General Instructions:

1. This question paper has 5 sections A to E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment of 4 marks each.
7. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, wherever required if not stated.

Section – A

Section A consists of 20 questions of 1 mark each.

1. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is:
   a. 13   b. 65   c. 875   d. 1750

2. For what value of k, are the roots of the quadratic equation $2x^2 - kx + k = 0$ equal?
   a. 0 only   b. 4   c. 8 only   d. 0 and 8

3. Given that HCF (306, 1314) = 18, then LCM (306, 1314) is:
   a. 22338   b. 2233   c. 2238   d. 22388

4. For the following distribution the lower limit of modal class is:

Class	$0 - 5$	$5 - 10$	$10 - 15$	$15 - 20$	$20 - 25$
Frequency	10	15	12	20	9

   a. 35   b. 15   c. 25   d. 30

5. 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. $-\frac{2}{3}$

6. Two signals blink at intervals of 24 minutes and 36 minutes respectively. After what time will they next blink together?
a. 4 hours   b.   2 hours   c.   1 hour 12 minutes   d.   3 hours
7. The number of polynomials having zeroes -2 and 5 is:
a. 1   b.   2   c.   3   d.   more than 3
8. Which equation of the following is intersecting with the linear equation $-3x + 5y - 2 = 0$?
a. $-6x + 10y - 4 = 0$
b. $6x - 10y - 4 = 0$
c. $6x + 10y - 4 = 0$
d. $-6x + 10y + 4 = 0$
9. If a 5 metre high pole casts a shadow 8 m long at a certain time and at the same time, a tower casts a 16 m long shadow, then the height of the tower is:
a. 5 m   b.   10 m   c.   6 m   d.   9 m
10. From a point P which is at 13 cm from the centre O of a circle of radius 5 cm, two tangents PQ and PR are drawn to the circle. The length of the tangents PQ and PR is:
a. 5 cm   b.   10 cm   c.   12 cm   d.   17 cm
11. It is given that, $\Delta ABC \sim \Delta DFE, \angle A = 30°, \angle C = 50°, AB = 5\ cm, AC = 8\ cm$ and $DF = 7.5\ cm$. Then, the following is true:
a. DE = 12 cm, $\angle F = 50°$
b. $DE = 12\ cm, \angle F = 100°$
c. $EF = 12\ cm, \angle D = 100°$
d. $EF = 12\ cm, \angle D = 30°$
12. Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5. Then the numbers are:
a. 40, 42   b.   42, 48   c.   40, 48   d.   44, 50
13. If $P(E) = 0.07$, then what is the probability of 'not E'?
a. 0.93   b.   0.95   c.   0.89   d.   0.90
14. Which of the following equations has 2 as a root?
a. $x^2 - 4x + 5 = 0$
b. $x^2 + 3x - 12 = 0$
c. $2x^2 - 7x + 6 = 0$
d. $3x^2 - 6x - 2 = 0$
15. If two dice are thrown in the air, the probability of getting sum as 3 will be:

a. $\frac{2}{18}$ b. $\frac{3}{18}$ c. $\frac{1}{18}$ d. $\frac{1}{36}$

16. If PA and PB are tangents to the circle with centre O such that $\angle APB = 50°$, then $\angle AOB$ is equal to:

a. 25°   b. 130°   c. 40°   d. 80°

17. If the difference between the circumference and the radius of a circle is 37 cm, calculate the circumference of the circle.

a. 44 cm   b. 55 cm   c. 45 cm   d. 54 cm

18. The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 4$ will have infinitely many solutions is:

a. 3   b. -3 c. -12 d. no value

19. Assertion (A): The discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$ is (-7) and hence, the nature of its roots is no real roots.

Reason (R): If $b^2 - 4ac < 0$, the nature of roots is no real roots.

20. Assertion (A): The equation $6x^2 + 3x + 2 = 0$ is a quadratic equation.

Reason (R): Any equation of the form $ax^2 + bx + c = 0$, where $a \neq 0$, is called a quadratic equation.

Section – B

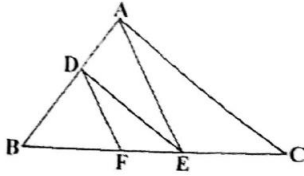**Section B consists of 5 questions of 2 marks each.**

21. Find the nature of roots of $-2x^2 + 3x + 2 = 0$. Also, find the roots, if they exist.

22. Solve the following pair of linear equations for the value of x and y:

$21x + 47y = 110$; $47x + 21y = 162$

23. In the given figure, PA and PB are tangents to the circle with centre O such that $\angle APB = 50°$. Write the measure of $\angle OAB$.
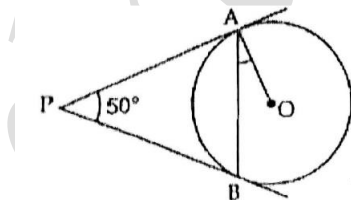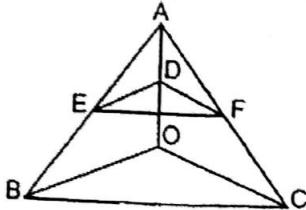

OR

Prove that the parallelogram circumscribing a circle is a rhombus.

24. In the given figure, DE ∥ AC and DF ∥ AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$.

3

OR

In the given figure, if DE || OB and DF || OC, then prove that EF || BC.

