



Series WX1YZ/6



SET~3

रोल नं. Roll No.							

प्रश्न-पत्र कोड
Q.P. Code **430/6/3**

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.

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.



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P.T.O.



General Instructions :

Read the following instructions very carefully and follow them :

- (i) *This Question Paper contains 38 questions. All questions are compulsory.*
- (ii) *Question Paper is divided into FIVE 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 Very Short Answer-I (VSA-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 Study 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 $\pi = \frac{22}{7}$ wherever required if not stated.*
- (x) *Use of Calculators is NOT allowed.*



खण्ड – क

(बहुविकल्पीय प्रश्न)

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

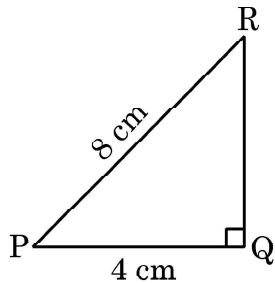
1. संख्या 5488 का अभाज्य गुणनखंडन है : 1

- (a) $2^3 \times 7^3$ (b) $2^4 \times 7^3$
(c) $2^4 \times 7^4$ (d) $2^3 \times 7^4$

2. तीनों केंद्रीय प्रवृत्ति के मापकों में आनुभविक संबंध है : 1

- (a) बहुलक = 3 माध्य – 2 माध्यक (b) बहुलक = 2 माध्यक – 3 माध्य
(c) बहुलक = 2 माध्य – 3 माध्यक (d) बहुलक = 3 माध्यक – 2 माध्य

3. दी गई आकृति में, PQR एक समकोण त्रिभुज है जिसमें $\angle Q$ एक समकोण है। यदि $PQ = 4$ cm और $PR = 8$ cm है, तो $\angle P$ है : 1



- (a) 60° (b) 45°
(c) 30° (d) 15°
4. पहली दस प्राकृत संख्याओं का माध्यक है : 1

- (a) 5 (b) 6
(c) 5.5 (d) 6.5



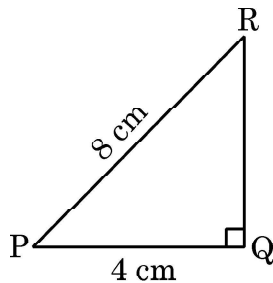


Section – A

(Multiple Choice Questions)

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

1. The prime factorisation of the number 5488 is 1
- (a) $2^3 \times 7^3$ (b) $2^4 \times 7^3$
(c) $2^4 \times 7^4$ (d) $2^3 \times 7^4$
2. The Empirical relation between the three measures of central tendency is 1
- (a) Mode = 3 Mean – 2 Median (b) Mode = 2 Median – 3 Mean
(c) Mode = 2 Mean – 3 Median (d) Mode = 3 Median – 2 Mean
3. In the given figure, $\triangle PQR$ is a right triangle right angled at Q. If PQ = 4 cm and PR = 8 cm, then $\angle P$ is 1



- (a) 60° (b) 45°
(c) 30° (d) 15°
4. The median of first 10 natural numbers is 1
- (a) 5 (b) 6
(c) 5.5 (d) 6.5





5. बहुपद $p(x) = 2x^2 - x - 3$ के शून्यक हैं :

1

(a) $-\frac{3}{2}, 1$

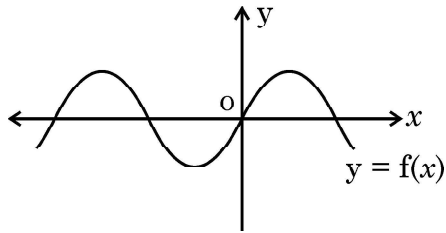
(b) $\frac{3}{2}, 1$

(c) $-\frac{3}{2}, -1$

(d) $\frac{3}{2}, -1$

6. किसी बहुपद $f(x)$ के लिए, $y = f(x)$ का ग्राफ आकृति में दिखाया गया है। बहुपद $f(x)$ के शून्यकों की संख्या हैं :

1



(a) 4

(b) 3

(c) 2

(d) 1

7. बिन्दु $(5, 0)$ की मूल बिंदु से दूरी है :

1

(a) 0

(b) 5

(c) $\sqrt{5}$

(d) 5^2

8. यदि 6, 7, x , 8, y , 14 का माध्य 9 हो, तो

1

(a) $x + y = 21$

(b) $x + y = 19$

(c) $x - y = 19$

(d) $x - y = 21$

9. यदि n एक प्राकृत संख्या है, तो 8^n निम्न में से किस अंक पर समाप्त नहीं होता है ?

