



Series **C4ABD/4**

SET~3

रोल नं.							
Roll No.							

प्रश्न-पत्र कोड
Q.P. Code **430/4/3**

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Q.P. Code on the title page of the answer-book.

नोट / NOTE :

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **23** हैं ।
Please check that this question paper contains **23** printed pages.
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **38** प्रश्न हैं ।
Please check that this question paper contains **38** questions.
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।
Please write down the serial number of the question in the answer-book before attempting it.
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित (बुनियादी)

MATHEMATICS (BASIC)



निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80



3. 6 cm त्रिज्या वाले एक वृत्त के त्रिज्यखंड, जो वृत्त के केन्द्र पर 60° का कोण अंतरित करता है, का क्षेत्रफल है :

(A) $\frac{142}{7} \text{ cm}^2$

(B) $\frac{152}{7} \text{ cm}^2$

(C) $\frac{132}{7} \text{ cm}^2$

(D) $\frac{122}{7} \text{ cm}^2$

4. द्विघात समीकरण $x^2 - 4 = 0$ का/के मूल है/हैं :

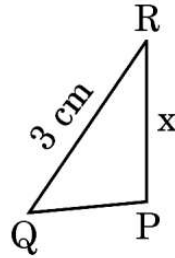
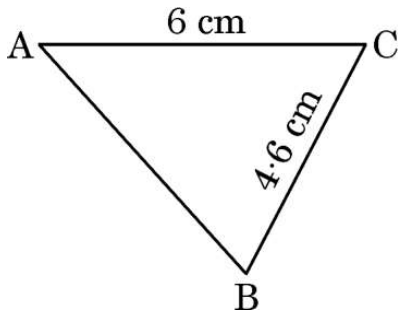
(A) केवल 2

(B) -2, 2

(C) केवल 4

(D) -4, 4

5. दी गई आकृति में, यदि $\triangle ABC \sim \triangle QPR$ है, तो x का मान है :



(A) 5.3 cm

(B) 4.6 cm

(C) 2.3 cm

(D) 4 cm

6. एक न्याय्य पासा एक बार फेंका जाता है। 5 से कम भाज्य संख्या प्राप्त होने की प्रायिकता है :

(A) $\frac{1}{3}$

(B) $\frac{2}{3}$

(C) 0

(D) $\frac{1}{6}$

7. बहुपद $x^2 - 5x + 4$ में क्या जोड़ा जाए जिससे परिणामी बहुपद का एक शून्यक 3 हो ?

(A) 1

(B) 2

(C) 4

(D) 5

8. किसी वृत्त की स्पर्श-रेखा वह रेखा होती है जो वृत्त को स्पर्श करती है :

(A) केवल एक ही बिन्दु पर

(B) दो बिन्दुओं पर

(C) तीन बिन्दुओं पर

(D) अनंत बिन्दुओं पर



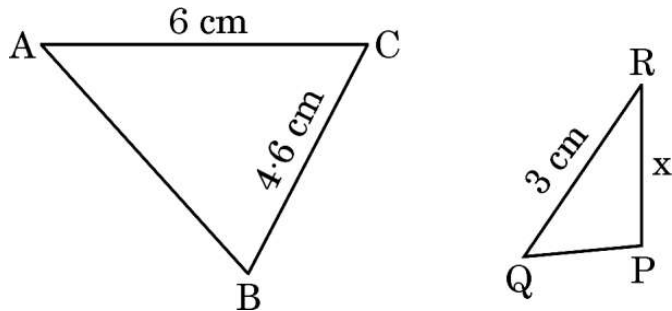
3. The area of the sector of a circle with radius 6 cm which subtends an angle of 60° at the centre of the circle is :

- (A) $\frac{142}{7} \text{ cm}^2$ (B) $\frac{152}{7} \text{ cm}^2$
(C) $\frac{132}{7} \text{ cm}^2$ (D) $\frac{122}{7} \text{ cm}^2$

4. The roots of the quadratic equation $x^2 - 4 = 0$ is/are :

- (A) 2 only (B) -2, 2
(C) 4 only (D) -4, 4

5. In the given figure, if $\triangle ABC \sim \triangle QPR$, then the value of x is :



- (A) 5.3 cm (B) 4.6 cm
(C) 2.3 cm (D) 4 cm

6. A fair die is thrown once. The probability of getting a composite number less than 5 is :

- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$
(C) 0 (D) $\frac{1}{6}$

7. What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is a zero of the resulting polynomial ?

- (A) 1 (B) 2
(C) 4 (D) 5

8. A tangent to a circle is a line that touches the circle at :

- (A) one point only (B) two points
(C) three points (D) infinite number of points



9. बिन्दुओं $(2, -1)$ और $(-1, -5)$ के बीच की दूरी है :

- (A) 15 इकाई (B) 5 इकाई
(C) 25 इकाई (D) 41 इकाई

10. यदि $1080 = 2^x \times 3^y \times 5$ है, तो $(x - y)$ बराबर है :

- (A) 6 (B) -1
(C) 1 (D) 0

11. निम्नलिखित में से कौन-सा द्विघात समीकरण *नहीं* है ?

