



Series WX1YZ/1



SET~1

रोल नं. Roll No.							

प्रश्न-पत्र कोड
Q.P. Code **430/1/1**

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.

गणित (बुनियादी)

MATHEMATICS (BASIC)

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80

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.
- 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 जाँच कर लें कि इस प्रश्न-पत्र में 38 प्रश्न हैं।
Please check that this question paper contains 38 questions.
- 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 परीक्षार्थी 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 candidates will read the question paper only and will not write any answer on the answer-book during this period.



430/1/1

105 A



Page 1

P.T.O.



General Instructions :

Read the following instructions carefully and follow them :

- (i) *This question paper contains 38 questions. All questions are compulsory.*
- (ii) *Question Paper is divided into 5 Sections – Section A, B, C, D and E.*
- (iii) *In Section–A question number 1 to 18 are Multiple Choice Questions (MCQs) and question number 19 & 20 are Assertion-Reason based questions of 1 mark each.*
- (iv) *In Section–B question number 21 to 25 are Short Answer-I (SA-I) type questions of 2 marks each.*
- (v) *In Section–C question number 26 to 31 are Short Answer-II (SA-II) type questions carrying 3 marks each.*
- (vi) *In Section–D question number 32 to 35 are Long Answer (LA) type questions carrying 5 marks each.*
- (vii) *In Section–E question number 36 to 38 are Case Based integrated units of Assessment questions carrying 4 marks each. Internal choice is provided in 2 marks question in each case-study.*
- (viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.*
- (ix) *Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.*
- (x) *Use of Calculator is NOT allowed.*





खण्ड – क
(बहुविकल्पीय प्रश्न)

खण्ड – क में 20 प्रश्न हैं और प्रत्येक प्रश्न 1 अंक का है।

1. प्राकृत संख्या 288 का अभाज्य गुणनखंडन है : 1
(a) $2^4 \times 3^3$ (b) $2^4 \times 3^2$
(c) $2^5 \times 3^2$ (d) $2^5 \times 3^1$
2. यदि $2 \cos \theta = 1$ है, तो θ का मान है : 1
(a) 45° (b) 60°
(c) 30° (d) 90°
3. 52 ताश के पत्तों की एक अच्छी प्रकार से फेंटी गई गड्डी में से एक पत्ता यादृच्छया निकाला जाता है। इस पत्ते के लाल रंग के होने की प्रायिकता होगी : 1
(a) $\frac{1}{26}$ (b) $\frac{1}{13}$
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$
4. द्विघात समीकरण $2x^2 - 5x - 3 = 0$ का विविक्तकर है : 1
(a) 1 (b) 49
(c) 7 (d) 19
5. बिंदुओं (3, 0) और (0, -3) के बीच की दूरी है : 1
(a) $2\sqrt{3}$ इकाई (b) 6 इकाई
(c) 3 इकाई (d) $3\sqrt{2}$ इकाई
6. एक A.P. जिसका पहला पद 28 और सार्व-अन्तर -4 है, का सातवाँ पद है : 1
(a) 0 (b) 4
(c) 52 (d) 56





Section – A
(Multiple Choice Questions)

Section – A consists of **20** questions of **1** mark each.

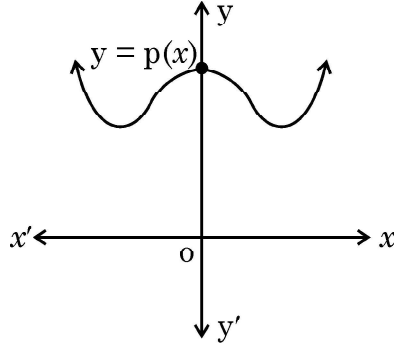
1. The prime factorisation of natural number 288 is 1
(a) $2^4 \times 3^3$ (b) $2^4 \times 3^2$
(c) $2^5 \times 3^2$ (d) $2^5 \times 3^1$
2. If $2 \cos \theta = 1$, then the value of θ is 1
(a) 45° (b) 60°
(c) 30° (d) 90°
3. A card is drawn at random from a well-shuffled deck of 52 cards. The probability of getting a red card is : 1
(a) $\frac{1}{26}$ (b) $\frac{1}{13}$
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$
4. The discriminant of the quadratic equation $2x^2 - 5x - 3 = 0$ is 1
(a) 1 (b) 49
(c) 7 (d) 19
5. The distance between the points (3, 0) and (0, -3) is 1
(a) $2\sqrt{3}$ units (b) 6 units
(c) 3 units (d) $3\sqrt{2}$ units
6. The seventh term of an A.P. whose first term is 28 and common difference - 4, is 1
(a) 0 (b) 4
(c) 52 (d) 56