1

(a) 0

(b) 2

(c) 4

(d) 6

10. 7 cm त्रिज्या वाले वृत्त के एक चतुर्थांश का क्षेत्रफल है :

1

(a) 154 cm^2

(b) 77 cm^2

(c) $\frac{77}{2} \text{ cm}^2$

(d) $\frac{77}{4} \text{ cm}^2$

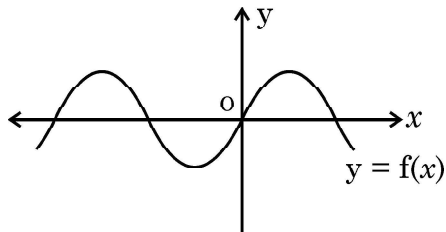




5. The zeroes of the polynomial $p(x) = 2x^2 - x - 3$ are 1

- (a) $-\frac{3}{2}, 1$ (b) $\frac{3}{2}, 1$
(c) $-\frac{3}{2}, -1$ (d) $\frac{3}{2}, -1$

6. The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. The number of zeroes of $f(x)$ are 1



- (a) 4 (b) 3
(c) 2 (d) 1

7. The distance of the point $(5, 0)$ from the origin is 1

- (a) 0 (b) 5
(c) $\sqrt{5}$ (d) 5^2

8. If the mean of 6, 7, x , 8, y , 14 is 9, then 1

- (a) $x + y = 21$ (b) $x + y = 19$
(c) $x - y = 19$ (d) $x - y = 21$

9. If n is a natural number, then 8^n cannot end with digit 1

- (a) 0 (b) 2
(c) 4 (d) 6

10. Area of a quadrant of a circle of radius 7 cm is 1

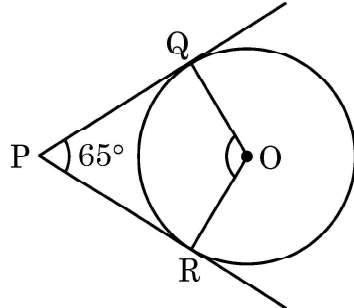
- (a) 154 cm^2 (b) 77 cm^2
(c) $\frac{77}{2} \text{ cm}^2$ (d) $\frac{77}{4} \text{ cm}^2$





11. In the given figure, PQ and PR are tangents drawn from P to the circle with centre O such that $\angle QPR = 65^\circ$. The measure of $\angle QOR$ is.

1



- (a) 65° (b) 125°
(c) 115° (d) 90°
12. One card is drawn at random from a well-shuffled deck of 52 playing cards. What is the probability of getting a black king ?

1

- (a) $\frac{1}{26}$ (b) $\frac{1}{13}$
(c) $\frac{1}{52}$ (d) $\frac{1}{2}$
13. The value of k, if (6, k) lies on the line represented by $x - 3y + 6 = 0$, is
- (a) -4 (b) 12
(c) -12 (d) 4

1

14. If (2, 4) is the mid-point of the line-segment joining (6, 3) and (a, 5), then the value of a is
- (a) 2 (b) 4
(c) -4 (d) -2

1

15. An unbiased die is thrown. The probability of getting an odd prime number is

1

- (a) $\frac{1}{6}$ (b) $\frac{1}{2}$
(c) $\frac{2}{3}$ (d) $\frac{1}{3}$



16. The value of 'k' for which the system of equations $kx + 2y = 5$ and $3x + 4y = 1$ have no solution, is 1
- (a) $k = \frac{3}{2}$ (b) $k \neq \frac{3}{2}$
(c) $k \neq \frac{2}{3}$ (d) $k = 15$
17. If $-5, x, 3$ are three consecutive terms of an A.P., then the value of x is 1
- (a) -2 (b) 2
(c) 1 (d) -1
18. If $\text{HCF}(72, 120) = 24$, then $\text{LCM}(72, 120)$ is 1
- (a) 72 (b) 120
(c) 360 (d) 9640

