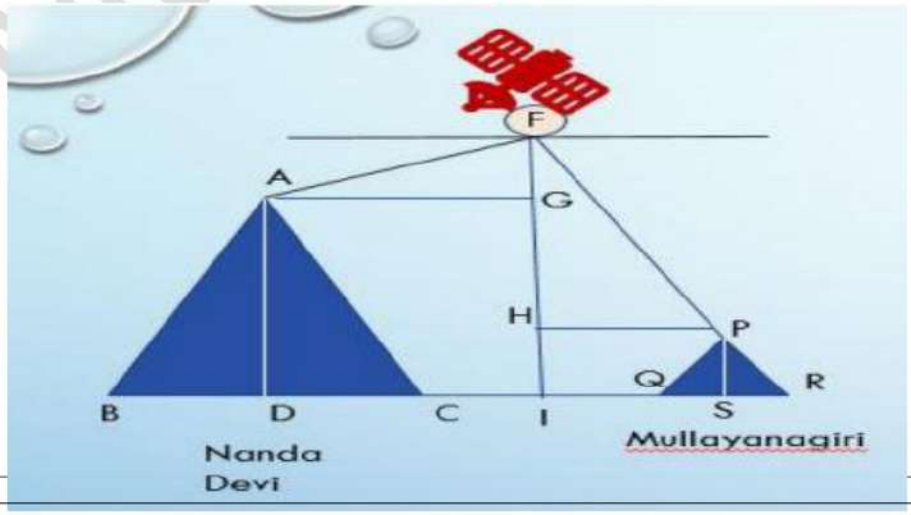
SECTION – B

Q7	The weight of coffee in 70 packets are shown in the following table Weight (in g) | Number of Packets 200 - 201 | 12 201 - 202 | 26 202 - 203 | 20 203 - 204 | 9 204 - 205 | 2 205 - 206 | 1 Determine the modal weight	3
Q8	Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°	3
Q9	The maximum bowling speeds, in km per hour, of 33 players at a cricket coaching centre are given as follows Speed (km / h) | 85 - 100 | 100 - 115 | 115 - 130 | 130 - 135 No. of Players | 11 | 9 | 8 | 5 Find the median.	3
Q10	A vertical pole and a vertical tower are on the same level ground in such a way that from the top of the pole the angle of elevation of the top of the tower is 60◦ and the angle of depression of the bottom of the tower is 30◦. Find the height of the tower, if the height of the pole is 20 m. OR A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60o. When he moves 40 m away from the bank, he finds the angle of elevation to be 30o. Find the height of the tree and the width of the river. (3=1.73)	3

SECTION – C

Q11	i) A hollow sphere of internal and external diameters 4 cm and 8 cm respectively, is melted into a cone of base diameter 8 cm. Find the height of the cone. ii) The radii of the internal and external surfaces of a hollow spherical shell are 3 cm and 5 cm respectively. If it is melted and recast into a solid cylinder of height 8/3 cm, find the diameter of the cylinder	4
Q12	Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact to the centre OR Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$  	4

CASE STUDY – 1

Q13	A Satellite flying at height h is watching the top of the two tallest mountains in Uttarakhand and Karnataka, them being Nanda Devi (height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite, to the top of Nanda Devi and Mullayanagiri are 30° and 60° respectively. If the distance between the peaks of the two mountains is 1937 km, and the satellite is vertically above the midpoint of the distance between the two mountains.  	4

	i) The distance of the satellite from the top of Nanda Devi is ii) The distance of the satellite from the top of Mullayanagiri is iii) The distance of the satellite from the ground is iv) What is the angle of elevation if a man is standing at a distance of 7816m from Nanda Devi?	

CASE STUDY – 2

Q14	A loan is when you receive money from a friend, bank or financial institution in exchange for future repayment of the principal, plus interest. The principal is the amount you borrowed, and the interest is the amount charged for receiving the loan.  Jaspar takes a loan from a bank for his car. Jaspar Singh repays his total loan of 118000 by paying every month starting with the first instalment of Rs.1000. If he increases the installment by Rs.100 every month. i) In how many months the loan will be cleared? ii) What amount does he still have to pay after 30th installment?	4

---------- ALL THE BEST ----------