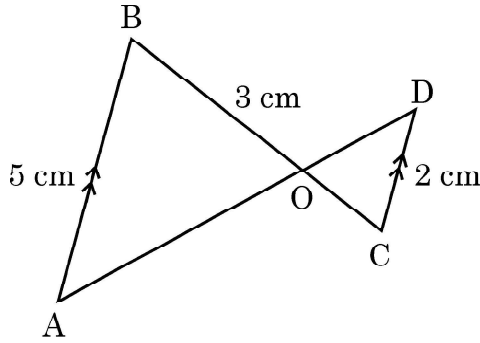
7. किसी एक बहुपद $p(x)$ के लिए, $y = p(x)$ का ग्राफ चित्र में दिखाया गया है। $p(x)$ के शून्यकों की संख्या है :

1



- (a) 0 (b) 1
(c) 2 (d) 3
8. दो समरूप त्रिभुजों की भुजाएँ 4 : 7 के अनुपात में हैं, तो उनके परिमापों का अनुपात होगा
- (a) 4 : 7 (b) 12 : 21
(c) 16 : 49 (d) 7 : 4
9. दी गई आकृति में, $AB \parallel CD$ । यदि $AB = 5$ cm, $CD = 2$ cm और $OB = 3$ cm हो, तो OC की लम्बाई होगी :

1



- (a) $\frac{15}{2}$ cm (b) $\frac{10}{3}$ cm
(c) $\frac{6}{5}$ cm (d) $\frac{3}{5}$ cm
10. बहुपद $p(x) = x^2 + 5x + 6$ के शून्यकों का योग और गुणनफल क्रमशः हैं :
- (a) 5, -6 (b) -5, 6
(c) 2, 3 (d) -2, -3

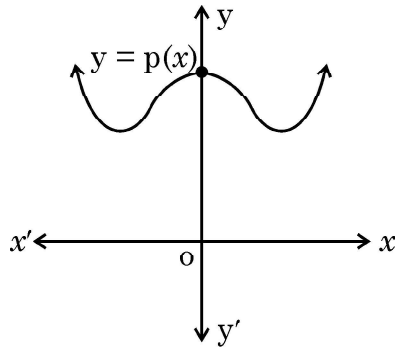
1





7. The graph of $y = p(x)$ is shown in the figure for some polynomial $p(x)$. The number of zeroes of $p(x)$ is/are :

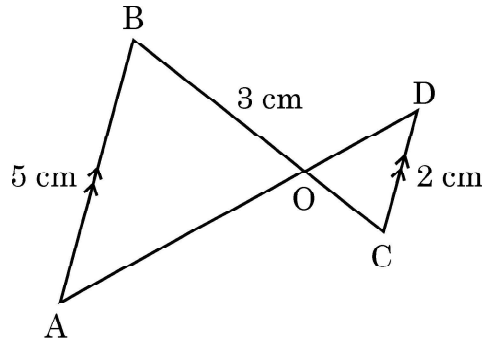
1



- (a) 0 (b) 1
(c) 2 (d) 3
8. The sides of two similar triangles are in the ratio 4 : 7. The ratio of their perimeters is
- (a) 4 : 7 (b) 12 : 21
(c) 16 : 49 (d) 7 : 4
9. In the given figure, $AB \parallel CD$. If $AB = 5$ cm, $CD = 2$ cm and $OB = 3$ cm, then the length of OC is

1

1



- (a) $\frac{15}{2}$ cm (b) $\frac{10}{3}$ cm
(c) $\frac{6}{5}$ cm (d) $\frac{3}{5}$ cm
10. The sum and the product of zeroes of the polynomial $p(x) = x^2 + 5x + 6$ are respectively
- (a) 5, -6 (b) -5, 6
(c) 2, 3 (d) -2, -3

