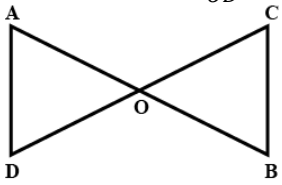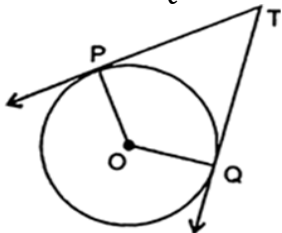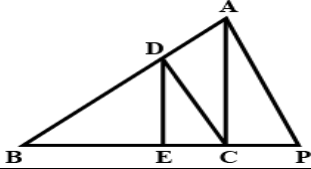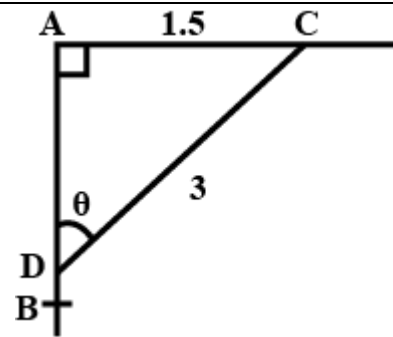Date:

General Instructions:

1. This Question Paper has 5 Sections A - E.

2. Section **A** has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.

3. Section **B** has 5 questions carrying 02 marks each.

4. Section **C** has 6 questions carrying 03 marks each.

5. Section **D** has 4 questions carrying 05 marks each.

6. Section **E** has 3 Case Based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

8. 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	
S.NO		MARKS
1.	If *p* and *q* are positive integers such that $p = ab^2$ and $q = a^2 b$, where *a* and *b* are prime numbers, then the LCM (p, q) is (a) ab (b) a^2b^2 (c) a^3b^3 (d) $a^3 b^2$	1
2.	A quadratic polynomial, whose zeroes are –3 & 4 is (a) $x^2 - x + 12$ (b) $x^2 + x + 12$ (c) $x^2 - x - 12$ (d) $2x^2 + 2x - 24$	1
3.	If α and $\frac{1}{\alpha}$ are the zeroes of the quadratic polynomial $2x^2 - x + k$, then *k* is (a) 4 (b) $\frac{1}{4}$ (c) $\frac{-1}{4}$ (d) 2	1
4.	Find the value of k for which system of linear equations x + 2y = 3, 5x + ky + 7 = 0 is inconsistent (a) $k = \frac{14}{3}$ (b) $k = \frac{-14}{3}$ (c) k = 10 (d) k = -10	1
5.	The vertices of a parallelogram taken in order are A(1, 2), B (4, y), C (x, 6) and D (3, 5). Then (x, y) is (a) (6, 3) (b) (3, 6) (c) (6, 5) (d) (1, 4)	1
6.	In $\Delta ABC \ and \ \Delta DEF \ \angle B = \angle E$ and $\angle F = \angle C$, AB = 3DE, then the two triangles are (a) congruent but not similar (b) similar but not congruent (c) neither congruent nor similar (d) congruent as well as similar	1
7.	If a pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then the Sun's elevation is (a) 60^0 (b) 45^0 (c) 30^0 (d) 15^0	1

8.	In ΔABC right angled at B, if $\tan A = \sqrt{3}$ then $\cos A \cos C - \sin A \sin C =$	1
	(a) -1 (b)0 (c) 1 (d) $\frac{\sqrt{3}}{2}$	
9.	In the figure, if $\frac{OA}{OD} = \frac{OC}{OB}$, then which pair of angles are equal? (a) $\angle A = \angle C, \angle B = D$ (b) $\angle A = \angle B, \angle C = D$ (c) $\angle B = \angle C, \angle D = \angle A$ (d) none of these	1
10.	In ΔABC, DE $\parallel AB, if\ CD$ = 3 cm, EC = 4 cm, BE = 6 cm, then DA is equal to (a) 7. 5 cm (b) 3 cm (c) 4.5 cm (d) 6 cm	1
11.	In the given figure, if TP and TQ are tangents to a circle with centre O, so that $\angle POQ = 110^0$, then$\angle PTQ$ is (a) 110^0 (b) $90^{\,0}$ (c) 80^0 (d) 70^0	1
12.	The area of a square that can be inscribed in a circle of radius 8 cm is (a) 256 cm^2 (b) 128 cm^2 (c) $64\sqrt{2}$ cm^2 (d) 64 cm^2	1
13.	The ratio of the total surface area to the lateral surface area of a cylinder with base radius 80 cm and height 20 cm is (a) 1:2 (b) 2:1 (c) 3:1 (d) 5:1	1
14.	The mean and mode of a frequency distribution are 28 and 16 respectively. The median is (a) 22 (b) 23.5 (c) 24 (d) 24.5	1
15.	The number of revolutions made by a circular wheel of radius 0.7 m in rolling a distance of 176 m is (a) 22 (b) 24 (c) 75 (d) 40	1
16.	For the following distribution	1

