PODAR PEARL SCHOOL

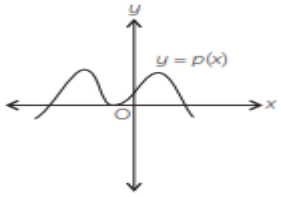
(Under the Supervision of Ministry of education and Higher Education, Qatar)

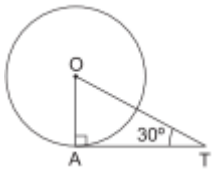
SECOND PRE-BOARD EXAMINATION-2022-23

SUBJECT: MATHEMATICS STANDARD (041) **DATE:02-01-2023**
CLASS : X **MAX. MARKS: 80**
TIME: 3 HOURS

General Instructions:

1. This Question paper contains - **five** sections **A, B, C, D** and **E**. Each section is compulsory. However, there are internal choices in some questions.
2. Section **A** has **18 MCQ's** and **02 Assertion-Reason based question** of **1** mark each.
3. Section **B** has **5 Very Short Answer (VSA)-type questions** of **2** marks each.
4. Section **C** has **6 Short Answer (SA)-type questions** of **3** marks each.
5. Section **D** has **4 Long Answer (LA)-type questions** of **5** marks each.
6. Section **E** has **3 source based/case based/passage based/integrated units of assessment** (**4** marks each) with sub parts.
7. Internal choices provided in **2** questions in **Section B**, **2** questions in **Section C**, **2** questions in **Section D**. You have to attempt only one of the alternatives in all such questions.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

	SECTION – A *(Multiple Choice Questions) Each question carries 1 mark*	
1	The ratio of LCM and HCF of the least composite and the least prime numbers is a) 1:2 b) 2:1 c) 1:1 d) 1:3	**1**
2	The LCM of two prime numbers p and q $(p > q)$ is 221. Find the value of $3p - q$. a) 4 b) 28 c) 38 d) 48	**1**
3	The number of zeroes for a polynomial $p(x)$ whose graph is given in the figure, is  a) 4 b) 3 c) 5 d) 1.	**1**

4	If $x - y = 2$ and $\frac{2}{x+y} = \frac{1}{5}$, then a) $x = 4, y = 2$ b) $x = 5, y = 3$ c) $x = 6, y = 4$ d) $x = 7, y = 5$.	**1**
5	The relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(1, 4)$ and $B(-1, 2)$ is a) $x - y + 3 = 0$ b) $x = y$ c) $x = 2y$ d) None of these.	**1**
6	If one zero of $3x^2 + 8x + k$ be the reciprocal of the other, then k =? a) 3 b) -3 c) $\frac{1}{3}$ d) $-\frac{1}{3}$.	**1**
7	The value of $(\sec A + \tan A)(1 - \sin A)$ is equal to a) $\sin A$ b) $\cos A$ c) $\sec A$ d) $cosec\ A$.	**1**
8	If $\sqrt{3}\tan\theta = 2\sin\theta$, then the value $\sin^2\theta - \cos^2\theta$ is a) $\frac{1}{2}$ b) $-\frac{1}{2}$ c) $\frac{3}{2}$ d) $-\frac{3}{2}$.	**1**
9	In ΔABC, $DE \parallel BC$ so that $AD = (7x - 4)cm$, $AE = (5x - 2)cm, DB = (3x + 4)cm$ and $EC = 3x\ cm$, then we have a) $x = 3$ b) $x = 5$ c) $x = 4$ d) $x = 2.5$.	**1**
10	The shadow of a 5m long stick is 2 m long. At the same time the length of the shadow of a 12.5m high tree (in m) is a) 3.0 b) 3.5 c) 4.5 d) 5.0	**1**
11	In the given figure, AT is a tangent to the circle with centre O such that $OT = 4\ cm$ and $\angle OTA = 30°$. Then, AT = ?  a) $4\ cm$ b) $2\ cm$ c) $2\sqrt{3}cm$ d) $4\sqrt{3}cm$.	**1**
12	The area of the circle that can be inscribed in a square of 6cm is a) $36\pi\ cm^2$ b) $18\pi\ cm^2$ c)$12\ \pi\ cm^2$ d) $9\pi\ \ cm^2$	**1**
13	Two cubes each of edge 12 cm are joined. The surface area of new cuboid is a) $140\ cm^2$ b) $1440\ cm^2$ c) $144\ cm^2$ d) $72\ cm^2$.	**1**
14	If the difference of Mode and Median of a data is 24, then the difference of median and mean is a) 8 b) 12 c) 24 d) 36	**1**
15	The number of revolutions made by a circular wheel of radius 0.7m in rolling a distance of 176m is a) 22 b) 24 c) 75 d) 40.	**1**