1

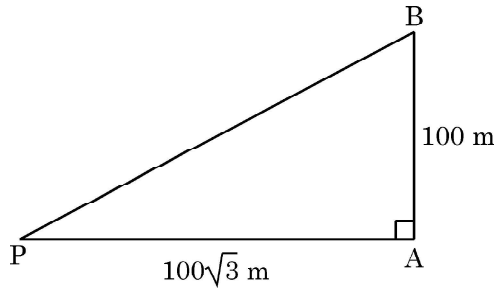




11. एक पासा एक बार फेंका गया। 7 से कम की संख्या के प्राप्त होने की प्रायिकता ज्ञात कीजिए। 1

- (a) $\frac{5}{6}$ (b) 1
(c) $\frac{1}{6}$ (d) 0

12. 100 m ऊँचा एक ऊर्ध्वाधर खंभा, भूमि के एक बिंदु से जो खंभे के पाद से $100\sqrt{3}$ m की दूरी पर है, जो कोण बनाता है उसकी माप है 1



- (a) 90° (b) 60°
(c) 45° (d) 30°

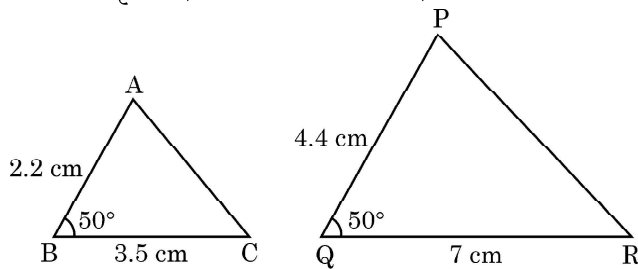
13. त्रिज्या 'r' और ऊँचाई '3r' के एक शंकु का आयतन होगा : 1

- (a) $\frac{1}{3} \pi r^3$ (b) $3 \pi r^3$
(c) $9 \pi r^3$ (d) πr^3

14. 7 cm व्यास के वृत्त पर दो समांतर स्पर्श-रेखाओं के बीच की दूरी है : 1

- (a) 7 cm (b) 14 cm
(c) $\frac{7}{2}$ cm (d) 28 cm

15. दी गई आकृति में, समरूपता की कसौटी, जिससे $\triangle ABC \sim \triangle PQR$ है, है : 1



- (a) SSA (भुजा – भुजा – कोण) समरूपता
(b) ASA (कोण – भुजा – कोण) समरूपता
(c) SAS (भुजा – कोण – भुजा) समरूपता
(d) AA (कोण – कोण) समरूपता

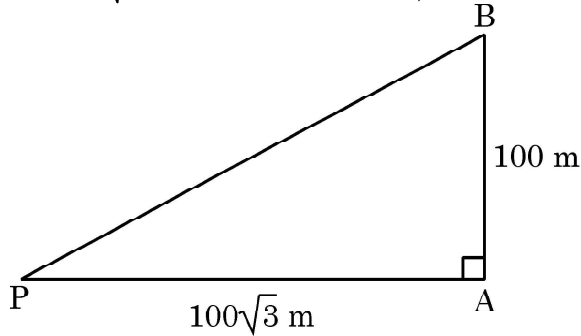




11. A die is thrown once. Find the probability of getting a number less than 7. 1

- (a) $\frac{5}{6}$ (b) 1
(c) $\frac{1}{6}$ (d) 0

12. The angle subtended by a vertical pole of height 100 m at a point on the ground $100\sqrt{3}$ m from the base is, has measure of 1



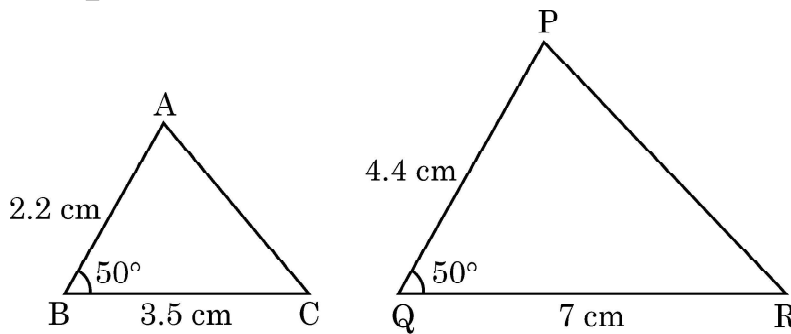
- (a) 90° (b) 60°
(c) 45° (d) 30°
13. The volume of a cone of radius 'r' and height '3r' is : 1