- (A) $(x - 2)^2 + 1 = 2x - 3$
(B) $(2x - 1)(x - 3) = (x + 5)(x - 1)$
(C) $x(x + 1) + 8 = (x + 2)(x - 2)$
(D) $2x + \frac{3}{x} = 5$

12. द्विघात बहुपदों, जिनके शून्यक -1 और 3 हैं, की संख्या है :

- (A) 1 (B) 2
(C) 3 (D) 3 से अधिक

13. निम्नलिखित बंटन एक फैक्टरी के 50 श्रमिकों की दैनिक आय दर्शाता है :

आय (₹ में)	400 – 424	425 – 449	450 – 474	475 – 499	500 – 524
श्रमिकों की संख्या	12	14	8	6	10

बहुलक वर्ग की निचली सीमा है :

- (A) 425 (B) 449
(C) 424.5 (D) 425.5

14. समांतर श्रेणी का सार्व अंतर, यदि $a_{23} - a_{19} = 32$ है, है :

- (A) 8 (B) -8
(C) -4 (D) 4



9. The distance between the points $(2, -1)$ and $(-1, -5)$ is :
- (A) 15 units (B) 5 units
(C) 25 units (D) 41 units
10. If $1080 = 2^x \times 3^y \times 5$, then $(x - y)$ is equal to :
- (A) 6 (B) -1
(C) 1 (D) 0
11. Which of the following is **not** a quadratic equation ?
- (A) $(x - 2)^2 + 1 = 2x - 3$
(B) $(2x - 1)(x - 3) = (x + 5)(x - 1)$
(C) $x(x + 1) + 8 = (x + 2)(x - 2)$
(D) $2x + \frac{3}{x} = 5$
12. The number of quadratic polynomials having zeroes -1 and 3 is :
- (A) 1 (B) 2
(C) 3 (D) more than 3
13. The following distribution gives the daily income of 50 workers of a factory :

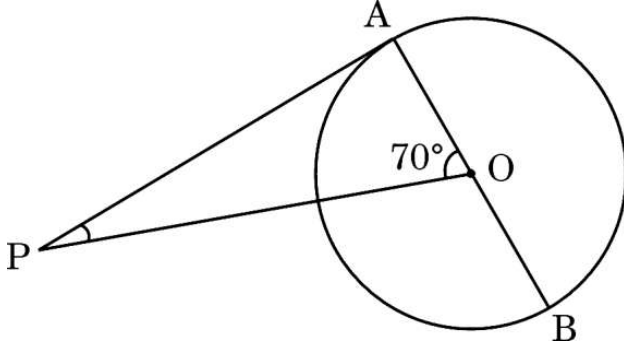
Income (in ₹)	400 – 424	425 – 449	450 – 474	475 – 499	500 – 524
Number of workers	12	14	8	6	10

The lower limit of the modal class is :

- (A) 425 (B) 449
(C) 424.5 (D) 425.5
14. The common difference of an A.P., if $a_{23} - a_{19} = 32$, is :
- (A) 8 (B) -8
(C) -4 (D) 4



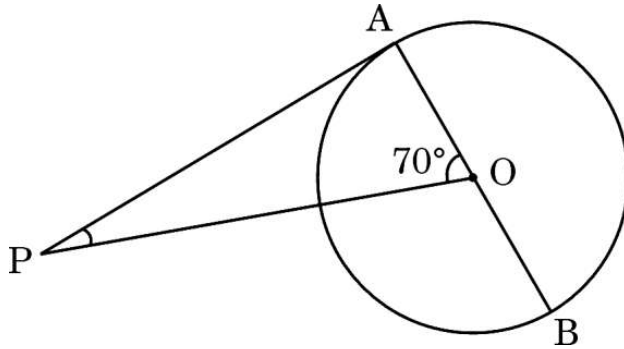
15. दी गई आकृति में, केन्द्र O वाले एक वृत्त पर बाह्य बिन्दु P से एक स्पर्श-रेखा PA बनी है। यदि $\angle AOP = 70^\circ$ है, तो $\angle APO$ का माप है :



