

**Series PPQQB/3****SET~3****प्रश्न-पत्र कोड
Q.P. Code 30/3/3**

रोल नं.

Roll No.

--	--	--	--	--	--	--

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
(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।	(I) Please check that this question paper contains 11 printed pages.
(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II) 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.
(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 14 प्रश्न हैं।	(III) Please check that this question paper contains 14 questions.
(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें।	(IV) Please write down the serial number of the question in the answer-book before attempting it.
(V) 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।	(V) 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 (मानक)****MATHEMATICS (STANDARD)**

निर्धारित समय : 2 घण्टे

अधिकतम अंक : 40

Time allowed : 2 hours

Maximum Marks : 40

**General Instructions :**

Read the following instructions very carefully and strictly follow them :

- (i) This question paper contains **14** questions. **All** questions are compulsory.
- (ii) This question paper is divided into **three** sections – **Sections A, B** and **C**.
- (iii) **Section A** comprises of **6** questions (Q.no. **1** to **6**) of **2** marks each. Internal choice has been provided in **two** questions.
- (iv) **Section B** comprises of **4** questions (Q.no. **7** to **10**) of **3** marks each. Internal choice has been provided in **one** question.
- (v) **Section C** comprises of **4** questions (Q.no. **11** to **14**) of **4** marks each. Internal choice has been provided in **one** question. It also contains two case study based questions.
- (vi) Use of calculator is **not** permitted.

SECTION A

Question numbers **1** to **6** carry **2** marks each.

1. In Figure 1, PQ and PR are tangents to the circle centred at O. If $\angle OPR = 45^\circ$, then prove that ORPQ is a square. 2

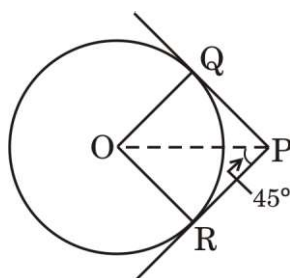


Figure 1

2. Find the mode of the given frequency distribution : 2

Class	Frequency
15 – 25	6
25 – 35	11
35 – 45	22
45 – 55	23
55 – 65	14
65 – 75	5

3. Find the common difference 'd' of an AP whose first term is 10 and the sum of the first 14 terms is 1505. 2
4. For what value of 'n', are the n^{th} terms of the APs : 9, 7, 5, and 15, 12, 9, the same ? 2



5. (a) Solve the quadratic equation for x :

$$x^2 - 2ax - (4b^2 - a^2) = 0$$

2

OR

- (b) If the quadratic equation

$$(1 + a^2)x^2 + 2abx + (b^2 - c^2) = 0$$

has equal and real roots, then prove that :

$$b^2 = c^2 (1 + a^2)$$

2

6. (a) 150 spherical marbles, each of diameter 1.4 cm, are dropped in a cylindrical vessel of diameter 7 cm containing some water, and are completely immersed in water. Find the rise in the level of water in the cylindrical vessel.

2

OR

- (b) Three cubes of side 6 cm each, are joined as shown in Figure 2. Find the total surface area of the resulting cuboid.

2

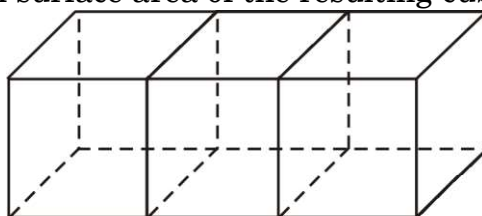


Figure 2

SECTION B

Question numbers 7 to 10 carry 3 marks each.

7. Two boats are sailing in the sea 80 m apart from each other towards a cliff AB. The angles of depression of the boats from the top of the cliff are 30° and 45° respectively, as shown in Figure 3. Find the height of the cliff.