- (a) $\frac{1}{3} \pi r^3$ (b) $3 \pi r^3$
(c) $9 \pi r^3$ (d) πr^3

14. The distance between two parallel tangents of a circle of diameter 7 cm is : 1

- (a) 7 cm (b) 14 cm
(c) $\frac{7}{2}$ cm (d) 28 cm

15. 1

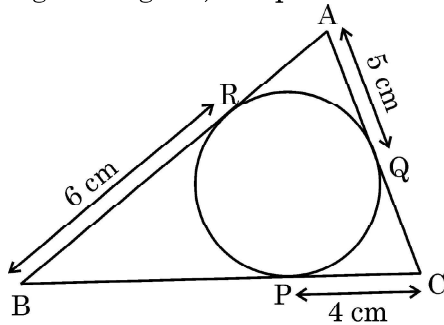


In the above figure, the criterion of similarity by which $\triangle ABC \sim \triangle PQR$ is :

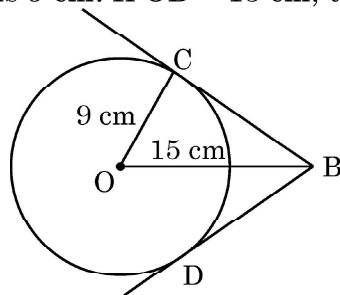
- (a) SSA (Side – Side – Angle) Similarity
(b) ASA (Angle – Side – Angle) Similarity
(c) SAS (Side – Angle – Side) Similarity
(d) AA (Angle – Angle) Similarity



16. The larger of two supplementary angles exceeds the smaller by 18 degrees. What is the measure of larger angle ? 1
(a) 81° (b) 99°
(c) 36° (d) 54°
17. In the given figure, the perimeter of $\triangle ABC$ is : 1



- (a) 30 cm (b) 15 cm
(c) 45 cm (d) 60 cm
18. In the given figure, BC and BD are tangents to the circle with centre O and radius 9 cm. If $OB = 15$ cm, then the length $(BC + BD)$ is : 1



- (a) 18 cm (b) 12 cm
(c) 24 cm (d) 36 cm
- (Assertion – Reason based questions)**
- Directions for Q.19 & Q.20 :** In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option :
- (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) :** A tangent to a circle is perpendicular to the radius through the point of contact. 1
Reason (R) : The lengths of tangents drawn from the external point to a circle are equal.



20. **Assertion (A) :** The system of linear equations $3x + 5y - 4 = 0$ and $15x + 25y - 25 = 0$ is inconsistent. 1

Reason (R) : The pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is inconsistent if $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$.

Section – B

This section comprises of short answer (SA-I) type of questions of **2** marks each.

21. (a) Find the coordinates of the point which divides the line segment joining the points $(7, -1)$ and $(-3, 4)$ internally in the ratio $2 : 3$. 2

OR

- (b) Find the value(s) of y for which the distance between the points $A(3, -1)$ and $B(11, y)$ is 10 units.

22. Evaluate : $\tan^2 60^\circ - 2 \operatorname{cosec}^2 30^\circ - 2 \tan^2 30^\circ$. 2

23. Find the LCM and HCF of 92 and 510, using prime factorisation. 2

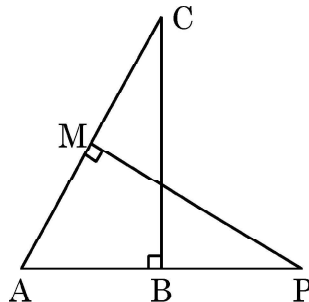
24. (a) Solve for x and y : $x + y = 6$, $2x - 3y = 4$. 2

OR

- (b) Find out whether the following pair of linear equations are consistent or inconsistent :

$$5x - 3y = 11, \quad -10x + 6y = 22$$

25. In the given figure, ABC and AMP are two right triangles, right angled at B and M , respectively. Prove that $\triangle ABC \sim \triangle AMP$. 2





खण्ड – ग

इस खण्ड में लघु उत्तरीय (SA-II) प्रकार के प्रश्न हैं और प्रत्येक प्रश्न के 3 अंक हैं।

26. (a) सिद्ध कीजिए कि

3

$$\sec\theta (1 - \sin\theta) (\sec\theta + \tan\theta) = 1$$

अथवा

- (b) सिद्ध कीजिए कि

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

27. दर्शाइए कि बिंदु A(1, 7), B(4, 2), C(-1, -1) तथा D(-4, 4) वर्ग ABCD के शीर्ष हैं।

