



Series WX1YZ/6



SET~1

रोल नं. Roll No.							

प्रश्न-पत्र कोड
Q.P. Code **430/6/1**

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.



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Page 1

P.T.O.



General Instructions :

Read the following instructions vary 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. 100 m बाधा दौड़ को पूरी के लिए 150 एथलीटों द्वारा लिया गया समय, सेकंड में, नीचे दिया गया है :

1

समय (से. में)	13-14	14-15	15-16	16-17	17-18	18-19
एथलीटों की संख्या	2	4	5	71	48	20

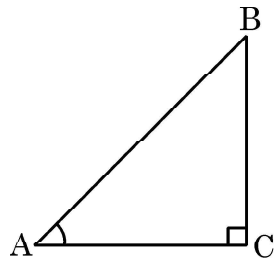
17 सेकंड से कम समय में दौड़ पूरी करने वाले एथलीटों की संख्या है :

- (a) 11 (b) 71
(c) 82 (d) 68
2. बिन्दु (5, 0) की मूल बिंदु से दूरी है
- (a) 0 (b) 5
(c) $\sqrt{5}$ (d) 5^2

1

3. त्रिभुज ABC में, C समकोण है। यदि $\tan A = \frac{8}{7}$ है, तो $\cot B$ का मान है :

1



- (a) $\frac{7}{8}$ (b) $\frac{8}{7}$
(c) $\frac{7}{\sqrt{113}}$ (d) $\frac{8}{\sqrt{113}}$





Section – A
(Multiple Choice Questions)

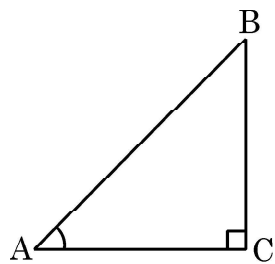
Section – A consists of **20** questions of **1** mark each.

1. The time, in seconds, taken by 150 athletes to run a 100 m hurdle race are tabulated below : 1

Time (sec.)	13-14	14-15	15-16	16-17	17-18	18-19
Number of Athletes	2	4	5	71	48	20

The number of athletes who completed the race in less than 17 seconds is

- (a) 11 (b) 71
(c) 82 (d) 68
2. The distance of the point (5, 0) from the origin is 1
(a) 0 (b) 5
(c) $\sqrt{5}$ (d) 5^2
3. In $\triangle ABC$, right angled at C, if $\tan A = \frac{8}{7}$, then the value of $\cot B$ is 1



- (a) $\frac{7}{8}$ (b) $\frac{8}{7}$
(c) $\frac{7}{\sqrt{113}}$ (d) $\frac{8}{\sqrt{113}}$





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

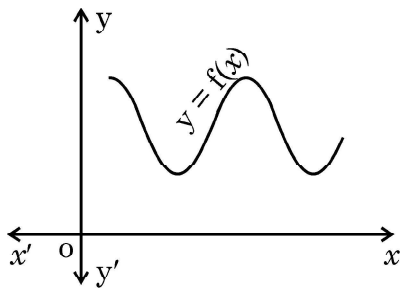
5. यदि $\text{HCF}(72, 120) = 24$ है, तो $\text{LCM}(72, 120)$ है : 1

- (a) 72 (b) 120
(c) 360 (d) 9640

6. 52 ताश के पत्तों की अच्छी प्रकार से फेंटी गई एक गड्डी में से एक पत्ता यादृच्छया निकाला जाता है। इस पत्ते के काला बादशाह होने की प्रायिकता क्या है ? 1

- (a) $\frac{1}{26}$ (b) $\frac{1}{13}$
(c) $\frac{1}{52}$ (d) $\frac{1}{2}$

7. किसी बहुपद $f(x)$ के लिए, $y = f(x)$ का ग्राफ दिया गया है। 1



$f(x)$ के शून्यकों की संख्या है :

- (a) 0 (b) 2
(c) 3 (d) 4





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

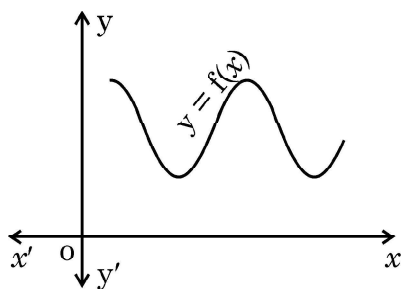
5. If $\text{HCF}(72, 120) = 24$, then $\text{LCM}(72, 120)$ is 1

