

MATHEMATICS QUESTION PAPER


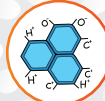


2022



MATHEMATICS

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SET~1

प्रश्न-पत्र कोड
Q.P. Code 30/1/1

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

.30/1/1

1

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) Find the sum of first 30 terms of AP : $-30, -24, -18, \dots$. 2

OR

- (b) In an AP if $S_n = n(4n + 1)$, then find the AP. 2

2. A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed. 2

3. (a) Find the value of m for which the quadratic equation
 $(m - 1)x^2 + 2(m - 1)x + 1 = 0$
 has two real and equal roots. 2

OR

- (b) Solve the following quadratic equation for x : 2
 $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

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

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	15	10	12	17	4

5. The product of Rehan's age (in years) 5 years ago and his age 7 years from now, is one more than twice his present age. Find his present age. 2
6. Two concentric circles are of radii 4 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle. 2

SECTION B

Question numbers 7 to 10 carry 3 marks each.

7. For what value of x , is the median of the following frequency distribution 34.5 ? 3

Class	Frequency
0 – 10	3
10 – 20	5
20 – 30	11
30 – 40	10
40 – 50	x
50 – 60	3
60 – 70	2

8. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Construct tangents to the circle from these two points P and Q. 3
9. (a) The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, then find the height of the building. 3

OR

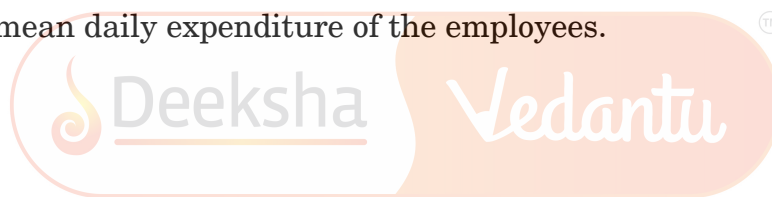
- (b) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, then find the width of the river. 3

10. Following is the daily expenditure on lunch by 30 employees of a company :

<i>Daily Expenditure (in Rupees)</i>	<i>Number of Employees</i>
100 – 120	8
120 – 140	3
140 – 160	8
160 – 180	6
180 – 200	5

Find the mean daily expenditure of the employees.

3



SECTION C

Question numbers 11 to 14 carry 4 marks each.

11. (a) From a solid cylinder of height 30 cm and radius 7 cm, a conical cavity of height 24 cm and same radius is hollowed out. Find the total surface area of the remaining solid.

4

OR

- (b) Water in a canal, 8 m wide and 6 m deep, is flowing with a speed of 12 km/hour. How much area will it irrigate in one hour, if 0.05 m of standing water is required ?

4

.30/1/1

4

P.T.O.

12. In Figure 1, a triangle ABC with $\angle B = 90^\circ$ is shown. Taking AB as diameter, a circle has been drawn intersecting AC at point P. Prove that the tangent drawn at point P bisects BC. 4

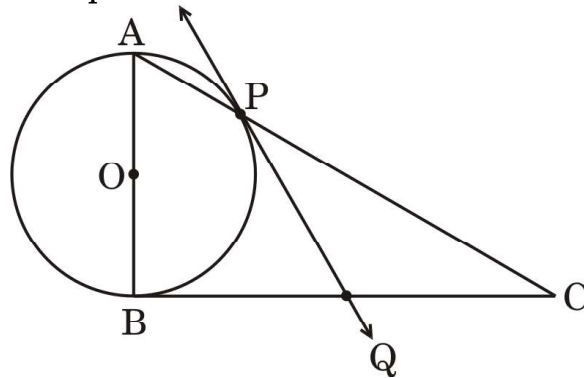


Figure 1

Case Study – 1

13. In Mathematics, relations can be expressed in various ways. The matchstick patterns are based on linear relations. Different strategies can be used to calculate the number of matchsticks used in different figures.