3

28. सिद्ध कीजिए कि बाह्य बिंदु से वृत्त पर खींची गई स्पर्श-रेखाओं की लम्बाइयाँ बराबर होती हैं।

3

29. यदि α, β द्विघात बहुपद $x^2 + 3x + 2$ के शून्यक हों, तो एक द्विघात बहुपद ज्ञात कीजिए जिसके शून्यक $\alpha + 1, \beta + 1$ हों।

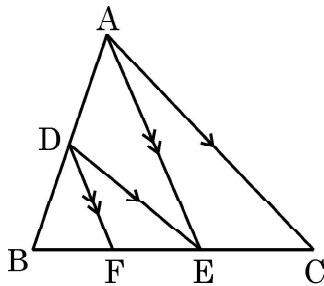
3

30. सिद्ध कीजिए कि $3 + 7\sqrt{2}$ एक अपरिमेय संख्या है, दिया गया है कि $\sqrt{2}$ एक अपरिमेय संख्या है।

3

31. (a) दी गई आकृति में, $DE \parallel AC$ और $DF \parallel AE$

3



सिद्ध कीजिए कि

$$\frac{BF}{FE} = \frac{BE}{EC}$$

अथवा





Section – C

This section comprises of Short Answer (SA-II) type questions of **3** marks each.

26. (a) Prove that **3**

$$\sec\theta (1 - \sin\theta) (\sec\theta + \tan\theta) = 1$$

OR

- (b) Prove that

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

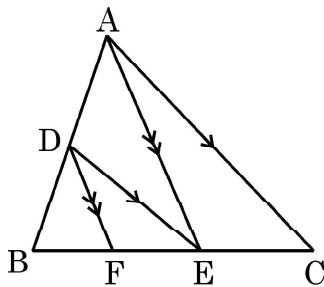
27. Show that the points A(1, 7), B(4, 2) C(-1, -1) and D(- 4, 4) are vertices of the square ABCD. **3**

28. Prove that the tangents drawn from an external point to a circle are equal in length. **3**

29. If α, β are zeroes of the quadratic polynomial $x^2 + 3x + 2$, find a quadratic polynomial whose zeroes are $\alpha + 1, \beta + 1$. **3**

30. Prove that $3 + 7\sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is an irrational number. **3**

31. (a) In the given figure, $DE \parallel AC$ and $DF \parallel AE$ **3**



Prove that

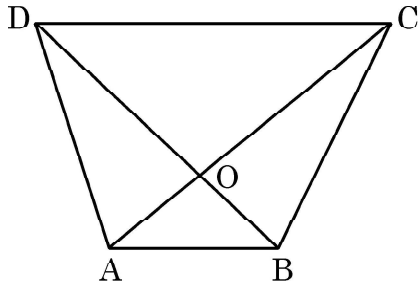
$$\frac{BF}{FE} = \frac{BE}{EC}$$

OR





- (b) The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{OD}$



Show that quadrilateral ABCD is a trapezium.

Section – D

This section consists of questions of Long Answer type, of 5 marks each.

32. (a) The diagonal of a rectangular field is 60 m more than the shorter side. If the longer side is 80 m more than the shorter side, find the length of the sides of the field. 5

OR

- (b) The sum of the ages of a father and his son is 45 years. Five years ago, the product of their ages (in years) was 124. Determine their present age.
33. A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel. Also, find the volume of the vessel. 5

34. The table given below shows the daily expenditure on food of 25 households in a locality :

Daily expenditure (₹)	100 – 150	150 – 200	200 – 250	250 – 300	300 – 350
Number of household	4	5	12	2	2

Find the mean daily expenditure on food. Also, find the mode of the data. **3 + 2**





35. (a) A TV tower stands vertically on the bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60° . From another point 20 m away from the point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower.

5

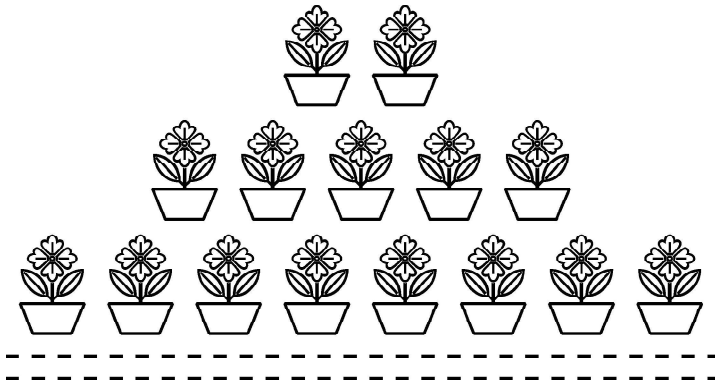
OR

- (b) An aeroplane when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. (Use $\sqrt{3} = 1.73$)

Section – E

This section comprises of 3 Case Study questions, each of 4 marks.