25. Explain why $17 \times 5 \times 11 \times 3 \times 2 + 2 \times 11$ is a composite number.

Section – C
Section C consists of 6 questions of 3 marks each.

26. Prove that $2 - 3\sqrt{5}$ is an irrational number, where $\sqrt{5}$ is an irrational number.

27. Find the zeroes of the quadratic polynomial $f(x) = 6x^2 + x - 12$ and verify the relationship between the zeroes and the coefficients of the polynomial.

28. The owner of a taxi company decides to run all the taxis on CNG fuel instead of petrol/diesel. The taxi charges in a city comprises of fixed charges together with the charge for the distance covered. For a journey of 12 km, the charge paid is ₹ 265 and for a journey of 20 km, the charge paid is ₹ 425. Find the fixed charge and the charge per km.

OR

Draw the graphs of the pair of linear equations $x - y + 2 = 0$ and $4x - y - 2 = 0$. Shade the triangle formed by the lines so drawn and the $x - axis$.

29. A chord AB of a circle with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment. Hence, find the area of the major segment.

OR

In a circle of radius 21 cm, an arc subtends an angle of $60°$ at the centre. Find:
(i)   the length of the arc.
(ii)   area of the sector formed by the arc.

30. Given below is the distribution of weekly pocket money of students of a class. Calculate the mode and median of the data given below.

Pocket Money (in ₹)	No. of students
0 – 20	2
20 – 40	2
40 – 60	3
60 – 80	12
80 – 100	18
100 – 120	5
120 – 140	2

31. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting:

(i)   a black card

(ii)   a jack of heart

(iii) an ace of red colour

Section – D

Section D consists of 4 questions of 5 marks each.

32. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

By using the above theorem, solve the following question:

Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

OR

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

33. State and proof Basic Proportionality Theorem.

Solve using the theorem, in the given figure, if DE ∥ AB, then find the value of x.
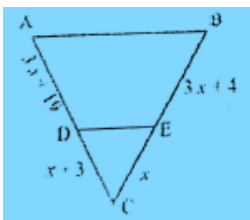
34. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find:

(i) the area of that part of the field in which the horse can graze.

(ii) the increase in grazing area if the rope were 10 m long instead of 5 m. (*Use* $\pi = 3.14$)

OR
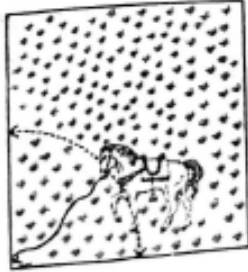
In the given figure, an equilateral triangle has been inscribed in a circle of radius 6 cm. Find the area of the shaded region.
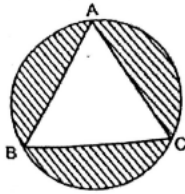

35. The mean of the following distribution is 48 and the sum of all the frequencies is 50. Find the missing frequencies x and y.

Class	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	8	6	x	11	y

Section – E

Section E consists of 3 questions of 4 marks each.

36. Nidhi and Ria are very close friends. Nidhi's parents own a Maruti Alto. Ria's parents own a Toyota Liva. Both the families decide to go for a picnic to Somnath Temple in Gujarat by their own cars.
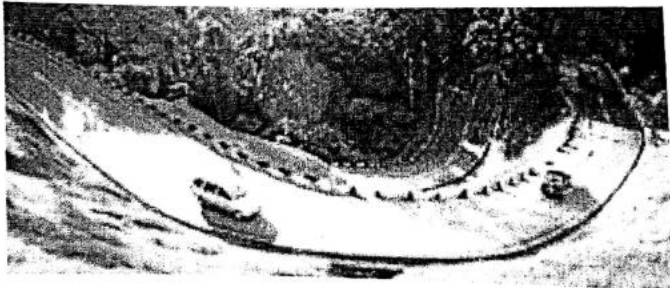
Nidhi's car travels at x km/h, while Ria's car travels at 5 km/h more speed than Nidhi's car. Nidhi's car took 4 hours more than Ria's car in covering 400 km.

(i)   Write the quadratic equation that describes the speed of Nidhi's car?(2)
(ii)   What is the speed of Nidhi's car?   (1)
(iii) What will be the distance covered by Ria's car in two hours?   (1)
       OR
       How much time did Ria take to travel 400 km?

37. Blood Group: Blood type or blood group is a medical term. It describes the type of blood a person has. It is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells (RBCs). Blood types predict whether a serious reaction will occur in a blood transfusion.

In a sample of 50 people, 21 had type O blood, 22 had type A blood, 5 had type B blood, and 2 had type AB blood. Set up a frequency distribution and find the following probabilities.

(i)   What is the probability that a person has type O blood?
(ii)   What is the probability that a person has type A or type B blood?
(iii) What is the probability that a person has neither type A nor type O blood?
       OR
       What is the probability that a person does not have type AB blood?

38. A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants for the subject Hindi, English and Mathematics are 60, 84 and 108 respectively.

Based on the given information, answer the following questions:

(i)   In each room the same number of participants are to be seated and all of them belong to the same subject. Hence, find the maximum number of participants that can be accommodated in each room.

(ii)   What is the minimum number of rooms required during the seminar?

(iii)   Find the product of HCF and LCM of 60, 84 and 108.