One such pattern is shown below. Observe the pattern and answer the following questions using Arithmetic Progression :

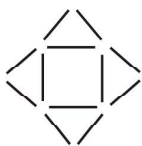


Figure 1

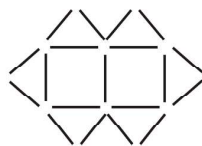


Figure 2

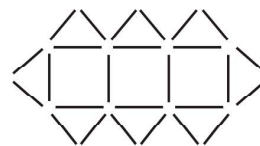
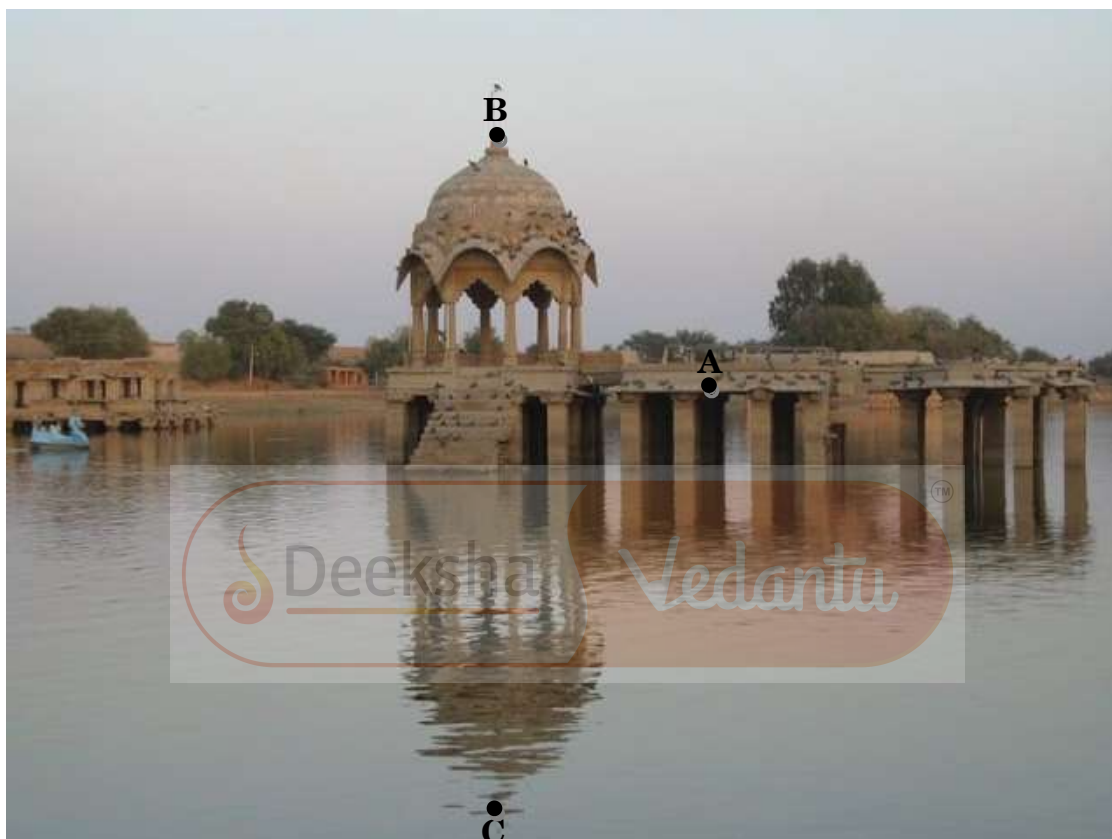


Figure 3

- (a) Write the AP for the number of triangles used in the figures. Also, write the n^{th} term of this AP. 2
- (b) Which figure has 61 matchsticks? 2

Case Study – 2

14. Gadisar Lake is located in the Jaisalmer district of Rajasthan. It was built by the King of Jaisalmer and rebuilt by Gadsis Singh in 14th century. The lake has many Chhatris. One of them is shown below :



Observe the picture. From a point A h m above from water level, the angle of elevation of top of Chhatri (point B) is 45° and angle of depression of its reflection in water (point C) is 60° . If the height of Chhatri above water level is (approximately) 10 m, then

- (a) draw a well-labelled figure based on the above information; 2
- (b) find the height (h) of the point A above water level. 2
(Use $\sqrt{3} = 1.73$)



Deeksha's balanced approach to PU and JEE prep, with weekly assessments and dedicated hours, refined my strategy. Supportive teachers and a great learning environment made all the difference.

P Sai Lekhya Deeksha Vedantu
Vidyanagar 2022-24 (Science)



Admission to Deeksha was transformative. The VidyaDaan scholarship enabled my PU studies, while my teachers instilled skills in technology and time management. Confident in my preparation, I aim to clear the CA Foundation exam by 2025.

Shamsudin, Deeksha Vedantu
Kengeri 2022-24 (Comm.)








With Deeksha's expert guidance, I effectively balanced JEE and PU preparation, achieving a 99.59 percentile in JEE Main. The weekly tests, model papers, and bite-sized materials were instrumental in mastering PU topics and staying exam-ready.

Neha Prabhu, Deeksha Main
Campus 2022-24 (Science)



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