- (a) 72 (b) 120
(c) 360 (d) 9640

6. 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) $\frac{1}{2}$

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



The number of zeroes of $f(x)$ is

- (a) 0 (b) 2
(c) 3 (d) 4





8. यदि बिन्दु $(6, k)$, समीकरण $x - 3y + 6 = 0$ से निरूपित रेखा पर स्थित हो, तो k का मान है 1
- (a) -4 (b) 12
(c) -12 (d) 4
9. संख्या 2304 का अभाज्य गुणनखंडन है : 1
- (a) $2^8 \times 3^2$ (b) $2^7 \times 3^3$
(c) $2^8 \times 3^1$ (d) $2^7 \times 3^2$
10. 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
11. पहली सात अभाज्य संख्याओं का माध्यक है : 1
- (a) 5 (b) 7
(c) 11 (d) 13
12. यदि बिंदु $(2, 4)$, बिंदुओं $(6, 3)$ और $(a, 5)$ को जोड़ने वाले रेखाखंड का मध्य-बिंदु हो, तो a का मान होगा : 1
- (a) 2 (b) 4
(c) -4 (d) -2
13. k का मान जिसके लिए रेखिक समीकरण युग्म $kx + 2y = 5$ और $3x + 4y = 1$ का कोई हल नहीं है, है : 1
- (a) $k = \frac{3}{2}$ (b) $k \neq \frac{3}{2}$
(c) $k \neq \frac{2}{3}$ (d) $k = 15$





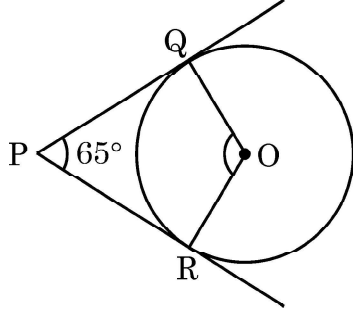
8. The value of k , if $(6, k)$ lies on the line represented by $x - 3y + 6 = 0$, is 1
- (a) -4 (b) 12
(c) -12 (d) 4
9. The prime factorisation of the number 2304 is 1
- (a) $2^8 \times 3^2$ (b) $2^7 \times 3^3$
(c) $2^8 \times 3^1$ (d) $2^7 \times 3^2$
10. If n is a natural number, then 8^n cannot end with digit 1
- (a) 0 (b) 2
(c) 4 (d) 6
11. The median of first seven prime numbers is 1
- (a) 5 (b) 7
(c) 11 (d) 13
12. If $(2, 4)$ is the mid-point of the line-segment joining $(6, 3)$ and $(a, 5)$, then the value of a is 1
- (a) 2 (b) 4
(c) -4 (d) -2
13. 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) $k = 15$





14. दी गई आकृति में, बिंदु P से केंद्र O वाले एक वृत्त पर PQ और PR स्पर्श-रेखाएँ हैं जिसमें $\angle QPR = 65^\circ$ है। $\angle QOR$ का माप है :

1

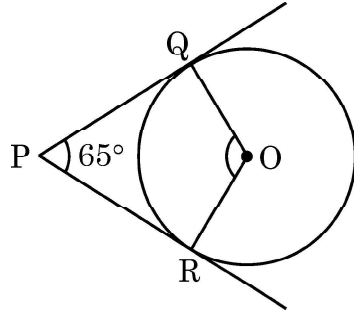


- (a) 65° (b) 125°
(c) 115° (d) 90°
15. द्विघात बहुपद $16x^2 - 9$ के शून्यक हैं :
- (a) $\frac{3}{4}, \frac{3}{4}$ (b) $-\frac{3}{4}, \frac{3}{4}$
(c) $\frac{9}{16}, \frac{9}{16}$ (d) $-\frac{3}{4}, -\frac{3}{4}$
16. यदि $-5, x, 3$ किसी A.P. के तीन क्रमागत पद हैं, तो x का मान होगा :
- (a) -2 (b) 2
(c) 1 (d) -1
17. एक निष्पक्ष पासा फेंका जाता है। विषम अभाज्य संख्या प्राप्त होने की प्रायिकता होगी :
- (a) $\frac{1}{6}$ (b) $\frac{1}{2}$
(c) $\frac{2}{3}$ (d) $\frac{1}{3}$
18. यदि $6, 7, x, 8, y, 14$ का माध्य 9 हो, तो
- (a) $x + y = 21$ (b) $x + y = 19$
(c) $x - y = 19$ (d) $x - y = 21$





14. 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°
15. The zeroes of the quadratic polynomial $16x^2 - 9$ are : 1
- (a) $\frac{3}{4}, \frac{3}{4}$ (b) $-\frac{3}{4}, \frac{3}{4}$
(c) $\frac{9}{16}, \frac{9}{16}$ (d) $-\frac{3}{4}, -\frac{3}{4}$
16. 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
17. 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) $\frac{1}{3}$
18. 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) $x - y = 21$





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) :** 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 $\frac{1}{7}$.