- (A) 70° (B) 90°
(C) 110° (D) 20°
16. यदि $5 \tan A = 3$ है, तो $\cot A$ का मान है :
- (A) $\frac{3}{5}$ (B) $\frac{5}{3}$
(C) $\frac{3}{4}$ (D) $\frac{4}{5}$
17. बिन्दुओं $(-6, -4)$ और $(0, 4)$ को मिलाने वाले रेखाखंड का मध्य-बिन्दु है :
- (A) $(-6, 0)$ (B) $(-3, 0)$
(C) $(-6, 8)$ (D) $(-6, 4)$
18. कुछ आँकड़ों का बहुलक और माध्य क्रमशः 7 और 8 हैं। तो, इन आँकड़ों का माध्यक है :
- (A) $\frac{23}{3}$ (B) $\frac{13}{3}$
(C) $\frac{1}{13}$ (D) 33



15. In the given figure, PA is a tangent from an external point P to a circle with centre O. If $\angle AOP = 70^\circ$, then the measure of $\angle APO$ is :



- (A) 70° (B) 90°
(C) 110° (D) 20°
16. If $5 \tan A = 3$, then the value of $\cot A$ is :
- (A) $\frac{3}{5}$ (B) $\frac{5}{3}$
(C) $\frac{3}{4}$ (D) $\frac{4}{5}$
17. The midpoint of the line segment joining the points $(-6, -4)$ and $(0, 4)$ is :
- (A) $(-6, 0)$ (B) $(-3, 0)$
(C) $(-6, 8)$ (D) $(-6, 4)$
18. The mode and mean of a data are 7 and 8 respectively. Then, the median of the data is :
- (A) $\frac{23}{3}$ (B) $\frac{13}{3}$
(C) $\frac{1}{13}$ (D) 33



Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

- (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, but 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.

19. Assertion (A) : The pair of linear equations $5x + 2y + 6 = 0$ and $7x + 6y + 18 = 0$ have infinitely many solutions.

Reason (R) : The pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ have infinitely many solutions, if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$.

20. Assertion (A) : The probability of getting number 8 on rolling a die is zero (0).

Reason (R) : The probability of an impossible event is zero (0).

SECTION B

This section comprises Very Short Answer (VSA) type questions of 2 marks each. 5×2=10

21. Evaluate :

$$5 \sin^2 60^\circ + 3 \cos^2 30^\circ - \sec^2 45^\circ$$

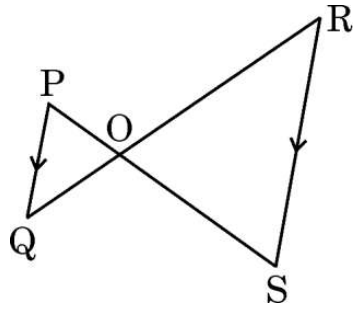
22. (a) If α, β are zeroes of the polynomial $8x^2 + 14x + 3$, then find the value of $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$.

OR

(b) Find a quadratic polynomial whose zeroes are -9 and 6 .

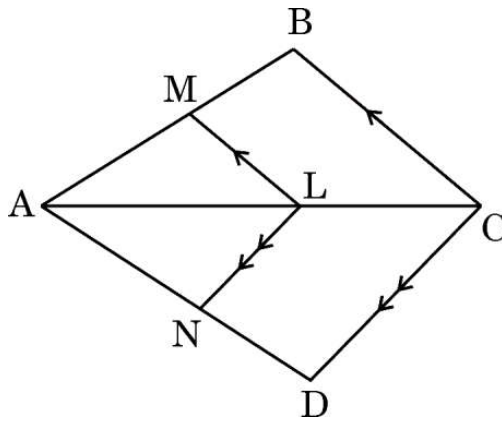


23. (a) In the given figure, $PQ \parallel RS$. Prove that $OP \times OR = OQ \times OS$.



OR

- (b) In the given figure, $LM \parallel CB$ and $LN \parallel CD$. Prove that $\frac{AM}{AN} = \frac{AB}{AD}$.



24. Given that $\text{HCF}(306, 1314) = 18$, find LCM of (306, 1314).
25. XY and PQ are two tangents drawn at the end points of the diameter AB of a circle. Prove that $XY \parallel PQ$.