16	For the following distribution, **Class** | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 **Frequency** | 10 | 15 | 12 | 20 | 9 the sum of the lower limits of the median and modal class is a) 15 b) 25 c) 30 d) 35	**1**
17	The probability that an ordinary year contains 53 Sundays is a) $\frac{2}{7}$ b) $\frac{1}{7}$ c) $\frac{7}{53}$ d) $\frac{7}{52}$.	**1**
18	For any ΔABC, find the value of $\cos\left(\frac{A+B+C}{2}\right)$. a) 0 b) 1 c) -1 d) 2.	**1**

ASSERTION-REASON BASED QUESTIONS

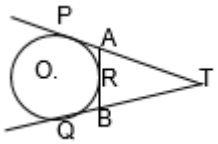
In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(i) Both A and R are true and R is the correct explanation of A.
(ii) Both A and R are true but R is not the correct explanation of A.
(iii) A is true but R is false.
(iv) A is false but R is true.

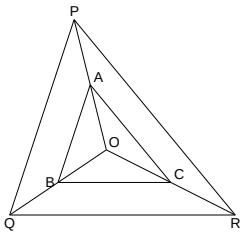
19	**Assertion**: The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. = 162. **Reason:** If a and b are two positive integers, then $H.C.F. \times L.C.M. = a \times b$	**1**
20	**Assertion**: Mid-point of a line segment divides line in the ratio $1:1$. **Reason:** The ratio in which the point $(-3, k)$ divides the line segment joining the points $(-5, 4)$ and $(-2, 3)$ is $1:2$.	**1**

SECTION – B

This section comprises of very short answer type-questions (VSA) of 2 marks each

21	In figure, TP and TQ are tangents from T to the circle with centre O and R is any point on the circle. If AB is any tangent to the circle at R, prove that TA + AR = TB + BR.  **(OR)** Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact and the centre.	**2**
22	Solve for x and y : $99x + 101y = 499, \quad 101x + 99y = 501.$	**2**
23	If $7sin^2\theta + 3cos^2\theta = 4$, then prove that $sec\theta + cosec\theta = \frac{2}{\sqrt{3}} + 2.$	**2**

24	If the perimeter of a semicircular protractor is 36 cm, find its diameter. **(OR)** A steel wire, when bent in the form of a square, encloses an area of $121cm^2$.The same wire is bent in the form of a circle. Find the area of the circle.	**2**
25	E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that ΔABE ~ ΔCFB.	**2**
	SECTION – C ***(This section comprises of short answer type questions (SA) of 3 marks each***	
26	If α and β are the zeroes of the polynomial $f(x) = x^2 + x - 2$, write the value of $\frac{1}{\alpha} - \frac{1}{\beta}$.	**3**
27	The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the area and perimeter of the rectangle. **(OR)** The students of a class are made to stand in rows. If 4 students are extra in each row, there would be 2 rows less. If 4 students are less in each row, there would be 4 rows more. Find the number of students in the class.	**3**
28	Given that $\sqrt{3}$ is irrational, hence show that $\frac{7-2\sqrt{3}}{5}$ is irrational.	**3**
29	The radius of the in-circle of a triangle is 4*cm* and the segments into which one side is divided by the point of contact are 6*cm* and 8*cm*. Determine the other two sides of the triangle.	**3**
30	If $x = k\,SinACosB,\ y = k\sin A\sin B$ and $z = k\cos A$ Prove that: $x^2 + y^2 + z^2 = k^2$. **(OR)** Prove that: $(\sec\theta - \tan\theta)^2 = \frac{\cos ec\theta - 1}{\cos ec\theta + 1}$.	**3**
31	A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is (i) a black king (ii) either a black card or a king (iii) a jack, queen or a king	**3**
	SECTION – D ***(This section comprises of long answer-type questions (LA) of 5 marks each)***	
32	One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels. **(OR)**	**5**

