



Series : PPQQD/4

SET ~ 2

प्रश्न-पत्र कोड
Q.P. Code **30/4/2**

रोल नं.

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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 12 हैं।	(I) Please check that this question paper contains 12 printed pages.
(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II) Q.P. Code number 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, 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 candidates will read the question paper only and will not write any answer on the answer-book during this period. *



गणित (मानक) – सैद्धान्तिक



MATHEMATICS (Standard) – Theory

निर्धारित समय : 2 घण्टे

अधिकतम अंक : 40

Time allowed : 2 hours

Maximum Marks : 40

.30/4/2

127 B

1

P.T.O.



General Instructions :

- (i) This question paper contains **14** questions. **All** questions are compulsory.
- (ii) This Question Paper is divided into 3 Sections – Section **A**, **B** and **C**.
- (iii) Section–**A** comprises of **6** questions (Q. Nos. **1** to **6**) of **2** marks each. Internal choice has been provided in **two** questions.
- (iv) Section–**B** comprises of **4** questions (Q. Nos. **7** to **10**) of **3** marks each. Internal choice has been provided in **one** question.
- (v) Section–**C** comprises of **4** questions (Q. Nos. **11** to **14**) of **4** marks each. An Internal choice has been provided in **one** question. It also contains two case study based questions.
- (vi) There is no overall choice in the question paper. However, internal choice has been provided in some questions. Attempt any one choice in such questions.
- (vii) Use of calculator is not permitted.

SECTION – A

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

1. (a) If the sum of the roots of the quadratic equation $ky^2 - 11y + (k - 23) = 0$ is $\frac{13}{21}$ more than the product of the roots, then find the value of k . **2**
- OR**
- (b) If $x = -2$ is the common solution of quadratic equations $ax^2 + x - 3a = 0$ and $x^2 + bx + b = 0$, then find the value of a^2b . **2**
2. In Fig. 1, there are two concentric circles with centre O. If ARC and AQB are tangents to the smaller circle from the point A lying on the larger circle, find the length of AC, if $AQ = 5$ cm. **2**

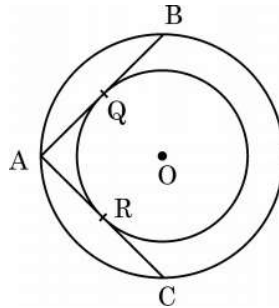


Fig. – 1



3. (a) The curved surface area of a right circular cylinder is 176 sq. cm and its volume is 1232 cu. cm. What is the height of the cylinder ? **2**

OR

- (b) The largest sphere is carved out of a solid cube of side 21 cm. Find the volume of the sphere. **2**
4. If the first term of an A.P. is 5, the last term is 15 and the sum of first n terms is 30, then find the value of n. **2**

5. For the following frequency distribution, find the mode : **2**

Class	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50
Frequency	12	5	14	8	9

6. If the mean of the following frequency distribution is 18, then find the missing frequency 'f'. **2**

Class	11 – 13	13 – 15	15 – 17	17 – 19	19 – 21	21 – 23	23 – 25
Frequency	3	6	9	13	f	5	4

SECTION – B

Question Numbers 7 to 10 carry 3 marks each.

7. (a) Find the value of 'p' for which the quadratic equation $p(x - 4)(x - 2) + (x - 1)^2 = 0$ has real and equal roots. **3**

OR

- (b) Had Aarush scored 8 more marks in a Mathematics test, out of 35 marks, 7 times these marks would have been 4 less than square of his actual marks. How many marks did he get in the test ? **3**
8. Construct a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 60° . **3**
9. There is a small island in the middle of a 100 m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on two banks and in line with the tree. If the angles of elevation of the top of the tree from P and Q are respectively 30° and 45° , find the height of the tree. (Use $\sqrt{3} = 1.732$) **3**



10. In an A.P., the sum of first n terms is $\frac{n}{2}(3n + 5)$. Find the 25th term of the A.P. 3

SECTION – C

Question Numbers 11 to 14 carry 4 marks each.

