

**Series PPQQB/3****SET~2**प्रश्न-पत्र कोड
Q.P. Code**430/3/2**

रोल नं.

Roll No.

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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 (बुनियादी)****MATHEMATICS (BASIC)**

निर्धारित समय : 2 घण्टे

अधिकतम अंक : 40

Time allowed : 2 hours

Maximum Marks : 40

.430/3/2

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P.T.O.



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. (a) A cubical block of side 7 cm is surmounted by a hemisphere of largest possible diameter as shown in Figure 1. Find the total surface area of the solid. 2

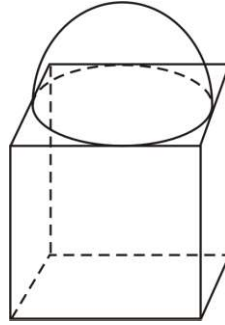


Figure 1

OR

- (b) How many solid cones of height 3 cm and radius 2 cm can be formed by melting a solid sphere of radius 3 cm ? 2
2. In Figure 2, PA and PB are tangents to the circle with centre at O. If $\angle APB = 70^\circ$, then find $m \angle AQB$. 2

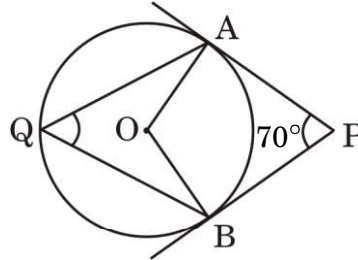


Figure 2



3. (a) For what value of p , does the quadratic equation $px^2 + 2x + p = 0$ have real and equal roots ? 2

OR

- (b) Solve the quadratic equation for x : $6 - x - x^2 = 0$ 2
4. For an AP with common difference 6, the sum of first ten terms is same as four times the sum of first five terms. Determine the first term of the AP. 2
5. Find the 15th term of an AP whose first term is 17 and fourth term is 44. 2
6. Find mode of the following frequency distribution : 2

<i>Class</i>	100 – 110	110 – 120	120 – 130	130 – 140	140 – 150
<i>Frequency</i>	5	9	8	11	7

SECTION B

Question numbers 7 to 10 carry 3 marks each.

7. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively as shown in Figure 3. Find the height of the transmission tower. 3

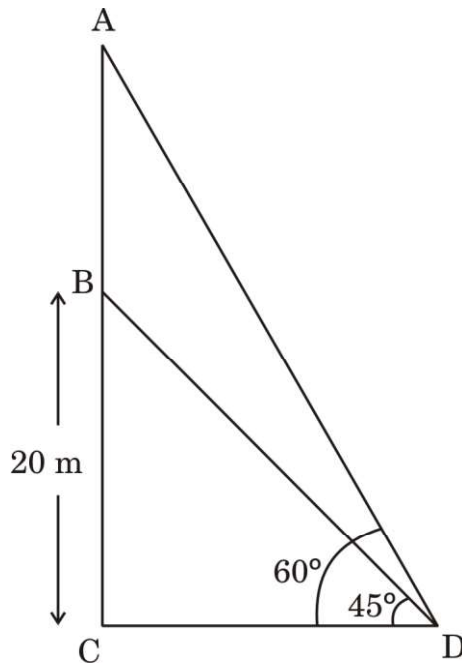


Figure 3



8. Determine median of the following frequency distribution : 3

<i>Class</i>	<i>Frequency</i>
15 – 20	8
20 – 25	13
25 – 30	21
30 – 35	12
35 – 40	5
40 – 45	4

9. (a) Draw two concentric circles of radii 5 cm and 2 cm. From a point P on the outer circle, construct a pair of tangents to the inner circle. 3

OR

- (b) Draw a line segment AB = 9 cm. Divide AB in the ratio 2 : 3. 3

10. The mileage (km/l) of 50 cars was recorded by a dealer and tabulated as given below :

<i>Mileage (in km / l)</i>	<i>Number of Cars</i>
10 – 12	13
12 – 14	18
14 – 16	10
16 – 18	7
18 – 20	2

Find mean of the above distribution. 3

SECTION C

Question numbers 11 to 14 carry 4 marks each.