3

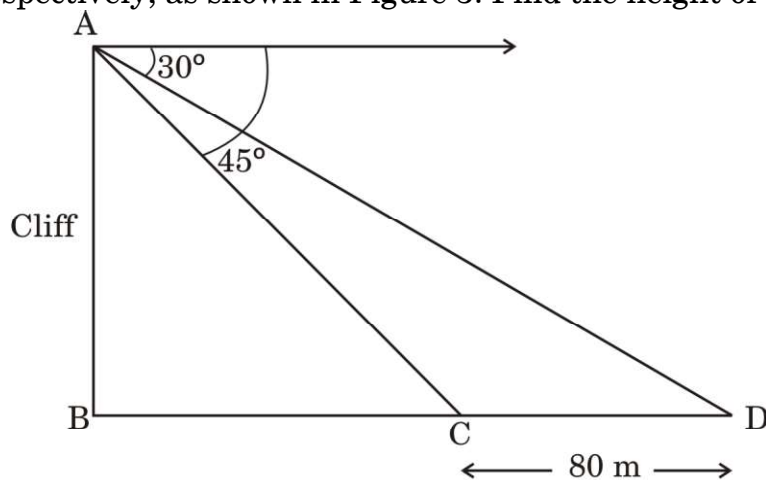


Figure 3



8. For the following frequency distribution, find the median : 3

<i>Class</i>	<i>Frequency</i>
1400 – 1550	6
1550 – 1700	13
1700 – 1850	25
1850 – 2000	10

9. (a) Draw a line segment AB of length 8 cm and locate a point P on AB such that AP : PB = 1 : 5. 3

OR

- (b) Draw a circle of radius 3 cm. From a point P lying outside the circle at a distance of 6 cm from its centre, construct two tangents PA and PB to the circle. 3

10. Find the mean of the following frequency distribution : 3

<i>Class</i>	<i>Frequency</i>
0 – 10	12
10 – 20	18
20 – 30	27
30 – 40	20
40 – 50	17
50 – 60	6

SECTION C

Question numbers 11 to 14 carry 4 marks each.

11. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . From a point Y, 40 m vertically above X, the angle of elevation of the top Q of tower PQ is 45° . Find the height of the tower PQ and the distance PX. [Use $\sqrt{3} = 1.73$] 4
12. (a) In Figure 4, two circles with centres at O and O' of radii 2r and r respectively, touch each other internally at A. A chord AB of the bigger circle meets the smaller circle at C. Show that C bisects AB. 4

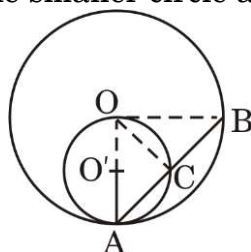


Figure 4

OR



- (b) In Figure 5, O is centre of a circle of radius 5 cm. PA and BC are tangents to the circle at A and B respectively. If $OP = 13$ cm, then find the length of tangents PA and BC.

4

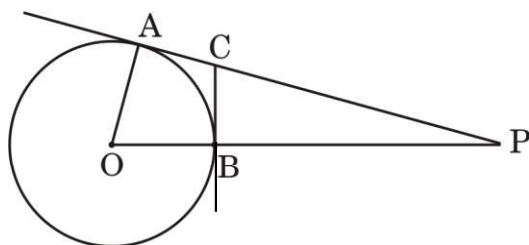


Figure 5

Case Study – 1

13. In the picture given below, one can see a rectangular in-ground swimming pool installed by a family in their backyard. There is a concrete sidewalk around the pool of width x m. The outside edges of the sidewalk measure 7 m and 12 m. The area of the pool is 36 sq. m.



- (a) Based on the information given above, form a quadratic equation in terms of x .
- (b) Find the width of the sidewalk around the pool.

2

2



Case Study – 2

14. John planned a birthday party for his younger sister with his friends. They decided to make some birthday caps by themselves and to buy a cake from a bakery shop. For these two items, they decided the following dimensions :

Cake : Cylindrical shape with diameter 24 cm and height 14 cm.

Cap : Conical shape with base circumference 44 cm and height 24 cm.



Based on the above information, answer the following questions :

- (a) How many square cm paper would be used to make 4 such caps ? 2
- (b) The bakery shop sells cakes by weight (0.5 kg, 1 kg, 1.5 kg, etc.). To have the required dimensions, how much cake should they order, if 650 cm^3 equals 100 g of cake ? 2