11. From the top of an 8 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower. (Take $\sqrt{3} = 1.732$). 4
12. (a) In Fig.-2, if a circle touches the side QR of ΔPQR at S and extended sides PQ and PR at M and N, respectively, then 4

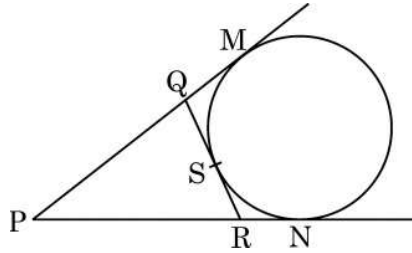


Fig. 2

prove that $PM = \frac{1}{2}(PQ + QR + PR)$

OR

- (b) In Fig. 3, a triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 6 cm and 8 cm respectively. If the area of ΔABC is 84 cm^2 , find the lengths of sides AB and AC. 4

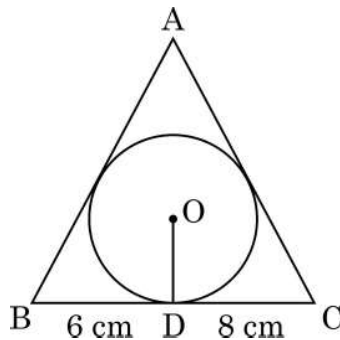


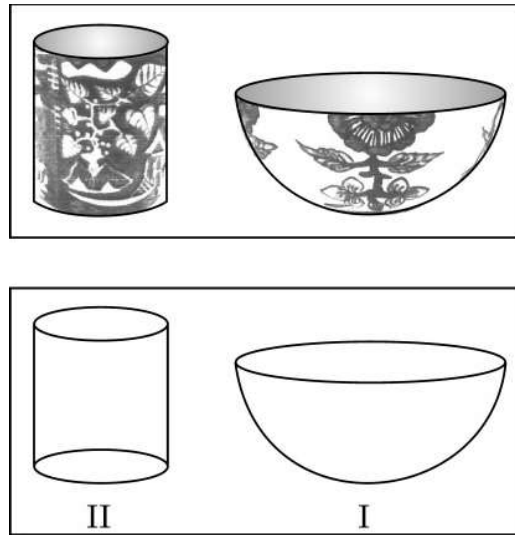
Fig. 3



Case Study – 1

13. Khurja is a city in the Indian state of Uttar Pradesh famous for the pottery. Khurja pottery is traditional Indian pottery work which has attracted Indians as well as foreigners with a variety of tea-sets, crockery and ceramic tile works. A huge portion of the ceramics used in the country is supplied by Khurja and is also referred as 'The Ceramic Town'.

One of the private schools of Bulandshahr organised an Educational Tour for class 10 students to Khurja. Students were very excited about the trip. Following are the few pottery objects of Khurja.



Students found the shapes of the objects very interesting and they could easily relate them with mathematical shapes viz sphere, hemisphere, cylinder etc. Maths teacher who was accompanying the students asked following questions :

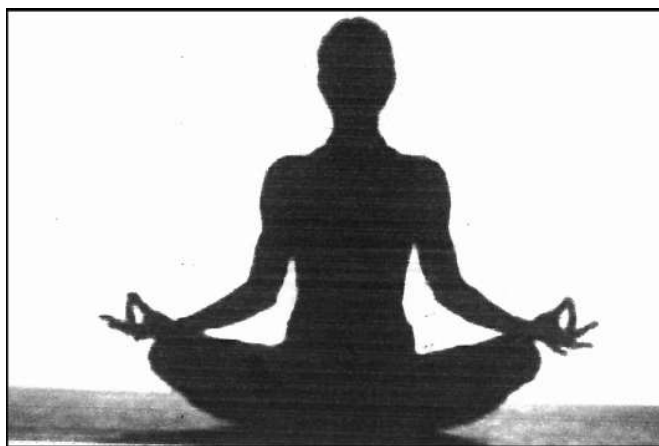
- (a) The internal radius of hemispherical bowl (filled completely with water) in I is 9 cm and radius and height of cylindrical jar in II is 1.5 cm and 4 cm respectively. If the hemispherical bowl is to be emptied in cylindrical jars, then how many cylindrical jars are required ? 2
- (b) If in the cylindrical jar full of water, a conical funnel of same height and same diameter is immersed, then how much water will flow out of the jar ? 2



Case Study – 2

14. Yoga is an ancient practice which is a form of meditation and exercise. By practising yoga, we not even make our body healthy but also achieve inner peace and calmness. The International Yoga Day is celebrated on 21st of June every year since 2015.

To promote Yoga, Green park society in Pune organised a 7-day Yoga camp in their society. The number of people of different age groups who enrolled for this camp is given as follows :



Age Group	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75	75 – 85
Number of People	8	10	15	25	40	24	18

Based on the above, find the following :

- (a) Find the median age of people enrolled for the camp. 2
- (b) If x more people of age group 65 – 75 had enrolled for the camp, the mean age would have been 58. Find the value of x . 2

