

**Series PPQQA/1****SET~3****प्रश्न-पत्र कोड
Q.P. Code****430/1/3**

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

**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. Find the mode of the following frequency distribution : 2

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	8	7	12	5	3

2. Solve the quadratic equation $2x^2 - 5x - 1 = 0$ for x. 2

3. In Figure 1, if tangents PA and PB drawn from a point P to a circle with centre O, are inclined to each other at an angle of 70° , then find the measure of $\angle POA$. 2

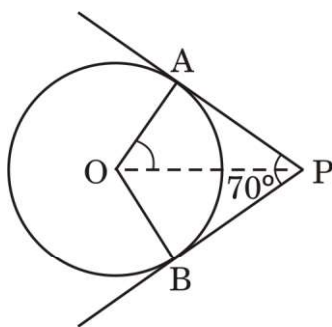


Figure 1

4. (a) In an AP, if $a = 50$, $d = -4$ and $S_n = 0$, then find the value of n. 2

OR

- (b) Find the sum of the first twelve 2-digit multiples of 7, using an AP. 2



5. A solid hemisphere of radius 8 cm is melted and recast into 4 identical right circular solid cones of base radius 4 cm. Find the height of the cone. 2
6. (a) Find the nature of the roots of the quadratic equation
 $x^2 - 5x + 9 = 0$. 2

OR

- (b) Write a quadratic equation with roots -3 and 5 . 2

SECTION B

Question numbers 7 to 10 carry 3 marks each.

7. The following table shows the age of patients admitted in a hospital during a particular week :

Age (in years)	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65
Number of Patients	5	12	20	24	15	4

Find the mean age of the patients. 3

8. In Figure 2, the angles of elevation of the top of a tower AB of height 'h' m, from two points P and Q at a distance of x m and y m from the base of the tower respectively and in the same straight line with it, are 60° and 30° , respectively. Prove that $h^2 = xy$. 3

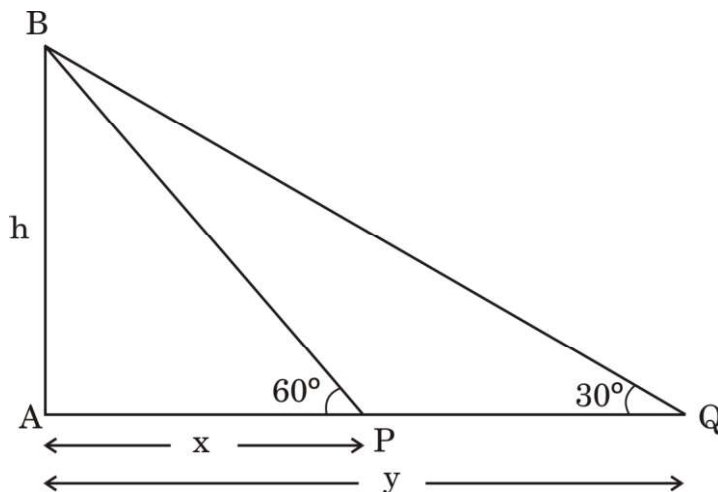


Figure 2



9. (a) Draw a circle of radius 3 cm. Take a point P at a distance of 8 cm from the centre of the circle. Construct a pair of tangents from the point P to the circle. 3

OR

- (b) Draw a line segment AB = 8.5 cm. Divide it in the ratio 1 : 3. 3

10. Weekly income of 110 families is given below :

<i>Weekly Income (in ₹)</i>	<i>Number of Families</i>
5000 – 6000	18
6000 – 7000	30
7000 – 8000	28
8000 – 9000	19
9000 – 10000	15

Find the median weekly income for this data. 3

SECTION C

Question numbers 11 to 14 carry 4 marks each.

11. In Figure 3, two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$. 4

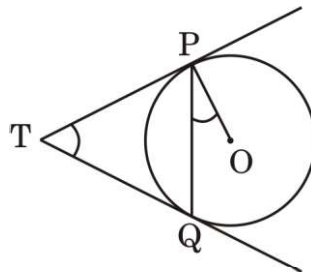


Figure 3



12. (a) A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely. 4

OR

- (b) From a solid cylinder, whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. 4

Case Study 1

13. Do you know old clothes which are thrown as waste not only fill the landfill site but also produce very harmful greenhouse gas. So, it is very important that we reuse old clothes in whatever way we can.

The picture given below on the right, shows a footmat (rug) made out of old t-shirts yarn. Observing the picture, you will notice that a number of stitches in circular rows are making a pattern : 6, 12, 18, 24, ...



Based on the above information, answer the following questions :

- (a) Check whether the given pattern forms an AP. If yes, find the common difference and the next term of the AP. 2
- (b) Write the n^{th} term of the AP. Hence, find the number of stitches in the 10^{th} circular row. 2



Case Study 2

14. The following TV Tower was built in 1988 and is located in Pitampura, Delhi. It has an observation deck. Observe the picture given below :



The TV Tower stands vertically on the ground. From a point 'A' on the ground, the angle of elevation of top of the tower (point 'B') is 60° . There is a point 'C' on the tower which is 78 m (approx.) above the ground. The angle of elevation of the point C from point A is found to be 30° .

- (a) Draw a well-labelled figure, based on the information given above. 2
- (b) Find the height of the tower and the distance of the tower from point A. 2