11. The angles of depression of the top and bottom of a 6 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings. (Use $\sqrt{3} = 1.73$) 4



12. (a) Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. 4

OR

- (b) In Figure 4, CD is a tangent and AB is a diameter of the circle centred at O. If $\angle DCB = 20^\circ$, then find $m \angle ADC$. 4

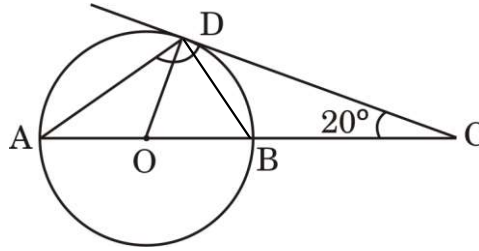


Figure 4

Case Study – 1

13. The tradition of pottery making in India is very old. In fact, it is older than Indus Valley Civilization. The shaping and baking of clay articles has continued through the ages. The picture of a potter is shown below :



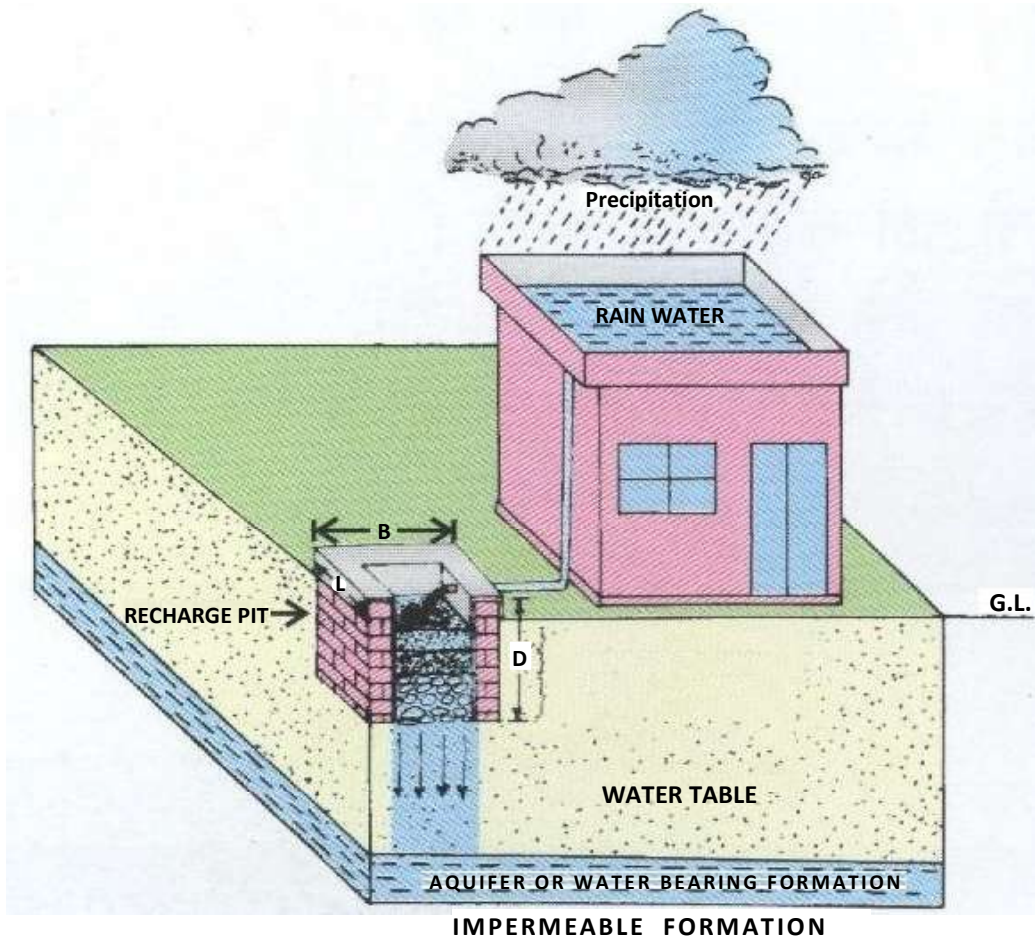
A potter makes a certain number of pottery articles in a day. It was observed on a particular day the cost of production of each article (in ₹) was one more than twice the number of articles produced on that day. The total cost of production on that day was ₹ 210.

- (a) Taking number of articles produced on that day as x , form a quadratic equation in x . 2
- (b) Find the number of articles produced and the cost of each article. 2



Case Study – 2

14. The technique of Rainwater harvesting through Recharge pit is very useful. Rainwater is collected on the roof and then flowing through the Recharge pit it goes to the ground. Observe the picture given below :



B (BREADTH) = 3 m
D (DEPTH) = 2 m
L (LENGTH) = 3 m

The surface area of the roof floor is 100 m^2 . The cuboidal pit measures $3 \text{ m} \times 3 \text{ m} \times 2 \text{ m}$.

- (a) Water standing on the roof is released into the cuboidal pit. If the cuboidal pit is filled completely by the roof water, then find the height of standing water on the roof. 2
- (b) Instead of a cuboidal pit, if a cylindrical pit with diameter 3 m and height 2 m had been built, then which tank would hold more water ? 2