

Grade : 10
Marks: 80

Term- I
MATHEMATICS

Date :
Time : 3 hrs

EACH QUESTION IN SECTION A & B CARRIES ONE MARK

EACH QUESTION IN SECTION C CARRIES TWO MARKS

EACH QUESTION IN SECTION D CARRIES THREE MARKS

EACH QUESTION IN SECTION E CARRIES FIVE MARKS

STUDENTS HAVE TO ANSWER ALL THE QUESTIONS.

SECTION A

1. Raj and Ajay are very close friends. Both the families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/h while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete the journey of 400 km.



- i) What will be the distance covered by Ajay's car in two hours?
a) $2(x+5)$ km b) $(x-5)$ km c) $2(x+10)$ km d) $(2x+5)$ km
- ii) Which of the following quadratic equation describe the speed of Raj's car?
a) $x^2 - 5x - 500 = 0$ b) $x^2 + 4x - 400 = 0$ c) $x^2 + 5x - 500 = 0$ d) $x^2 - 4x + 400 = 0$
- iii) What is the speed of Raj's car?
a) 20 km/hour b) 15 km/hour c) 25 km/hour d) 10 km/hour
- iv) How much time took Ajay to travel 400 km?
a) 20 hour b) 40 hour c) 25 hour d) 16 hour

2. Your friend Veer wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds .



- i) Which of the following terms are in AP for the given situation
 a) 51,53,55.... b) 51, 49, 47.... c) -51, -53, -55.... d) 51, 55, 59...
- ii) What is the minimum number of days he needs to practice till his goal is achieved
 a) 10 b) 12 c) 11 d) 9
- iii) Which of the following term is not in the AP of the above given situation
 a) 41 b) 30 c) 37 d) 39
- iv) If nth term of an AP is given by $a_n = 2n + 3$ then common difference of an AP is
 a) 2 b) 3 c) 5 d) 1

3. A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height.



- i) What is the angle of elevation if they are standing at a distance of 42m away from the monument?
 a) 30° b) 45° c) 60° d) 0°
- ii) They want to see the tower at an angle of 60° . So, they want to know the distance where they should stand and hence find the distance.
 a) 25.24 m b) 20.12 m c) 42 m d) 24.64 m
- iii) If the altitude of the Sun is at 60° , then the height of the vertical tower that will cast a shadow of length 20 m is
 a) $20\sqrt{3}$ m b) $\frac{20}{\sqrt{3}}$ m c) $\frac{15}{\sqrt{3}}$ m d) $15\sqrt{3}$ m
- iv) The ratio of the length of a rod and its shadow is 1:1. The angle of elevation of the Sun is
 a) 30° b) 45° c) 60° d) 90°

4. Rahul and Ravi planned to play Business (board game) in which they were supposed to use two dice.



- i) Ravi got first chance to roll the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is 8?
 a) $\frac{1}{26}$ b) $\frac{5}{36}$ c) 0 d) $\frac{1}{18}$

20. Two different dices are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

SECTION-C

21. Find the largest number which divides 70 and 125 leaving remainder 5 and 8 respectively.

22. Compute the zeroes of the polynomial $4x^2 - 4x - 8$. Also, establish a relationship between the zeroes and coefficients.

23. Solve: $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

24. Solve the following pair of equations by substitution method:

$$7x - 15y = 2 ; x + 2y = 3$$

25. If $4 \tan \theta = 3$, evaluate $\frac{(4 \sin \theta - \cos \theta + 1)}{(4 \sin \theta + \cos \theta + 1)}$

(or)

If $\sin \theta + \cos \theta = \sqrt{2}$, prove that $\tan \theta + \cot \theta = 2$

SECTION - D

26. Prove that $\sqrt{7} - \sqrt{3}$ is irrational.

27. Show that if the roots of the following quadratic equation in

$$X^2(a^2 + b^2) - 2(ac + bd)x + (c^2 + d^2) = 0$$
 are equal then $ad = bc$.

(or)

Two water taps together can fill a tank in $\frac{75}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately.

Find the time in which each tap can separately fill the tank.

28. If α and β are the roots of the quadratic polynomial $x^2 + 9x + 20$, form a quadratic polynomial whose zeros are $(\alpha + 1)$ and $(\beta + 1)$

29. The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save Rs. 2000 per month, find their monthly incomes.

30. A tree breaks due to a storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

31. In a single throw of a pair of different dice, what is the probability of getting (i) a prime number on each dice? (ii) a total of 9 or 11?

SECTION –E

32. A plane left 30minutes late than its scheduled time and in order to reach the destination 1500km away in time, it had to increase its speed by 100km/hr from the usual speed. Find its usual speed.

33. Prove that: $\frac{\cos \theta - \sin \theta + 1}{\cos \theta + \sin \theta - 1} = \operatorname{cosec} \theta + \cot \theta$

(or)

If the sum of the first 7 terms of an AP is 119 and that of the first 17 terms is 714, find the sum of its first n terms.

34. How many terms of the Arithmetic Progression 45, 39, 33,... must be taken so that their sum is 180? Explain the double answer.
35. A flagstaff stands at the top of a 5m high tower. From a point on the ground, the angle of elevation of the top of the flagstaff is 60° and from the same point, the angle of elevation of the top of the tower is 45° . Find the height of the flagstaff.