Class	0 – 5	6 - 11	12 - 17	18 – 23	24 – 29
Frequency	13	10	15	8	11

The upper limit of the median class is

     (a) 18.5   (b) 20.5   (c) 25.5   (d) 17.5

17.	Two different dice are thrown together. The probability of getting the sum of the two numbers less than 7 is (a) $\frac{5}{12}$ (b) $\frac{7}{12}$ (c) $\frac{12}{5}$ (d) $\frac{3}{11}$	1
18.	If $5 \tan \theta = 4$, then the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$ is (a) $\frac{1}{6}$ (b) $\frac{1}{7}$ (c) $\frac{1}{4}$ (d) $\frac{1}{5}$	1
19.	DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option **Statement A (Assertion):** The number 6^n never end with digit 0 for any natural number n **Statement R(Reason***)* : The number 9^n never end with digit 0 for any natural number n	1

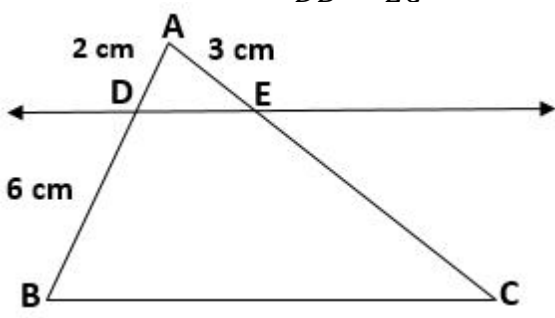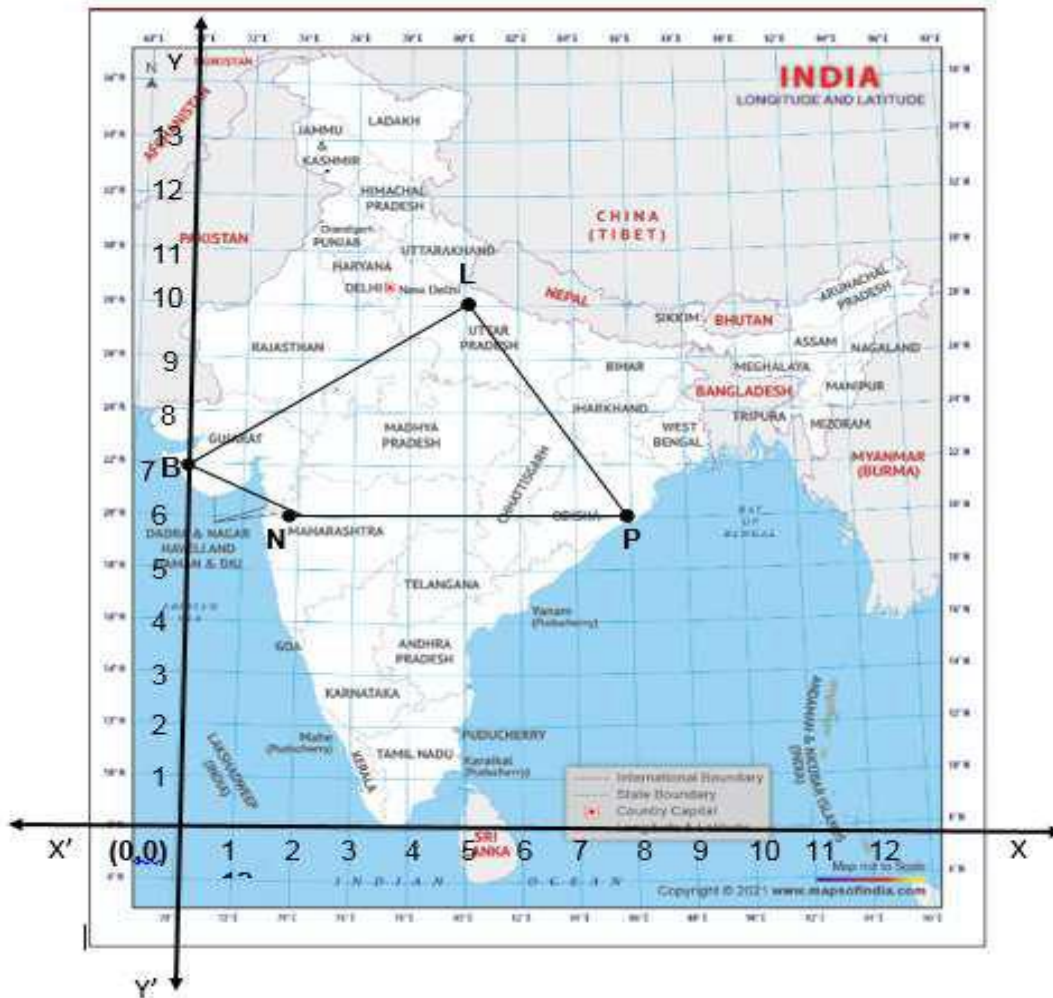|	(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A) (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true.	
20.	DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option **Statement A (Assertion):** The value of y is 3, if the distance between the points P(2, -3) and Q (10, y) is 10 . **Statement R(Reason)** : Distance between two points is given by $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A) (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true	1
	SECTION B	
	Section B consists of 5 questions of 2 marks each.	
S.No.		Marks
21.	If 217 x + 131y = 913, 131x + 217 y = 827, then find the value of x and y	2
22.	In the adjoining figure, DE || AC and DC || AP. Prove that $\frac{BE}{EC} = \frac{BC}{CP}$ 	2
23.	From an external point P, tangents PA and PB are drawn to a circle with centre O. If ∠PAB = 50^0 , then find ∠AOB	2
24.	The minute hand of a clock is 10 cm long. Find the area of the face of the clock described by the minute hand between 9 am and 9.35 am OR If the area of a sector of a circle is $\frac{5}{18}$th of the area of a circle, then find the central angle of the sector.	2
25.	The rod AC of a TV disc antenna is fixed at right angles to the wall AB and a rod CD is supporting the disc as in figure. If AC = 1.5 m and CD = 3m , find (i) tan θ (ii) secθ+ cosecθ	2