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

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

Section – B

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

21. Evaluate : $5 \operatorname{cosec}^2 45^\circ - 3 \sin^2 90^\circ + 5 \cos 0^\circ$. **2**

22. (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**

23. (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**





24. A box contains 20 discs which are numbered from 1 to 20. If one disc is drawn at random from the box, then find the probability that the number on the drawn disc is a
- (i) 2-digit number
 - (ii) number less than 10
- 1 + 1
25. 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

Section – C

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

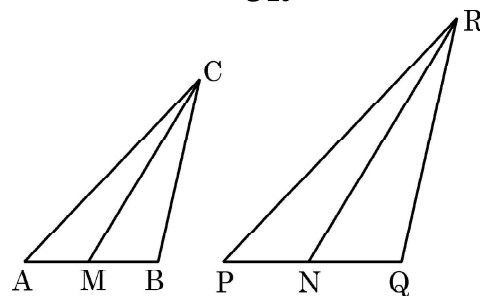
26. The sum of the reciprocals of Varun's age (in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age.
- 3
27. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household :
- 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.

28. (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
29. Find the co-ordinates of the points of trisection of the line-segment joining the points (5, 3) and (4, 5).
- 3





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

31. (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

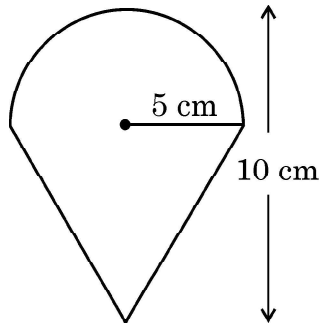
Section – D

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

32. (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
33. The first term of an A.P. is 22, the last term is -6 and the sum of all the terms is 64. Find the number of terms of the A.P. Also, find the common difference. 5
34. An ice-cream filled cone having radius 5 cm and height 10 cm is as shown in the figure. Find the volume of the ice-cream in 7 such cones. 5





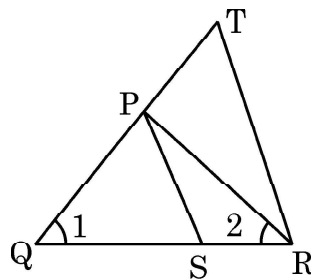
35. (a) Prove that a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, divides the two sides in the same ratio.

5

OR

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

5



Section – E

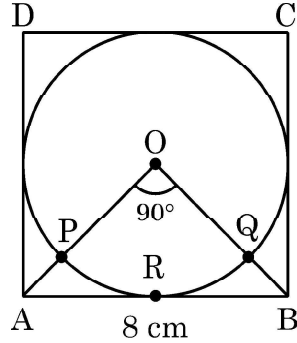
Section – E comprises of 3 Case Study questions each of 4 marks.

36. 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 OPRQ. 2

OR

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

37.



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.

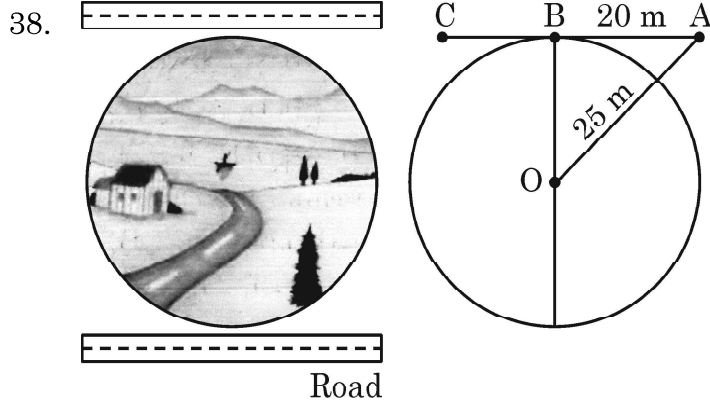


Based on the above information, answer the following questions :

- (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



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



