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ERNAKULAM REGION

PRE BOARD EXAMINATION 2026-27

Class X

Sub: Mathematics Standard (041) **Max. Marks: 80**

Time: 3 Hours

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.

2. This Question Paper is divided into 5 Sections A, B, C, D and E.

3. In Section A, Question numbers 1-18 are multiple choice questions (MCQ's) and question no.19 and 20 are Assertion- Reason based questions of 1 mark each.

4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.

5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.

6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.

7. In Section E, Question numbers 36-38 are case study-based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.

8. There is no overall choice. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.

9. Draw neat and clean figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

10. Use of calculators is not allowed.

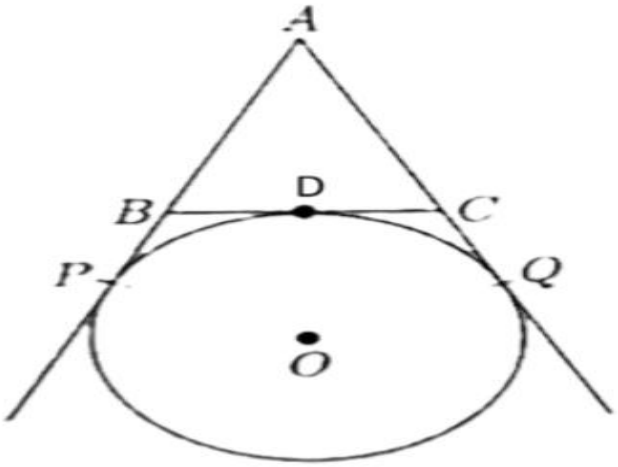
SECTION A :

Section A consists of 20 questions of 1 mark each.

1	**The radius of the largest right circular cone that can be cut from a cube of edge 5.6 cm is** **(a) 5.6 cm (b) 2.3 cm (c) 2.8 cm (d) 11.2 cm**	**1**
2	**If three sides of a triangle are $\sqrt{2}$ x, $\sqrt{3}$ x , $\sqrt{5}$ x ,then the measure of the angle opposite to the longest side is** **(a) 15° (b) 30° (c) 60° (d) 90°**	**1**
3	**The length of shadow of a vertical pole of height 12 m when angle of elevation of the Sun is 60° is** **(a) $12\sqrt{3}$ m (b) $4\sqrt{3}$ m (c) 12 m (d) $6\sqrt{3}$ m**	**1**

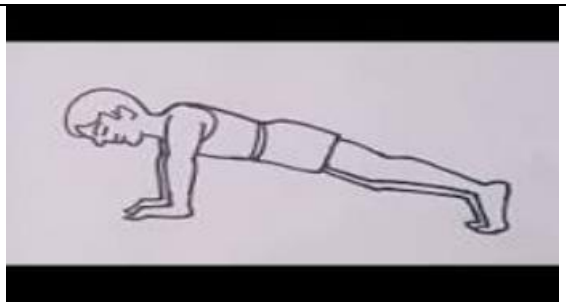
4	If α and β are the zeroes of f(x)= $kx^2+ 4x +3k$ and α + β =2α β, then k is (a) $\frac{1}{3}$ (b) - $\frac{1}{3}$ (c) $\frac{2}{3}$ (d)- $\frac{2}{3}$	1
5	A 90cm tall girl and a 400cm tall lamp post are in the same line.The girl is 4 m from the post.The length of her shadow is (a) 1.33m (b) 1.66m (c) 2.16m (d) 1.16 m	1
6	a,b are two positive integers such that a= l^4m^3 and b= l^3m^2 ,where *l* and *m* are prime numbers.If HCF (a,b)= l^cm^d and LCM (a,b)= l^rm^s, then (c+d) (r+s) is equal to (a) 72 (b) 35 (c) 40 (d) 25	1
7	For what value of k does the following pair of linear equation have unique solution $3x$ +(k-5) y = 0 $6x$ +ky - 10 =0 (a) k=10 (b) k=12 (c) k≠ 10 (d) k≠12	1
8	The point which divides the line segment of the points A (-1,7) and B (4,-3) in the ratio 2:3 is (a) (1, 3) (b) (1,-3) (c) (-1, 3) (d) (-1,-3)	1
9	The graph of y = x^2 +1 (a) intersects x-axis at 2 distinct points (b) touches x-axis at a point (c) neither touches nor intersects x-axis (d) either touches or intersects x-axis	1
10	The perimeter of a quadrant of a circle of radius 14 cm is (a) 22 cm (b) 50 cm (c) 48 cm (d) 24 cm	1
11	The area of a semi-circle of diameter d is (a) $\frac{1}{2}\pi d^2$ (b) $\frac{1}{4}\pi d^2$ (c) $\frac{1}{8}\pi d^2$ (d) $\frac{1}{16}\pi d^2$	1
12	Amita has only ₹2 coins and ₹5 coins with her.If the total number of coins with her is 50 and the amount with her is ₹160,then the number of ₹2 coins and ₹5 coins with her are_____ and _____ respectively (a) 30,20 (b) 25,25 (c) 20,30 (d) 35,15	1
13	PA and PB are tangents to a circle with centre O and of radius 5 cm.If OP= 13 cm, the area of the quadrilateral OAPB is (a) 60 cm^2 (b) 20 cm^2 (c) 30 cm^2 (d) 40 cm^2	1
14	If in two similar triangles LMN and PQR, $\frac{LM}{PQ} = \frac{MN}{PR}$,then	