OR

If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, then prove that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
S.No.		Marks
26.	Given that $\sqrt{5}$ is irrational, prove that $2+3\sqrt{5}$ is irrational.	3
27.	If α and β are the zeroes of the quadratic polynomial such that $\alpha + \beta = 24$ and $\alpha - \beta = 8$. Find the quadratic polynomial having α and β as its zeroes	3
28.	A train covered a certain distance at a uniform speed. If the train would have been 10 km/hr faster, it would have taken 2 hours less than the scheduled time. And if the train were slower by 10km/hr, it would have taken 3 hours more than the scheduled time. Find the distance covered by the train. OR A plane left 30 minutes later than the scheduled time and in order to reach its destination 1500 km away on time, it has to increase its speed by 250 km/hr from its usual speed. Find the usual speed of the plane.	3
29.	Prove that $$\frac{tan\theta}{1 - tan\theta} - \frac{cot\theta}{1 - cot\theta} = \frac{cos\theta + sin\theta}{cos\theta - sin\theta}$$ OR If $\sin(A + B - C) = \frac{1}{2}$, $\cot(A - B + C) = 0$ and $\cos(B + C - A) = \frac{1}{2}$, find A, B and C	3
30.	In the figure PA and PB are tangents from P to the circle with centre O and Q is any point on the circle. If CD is a tangent to the circle at Q, prove that PC + CQ = PD + DQ OR In the figure , from an external point P, two tangetns PT and PS are drawn to a cicle with centre O and radius r. If OP = 2r, show that $\angle OTS = \angle OST = 30^0$ 	3

31.	Three different coins are tossed together. Find the probability of getting (i) exactly two heads. (iii) at least two tails (iii) at most two heads?	3

SECTION D

Section D consists of 4 questions of 5 marks each.