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) :** For $0 < \theta \leq 90^\circ$, $\text{cosec } \theta - \cot \theta$ and $\text{cosec } \theta + \cot \theta$ are reciprocal of each other. 1

Reason (R) : $\cot^2 \theta - \text{cosec}^2 \theta = 1$

20. **Assertion (A) :** The probability that a leap year has 53 Sundays is $\frac{2}{7}$. 1

Reason (R) : The probability that a non-leap year has 53 Sundays is $\frac{1}{7}$.





Section – B

Section – B consists of Very Short Answer (VSA) type questions of **2** marks each.

21. A bag contains 30 discs numbered from 1 to 30. One disc is drawn at random from the bag. Find the probability that it bears a number **2**
- (a) divisible by 6.
- (b) greater than 25.

22. (a) Find the value of k for which the roots of the quadratic equation $5x^2 - 10x + k = 0$ are real and equal. **2**

OR

- (b) If one root of the quadratic equation $3x^2 - 8x - (2k + 1) = 0$ is seven times the other, then find the value of k . **2**
23. Evaluate : $5 \operatorname{cosec}^2 45^\circ - 3 \sin^2 90^\circ + 5 \cos 0^\circ$. **2**
24. From a point P , the length of the tangent to a circle is 24 cm and the distance of P from the centre of the circle is 25 cm. Find the radius of the circle. **2**
25. (a) Find a quadratic polynomial whose zeroes are 6 and -3 . **2**

OR

- (b) Find the zeroes of the polynomial $x^2 + 4x - 12$. **2**

Section – C

Section – C consists of Short Answer (SA) type questions of **3** marks each.

26. Prove that $7 + 4\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. **3**
27. Solve for x : **3**

$$\frac{1}{x} - \frac{1}{x-2} = 3; x \neq 0, 2$$



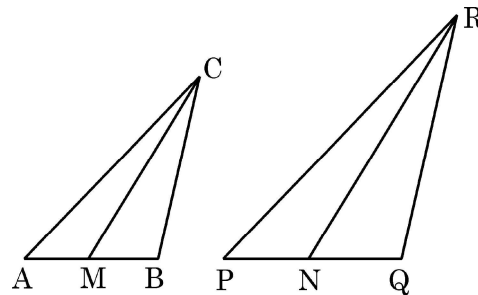


28. (a) Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\cos^2 A}{(1 + \sin A)^2}$ 3

OR

- (b) Prove that $(\sec \theta + \tan \theta)(1 - \sin \theta) = \cos \theta$ 3
29. (a) E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$. 3

OR



- (b) In the given figure, CM and RN are respectively the medians of $\triangle ABC$ and $\triangle PQR$. If $\triangle ABC \sim \triangle PQR$, then prove that $\triangle AMC \sim \triangle PNR$. 3
30. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household : 3
- | | | | | | |
|---------------------------|-----|-----|-----|-----|------|
| Family size | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 |
| Number of Families | 7 | 8 | 2 | 2 | 1 |
- Find the median of this data.
31. Find the co-ordinates of the points of trisection of the line-segment joining the points (5, 3) and (4, 5). 3





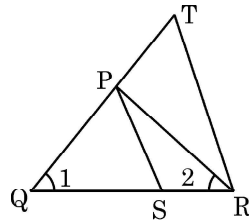
Section – D

Section – D consists of Long Answer (LA) type questions of **5** marks each.