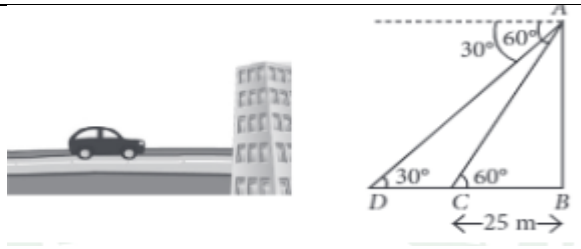
	A trader bought a number of articles for ₹900. 5 articles were found damaged. He sold each of the remaining articles at ₹2 more than what he paid for it. He got a profit of ₹80 on the whole transaction. Find the number of articles he bought.	
33	Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio. In figure, A, B and C are points on OP, OQ and OR respectively such that AB ‖ PQ and BC ‖ QR. Show that AC ‖ PR.  	**5**
34	The height of a cone is 40 cm. a small cone is cut off at the top by a plane parallel to the base and its volume $\frac{1}{64}$ times the volume of original cone. Find the height from the base at which the section is made. **(OR)** A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m^2.	**5**
35	The daily expenditure of 100 families are given below. Calculate f_1 and f_2 if the mean daily expenditure is ₹188. Expenditure (in ₹) | 140–160 | 160–180 | 180–200 | 200–220 | 220–240 Number of families | 5 | 25 | f_1 | f_2 | 5	**5**

SECTION – E

(This section comprises of 3 case-study/passage-based questions of 4 marks each with two sub-parts. It has three sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.)

36 **Moving Car**

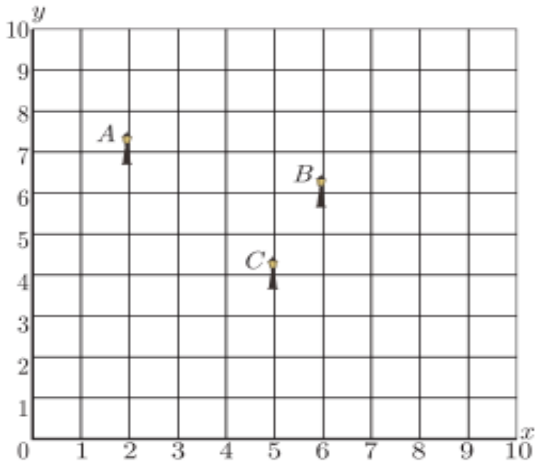
Rohit is standing at the top of the building observes a car at an angle of depression of **30**°, which approaching to the foot of the building with a uniform speed. **6** second later, the angle of depression of the car formed to be **60**°, whose distance at that instant from the building is **25m**.



Based on the above information, answer the following questions

	i)	Find the height of the building.	**1**
	ii)	Find the distance of the observer from the car when it makes angle of $\mathbf{60}°$.	**1**
	iii)	Find the distance between the two positions of the car. **(OR)** Find the total time taken by the car to reach the foot of the building from the starting point	**2**
37	Resident Welfare Association (RWA) of a Gulmohar Society in Delhi have installed three electric poles A,B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decides to have one more electric pole D in the park.		

The park can be modelled as a coordinate systems given below.



On the basis of the above information, answer any four of the following questions:

	i)	What is the position of the pole C?	**1**
	ii)	What is the distance of the pole B from the corner O of the park?	**1**

	iii)	Find the position of the fourth pole D so that four points A, B C and D form a parallelogram. **(OR)** If ABCD is a parallelogram, then what is the distance between poles B and D?	**2**
38	In a board game, the number of sea shells in various cells forms an AP. If the number of sea shells in the **3**rd and **11**th cell together is **68** and number of shells in the **11**th cell is **24** more than that of **3**rd cell. 		
	i)	What is the difference between the number of sea shells in the **19**th and **20**th cells?	**1**
	ii)	How many sea shells are there in the first cell?	**1**
	iii)	How many total sea shells are there in first **13** cells? **(OR)** What is the sum of number of sea shells in the **7**th and **9**th cell?	**2**

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