36. Aahana being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that number of pots in the first row is 2, second row is 5, third row is 8 and so on.



Based on the above information, answer the following questions :

- (i) Find the number of pots placed in the 10th row. 1
- (ii) Find the difference in the number of pots placed in 5th row and 2nd row. 1
- (iii) If Aahana wants to place 100 pots in total, then find the total number of rows formed in the arrangement. 2

OR

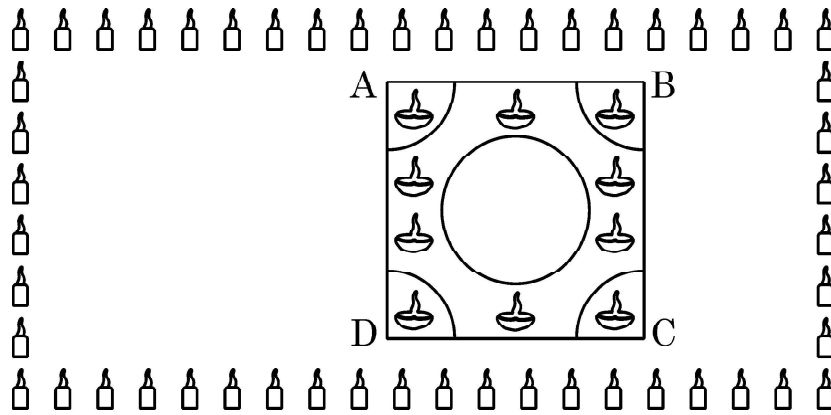




- (iii) If Aahana has sufficient space for 12 rows, then how many total number of pots are placed by her with the same arrangement ?

2

37. Interschool Rangoli Competition was organized by one of the reputed schools of Odissa. The theme of the Rangoli Competition was Diwali celebrations where students were supposed to make mathematical designs. Students from various schools participated and made beautiful Rangoli designs. One such design is given below.



Rangoli is in the shape of square marked as ABCD, side of square being 40 cm. At each corner of a square, a quadrant of circle of radius 10 cm is drawn (in which diyas are kept). Also a circle of diameter 20 cm is drawn inside the square.

- (i) What is the area of square ABCD ? 1
- (ii) Find the area of the circle. 1
- (iii) If the circle and the four quadrants are cut off from the square ABCD and removed, then find the area of remaining portion of square ABCD. 2

OR

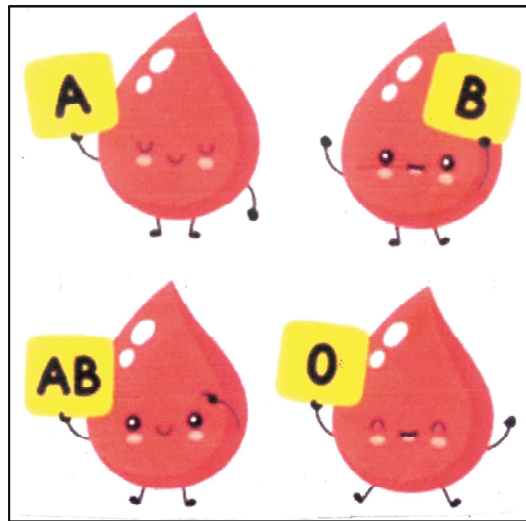
- (iii) Find the combined area of 4 quadrants and the circle, removed. 2





38. Blood group 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. 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, 5 had type B and rest had type AB blood group.



Based on the above, answer the following questions :

- | | |
|--|---|
| (i) What is the probability that a person chosen at random had type O blood ? | 1 |
| (ii) What is the probability that a person chosen at random had type AB blood group ? | 1 |
| (iii) What is the probability that a person chosen at random had neither type A nor type B blood group ? | 2 |

OR

- | | |
|--|---|
| (iii) What is the probability that person chosen at random had either type A or type B or type O blood group ? | 2 |
|--|---|