S.No.		Marks
32.	Two pipes running together can fill a cistern in $3\frac{1}{13}$ hours. If one pipe takes 3 hours more than the other to fill it, find the time in which each pipe would fill the cistern. OR A train travels 180 km at a uniform speed. If the speed had been 9 km/ hour more, it would have taken 1 hour less for the same journey. Find the speed of the train.	5
33.	Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio." In the figure, find EC if $\dfrac{AD}{DB} = \dfrac{AE}{EC}$ using the above theorem 	5
34.	A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6cm. Find the height of each bottle if 10% liquid is wasted in this transfer. OR A copper wire of diameter 3 mm is evenly wrapped on a cylinder of length 12 cm and diameter 10 cm to cover the whole surface. Find (i) the length of the wire (ii) the volume of the wire.(Use $\pi = 3.14$)	5
35.	If the median of the distribution given below is 32.5, find the values of x and y.	5

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 – 60	60 - 70	Total
Frequency	x	5	9	12	y	3	2	40

SECTION E

Case study based questions are compulsory.

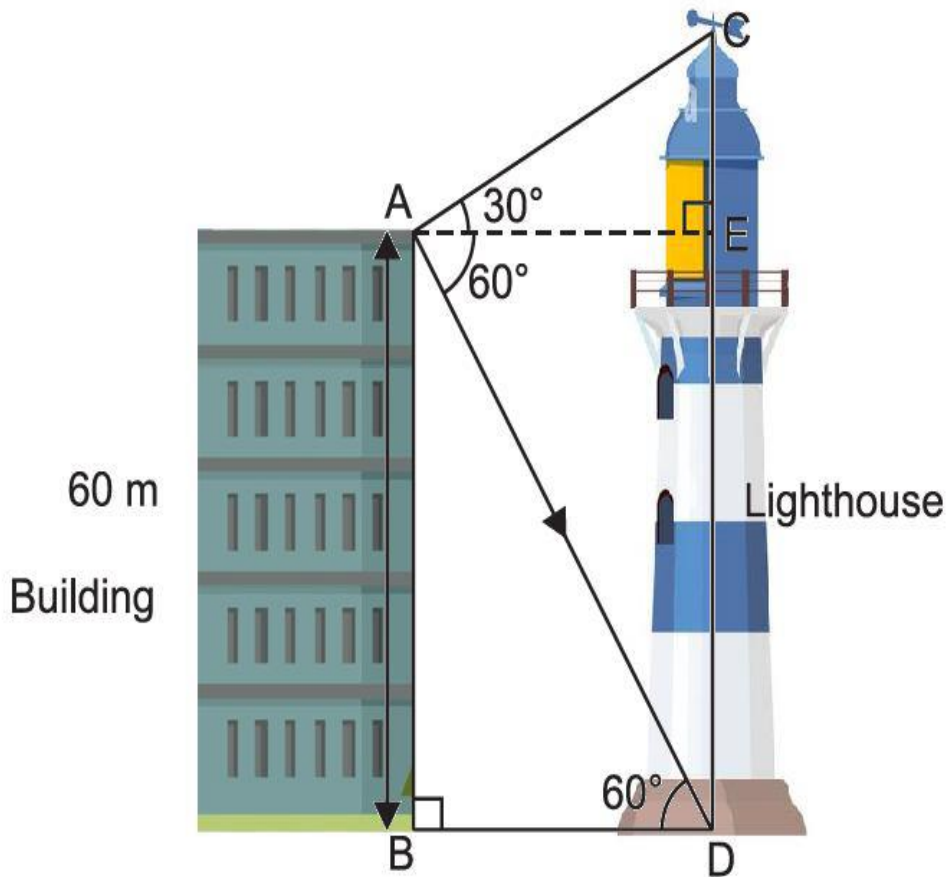| 36. | In a GPS, The lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below.
Based on the above information answer the following questions using the coordinate geometry.
(i) Find the distance between Lucknow (L) to Bhuj (B).
(ii) If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K).
(iii) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P)
OR
Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P). |

(1)
(1)

(2) |

37.	In the month of April to June 2022 the exports of passengers cars from India increased by 26% in the corresponding quarter of 2021-22, as per our report. A care manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increased by a fixed number every year. Based on the above information answer the following questions:-	
	(i)Find the production in the first year.	(1)
	(ii) Find the production in 12th year.	(1)
	(iii) Find the total production in first 10 year OR	(2)
	In which year the total production year will reach to 31200 cars?	
38.	Ram is watching the top and bottom of a lighthouse from the top of the building. The angles of elevation and depression of the top and bottom of a lighthouse from the top of a 60 m high building are 30° and 60° respectively	

Find (i) the difference between the heights of the lighthouse and the building.
(ii) the distance between the lighthouse and the building.
OR
The ratio of the height of a light house and the length of its shadow on the ground is √3 : 1
What is the angle of elevation?
(iii) What is the distance from the foot of the lighthouse to the top of the building?

1

2

1