	(a) $\angle M = \angle N$ (b)$\angle N = \angle R$ (c) $\angle M = \angle R$ (d) $\angle L = \angle R$	1
15	A circular playground has radius 10 m. A boy stands at point P, 26 m away from the center O. He runs along a straight path PA touching the circle at point A. The length of path PA is: (a) 24m (b) 25 m (c) 20m (d)15m	1
16	If one equation of a pair of dependent linear equation is $-2x+3y = 6$,the second equation can be (a) $-4x - 6y = 12$ (b)$4x+ 6y = -12$ (c)$-4x+ 6y = -12$ (d) $4x - 6y = -12$	1
17	In making 1000 revolutions,a wheel covers 44 km.The diameter of the wheel is (a) 14 m (b) 24 m (c)28 m (d) 40 m	1
18	If $\text{cosec}\theta + \cot\theta = p$, then $\cot\theta$ is a) $\frac{p^2-1}{2p}$ b) $\frac{p^2+1}{2p}$ c) $\frac{p^2+1}{p}$ d) $\frac{p^2-1}{p^2+1}$	1
	Assertion and Reason Questions	
19	Assertion (A):The product of any three consecutive positive integers is divisible by6. Reason (R) : Among any three consecutive positive integers,one is divisible by 3 and at least one is even a)Both A and R are true, and R is the correct explanation of A. b)Both A and R are true, but R is not the correct explanation of A. c)A is true, but R is false. d)A is false, but R is true.	1
20	Assertion (A):If the radius of the cone is halved and the volume is not changed, their height remains the same. Reason (R) :If the radius of the cone is halved and the volume is not changed, their height must become four times of its original value. a)Both A and R are true, and R is the correct explanation of A. b)Both A and R are true, but R is not the correct explanation of A. c)A is true, but R is false. d)A is false, but R is true.	1
	SECTION B **Section B consists of 5 questions of 2 marks each**	

21	**A capsule is made up of a cylinder with two hemispherical ends.If the length and radius of the cylindrical part are 10 cm and 3cm respectively,find how much of medicine can be filled in the capsule.**	**2**
22	**A)Find the middle term of the sequence:** **-12,-7,- 2,……58** **OR** **B)A company records its monthly losses .In the first month, the loss is ₹11,500, in the second month ₹15,500, in the third month ₹19,500, and so on.If the losses continue in the same pattern for the 12 months of the year ,find the loss in the 9^{th} month from the end of the year**	**2**
23	**Solve for x and y if** **$24x + 56y - 1080 = 0$** **$56x + 24y - 920 = 0$**	**2**
24	**Find the zeroes of the polynomial $5y^2 - (\frac{7}{3})\, y - \frac{2}{3}$** **and verify the relationship between the zeroes and the coefficients**	**2**
25	**A)If sin A =cos A,find the value of 2cot A+ $\sin^2$ A** **OR** **B)If tan(A-B) = $\frac{1}{\sqrt{3}}$ and** **cos(A+B) = 0 , $0^\circ \leq$ A,B $\leq 90°$, find A and B.**	**2**
	SECTION C **Section C consists of 6 questions of 3 marks each.**	
26	**A city planner wants to place a divider along a road at a point P(x,y) such that it is equidistant from the junctions A (2,5) and B (8,7).Find the relation between x and y such that P(x,y) is equidistant from the junctions A and B.**	**3**
27	**In the figure AP ,AQ and BC are tangents of a circle with centre O.If AB =5 cm , AC =6 cm and BC =4 cm,find the length of AP.**  	**3**