SECTION C

This section comprises Short Answer (SA) type questions of 3 marks each. $6 \times 3 = 18$

26. Prove that $2 + 5\sqrt{3}$ is an irrational number, if it is given that $\sqrt{3}$ is an irrational number.
27. (a) Using quadratic formula, find the real roots of the equation $2x^2 + 2x + 9 = 0$, if they exist.

OR



- (b) Find the values of 'k' for which the quadratic equation $kx^2 - 2kx + 6 = 0$ has real and equal roots. Also, find the roots.

28. Prove that :

$$\frac{1 + \sec \theta}{\sec \theta} = \frac{\sin^2 \theta}{1 - \cos \theta}$$

29. From a well-shuffled deck of 52 playing cards, all black queens and red kings are removed. One card is selected at random from the remaining cards. Find the probability that the selected card is :

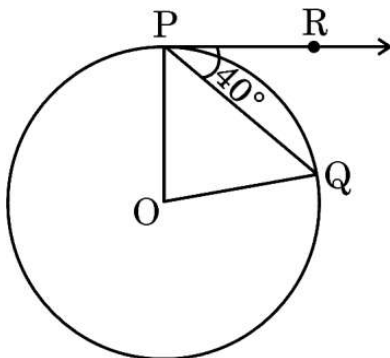
- (i) an ace.
- (ii) a jack of red colour.
- (iii) a king of spade.

30. A chord of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding (i) minor sector (ii) major sector. (Use $\pi = 3.14$)

31. (a) Prove that opposite sides of a quadrilateral circumscribing a circle subtends supplementary angles at the centre of the circle.

OR

(b) If O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 40° with PQ, then find the measure of $\angle POQ$.





SECTION D

This section comprises Long Answer (LA) type questions of 5 marks each.

4×5=20

32. (a) If BD and QM are medians of triangles ABC and PQR, respectively, where $\triangle ABC \sim \triangle PQR$, prove that $\frac{AB}{PQ} = \frac{BD}{QM}$.

OR

- (b) CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of $\triangle ABC$ and $\triangle FEG$ respectively. If $\triangle ABC \sim \triangle FEG$, show that :

(i) $\frac{CD}{GH} = \frac{AC}{FG}$

(ii) $\triangle DCB \sim \triangle HGE$

33. (a) Two cubes each of volume 125 cm^3 are joined end to end. Find the volume and the surface area of the resulting cuboid.

OR

- (b) A solid is in the shape of a cone surmounted on a hemisphere with both their diameters being equal to 7 cm and the height of the cone is equal to its radius. Find the volume of the solid.

34. If the sum of the first 7 terms of an A.P. is 91 and that of the first 17 terms is 561, then find the sum of the first n terms and hence find the n^{th} term.

35. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point, the angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal. (Use $\sqrt{3} = 1.732$)



SECTION E

This section comprises 3 case study based questions of 4 marks each.

3×4=12

Case Study – 1

- 36.** Deepankar bought 3 notebooks and 2 pens for ₹ 80 and his friend Suryansh bought 4 notebooks and 3 pens for ₹ 110 from the school bookshop.



Based on the above information, answer the following questions.

- (i) If the price of one notebook be ₹ x and the price of one pen be ₹ y , write the given situation algebraically. 1

- (ii) (a) What is the price of one notebook ? 2

OR

- (b) What is the price of one pen ? 2

- (iii) What is the total amount to be paid by Suryansh, if he purchases 6 notebooks and 3 pens ? 1



Case Study – 2

37. **Mutual Fund :** A mutual fund is a type of investment vehicle that pools money from multiple investors to invest in securities like stocks, bonds or other securities. Mutual funds are operated by professional money managers, who allocate the fund's assets and attempt to produce capital gains or income for the fund's investors.



Net Asset Value (NAV) represents a fund's per share market value. It is the price at which the investors buy fund shares from a fund company and sell them to a fund company.