32. (a) Prove that a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, divides the two sides in the same ratio. 5

OR

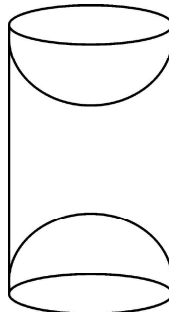
- (b) In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Prove that $\Delta PQS \sim \Delta TQR$. 5



33. (a) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, find the width of the river. (Use $\sqrt{3} = 1.73$) 5

OR

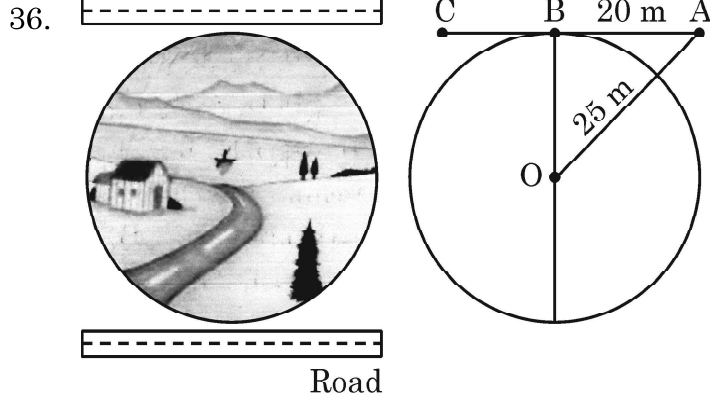
- (b) From a point on the ground, the angle of elevation of the bottom and top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower. (Use $\sqrt{3} = 1.73$) 5
34. The sum of the 4th and 8th term of an A.P. is 24 and the sum of the 6th and 10th term of the A.P. is 44. Find the A.P. Also, find the sum of first 25 terms of the A.P. 5
35. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder (as shown in the figure). 5
- If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article.





Section – E

Section – E comprises of 3 Case Study questions each of 4 marks.



People of a circular village Dharamkot want to construct a road nearest to it. The road cannot pass through the village. But the people want the road at a shortest distance from the centre of the village. Suppose the road starts from A which is outside the circular village (as shown in the figure) and touch the boundary of the circular village at B such that $AB = 20$ m. Also the distance of the point A from the centre O of the village is 25 m.

Based on the above information, answer the following questions :

- (i) If B is the mid-point of AC, then find the distance AC. 1
- (ii) Find the shortest distance of the road from the centre of the village. 1
- (iii) Find the circumference of the village. 2

OR

- (iii) Find the area of the village. 2

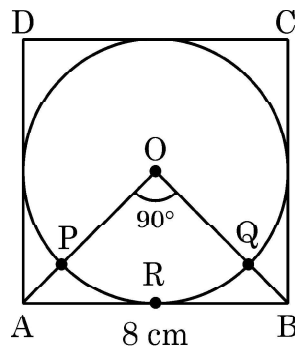




37. For the inauguration of 'Earth day' week in a school, badges were given to volunteers. Organisers purchased these badges from an NGO, who made these badges in the form of a circle inscribed in a square of side 8 cm.



O is the centre of the circle and $\angle AOB = 90^\circ$:



Based on the above information, answer the following questions :

- | | |
|---|---|
| (i) What is the area of square ABCD ? | 1 |
| (ii) What is the length of diagonal AC of square ABCD ? | 1 |
| (iii) Find the area of sector OPRQO. | 2 |

OR

- | | |
|---|---|
| (iii) Find the area of remaining part of square ABCD when area of circle is excluded. | 2 |
|---|---|





38.



Lokesh, a production manager in Mumbai, hires a taxi everyday to go to his office. The taxi charges in Mumbai consists of a fixed charges together with the charges for the distance covered. His office is at a distance of 10 km from his home. For a distance of 10 km to his office, Lokesh paid ₹ 105. While coming back home, he took another route. He covered a distance of 15 km and the charges paid by him were ₹ 155.

Based on the above information, answer the following questions :

- | | |
|--|---|
| (i) What are the fixed charges ? | 1 |
| (ii) What are the charges per km ? | 1 |
| (iii) If fixed charges are ₹ 20 and charges per km are ₹ 10, then how much Lokesh have to pay for travelling a distance of 10 km ? | 2 |

OR

- | | |
|---|---|
| (iii) Find the total amount paid by Lokesh for travelling 10 km from home to office and 25 km from office to home. [Fixed charges and charges per km are as in (i) & (ii).] | 2 |
|---|---|