28	A)Prove that : $\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\tan A} = 1 + \sec A \operatorname{cosec} A$ **OR** B) Prove that : $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$	3
29	A solid cuboid of dimensions 20 cm × 15 cm × 10 cm has a cylindrical hole of radius 5 cm drilled right through its center along its height of 10 cm.Find the total surface area of the remaining solid.(Use $\pi = 22/7$)	3
30	A)A kite is tied to the ground with a rope. The angle of elevation of the kite from a point on the ground is 30° . After the kite rises vertically by 20 m, the angle of elevation from the same point becomes 60° .Find the initial height and the final height of the kite. **OR** B)Two poles of equal heights are standing opposite each other on either side of the road 60 m wide . From a point between them on the road,angles of elevation of the tops of the poles are 60° and 30°.Find the height of the poles.	3
31	A park is in the shape of a circle of radius 21 m. A sector of angle 120° is to be fenced separately for a children's play area. Find the area and the perimeter of the sector.(Use $\pi = 22/7$)	3
	SECTION D **Section D consists of 4 questions of 5 marks each**	
32	a) Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points,then the other two sides are divided in the same ratio. b) In a triangular park ABC,a walking track DE is to be constructed parallel to the side BC with ropes and poles.The measurement on the sides are AD = x ,DB = (x -2), AE= (x +2) and EC = (x -1).Find the sides AD, DB, AE and EC	5
33	A)In a flight journey of 720 km,an aircraft slowed down due to bad weather.Its average speed was reduced by120km/hr from its usual speed and the time of flight increased by 60 minutes.Find the usual speed and scheduled duration of the flight. **OR** B)A person has ₹7200 for a tour.If he extends tour by 6 days,his daily expense is reduced by ₹40 .Find the original duration of the tour.	5
34	A)Prove that a parallelogram circumscribing a circle is a rhombus. **OR** B)Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.	5
35	A 1.6m tall girl is standing at some distance from a 40 m tall building.The angles of elevation from her eyes to the top of the building increases from 30° to 60° as she walks towards the building.Find the distance she walks towards the building	5
	SECTION E	

	Section E consists of 3 case study-based questions of 4 marks each	
36	**CASE STUDY 1:**  **A school uses two bells as a signal for different activities during the day.Whenever the bells ring together,the students recognize it as the moment when the whole school participates in the same activity together .Two school bells ring at different intervals.The first bell rings every 18 minutes, and the second bell rings every 24 minutes. Both bells ring together at 9:00 AM.Based on this situation,answer the following questions:** **(i) After how many minutes will both bells ring together again?** **(ii)At what time will they ring together again after 9:00 AM?** **(iii)Till 12:00 noon, how many times will both bells ring together (excluding 9:00 AM)?** **OR** **At what time does the first bell ring for the 10th time after 9:00 AM?**	**1** **1** **2**
37	**CASE STUDY 2: Park Development Project**  **The Municipal Council of a town is developing a new park. The park boundary is represented on a coordinate plane with corners at points A(0, 6), B(8, 6), C(6, 12) and D(- 2, 12). The council plans to install a fountain at the center of the park and benches along one of its sides.** **Based on the above information, answer the following questions:** **(i) Find the coordinates of the point where the fountain will be placed.** **(ii) Determine the coordinates of the point that lies one-third of the way along side AB from A.** **(iii) Calculate the straight-line distance between A and C.** **OR** **Verify whether ABCD forms a rectangle.**	**1** **1** **2**
38	**CASE STUDY 3: Health is wealth**	



Amit is training for a fitness test and does push-ups every day. He increases the number of push-ups by the same amount each day. The total number of push-ups he does on the 3rd and 7th days together is 48. On the 9th day he does exactly two times as many push-ups as on the 1st day. His target is to do 76 push-ups in a single day. Based on this situation, answer the following:

(i) How many push-ups does he do on the 1st day, and by how many does he increase them each day? **1**

(ii) On which day does he reach his target of 76 push-ups? **1**

(iii) Find the total number of push-ups he does in the first 20 days.

OR

Find the total number of push-ups he does from the 1st day up to the day he reaches his target **2**