The following table shows the Net Asset Value (NAV) per unit of mutual fund of ICICI mutual funds :

NAV (in ₹)	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25
Number of mutual funds	13	16	22	18	11

Based on the above information, answer the following questions :

- (i) What is the upper limit of modal class of the data ? 1
- (ii) What is the median class of the data ? 1
- (iii) (a) What is the mode NAV of mutual funds ? 2

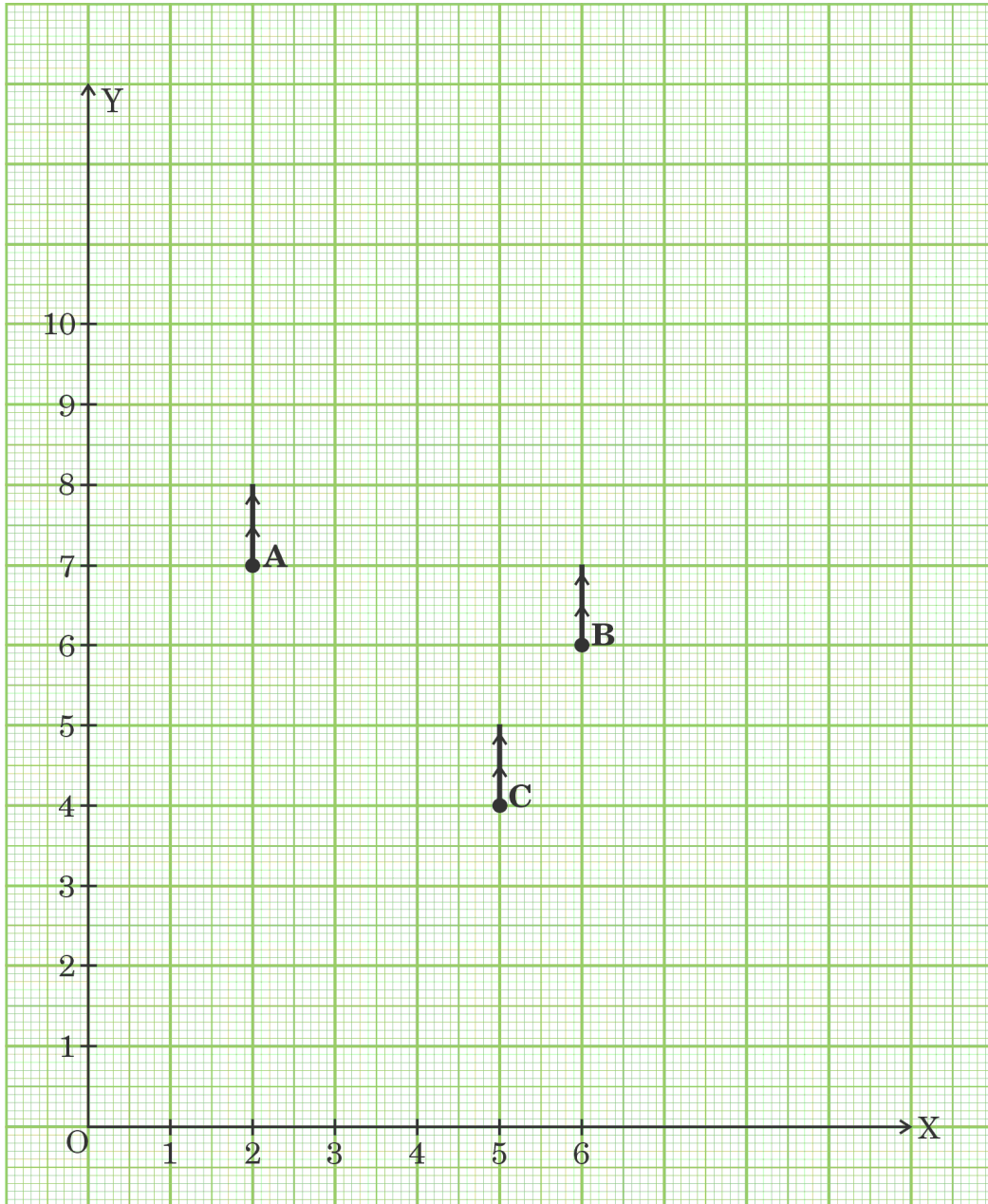
OR

- (b) What is the median NAV of mutual funds ? 2



Case Study – 3

38. Resident Welfare Association (RWA) of Gulmohar Society in Delhi, have installed three electric poles A, B and C in the society's common park. Despite these three poles, some parts of the park are still in the dark. So, RWA decides to have one more electric pole D in the park. The park can be modelled as a coordinate system given below.



On the basis of the above information, answer the following questions :

- | | | |
|-------|---|---|
| (i) | What is the position of the pole C ? | 1 |
| (ii) | What is the distance of the pole B from the corner O of the park ? | 1 |
| (iii) | (a) Find the position of the fourth pole D so that the four points A, B, C and D form a parallelogram ABCD. | 2 |
| | OR | |
| | (b) Find the distance between poles A and C. | 2 |