CODE:0402- AG-A-TS-23-24 पजियन क्रमांक

REG.NO:-TMC -D/79/89/36

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 questions 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 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

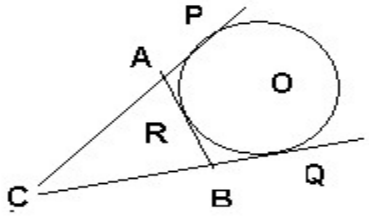
EXAMINATION 2023 -24

Time : 3 Hours | Maximum Marks : 80

CLASS – X | **MATHEMATICS**

Sr. No.	**SECTION – A** **This section comprises of very short answer type-questions (VSA) of 1 marks each**	Marks allocated
Q.1	The product of the HCF and LCM of the smallest prime number and smallest composite number is : (a) 2 (b) 4 (c) 6 (d) 8	1
Q.2	The ratio of the sum and product of the roots of $7x^2 - 12x + 18 = 0$ is	1

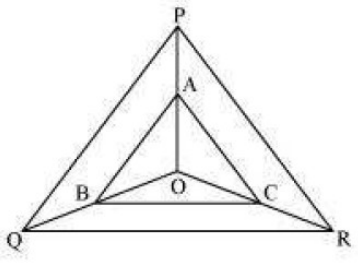
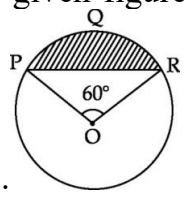
Target Mathematics by- Dr.Agyat Gupta
visit us: agyatgupta.com ; Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
Ph. : 4063585(O), 7000636110(O) Mobile : 9425109601(P)

	(a) 7 : 12 (b) 2 : 3 (c) 3 : 2 (d) 7 : 18	
Q.3	If one zero of polynomial $3x^2+8x+2k+1$ is seven times the other, then the value of k a) $\frac{5}{3}$ (b) $-\frac{5}{3}$ (c) 5 (d) none .	1
Q.4	If a pair of linear equations is consistent, then the lines will be (a) parallel (b) always coincident (c) intersecting or coincident (d) always intersecting.	1
Q.5	Point P(5,- 3) is one of the two points of trisection of the line segment joining the points A (7, -2) and B(1, -5) near to A. The coordinates of the other point of trisection (a) $(-3,-4)$ (b) $(3,4)$ (c) $(3,-4)$ (d) NONE ..	1
Q.6	In the given figure, $\frac{AD}{DB}=\frac{AE}{EC}$ & $\angle ADE=70^\circ, \angle BAC=50^\circ$, then angle $\angle BCA=$ (a) 70° (b) 50° (c) 80° (d) 60°	1
Q.7	If $x=p\sec\theta$ *and* $y=q\tan\theta$, then a) $x^2-y^2=p^2q^2$ b) $x^2q^2-y^2p^2=pq$ c) $x^2q^2-y^2p^2=\frac{1}{p^2q^2}$ d) $x^2q^2-y^2p^2=p^2q^2$	1
Q.8	The length of the string between a kite and a point on the ground is 85m. if the string makes angle θ with the level ground such that $\tan\theta=\frac{15}{8}$, how height is the kite? (a)68m (b) 75m (c) 42m (d) 26m.	1
Q.9	Which is correct? (a) Two figures are similar if they have the same shape and same size. (b) All similar triangles are congruent. (c) Two polygons are similar if their corresponding sides are proportional. (d) Two triangles are similar if their corresponding sides are proportional.	1
Q.10	P and Q are points on sides AB and AC respectively of ΔABC. If AP = 3 cm, PB = 6 cm, AQ = 5 cm and QC = 10 cm, find k if BC = k PQ. (a) 1 (b) 2 (c) 3 (d) none	1
Q.11	In the given fig  ., CP and CQ are tangents to a	1

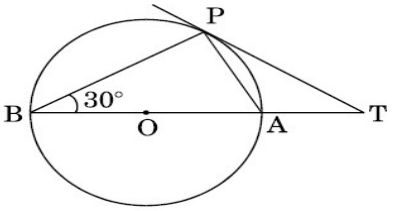
Target Mathematics by- Dr.Agyat Gupta
visit us: agyatgupta.com ; Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
Ph. : 4063585(O), 7000636110(O) Mobile : 9425109601(P)

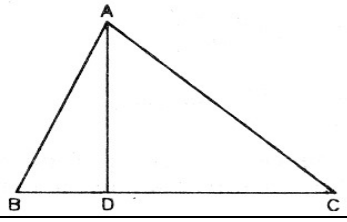
	circle with center O and line segment AB touches the circle at R with CP = 11cm, AR = 3cm, BC = 7 cm, then BR Is equal to: (A) 4 cm (B) 3 cm (C) 5 cm (D) 10 cm	
Q.12	The area of a circle inscribed in an equilateral triangle is $154cm^2$ .Find the perimeter of the triangle (a) $63\sqrt{3}$ cm (b) $42\sqrt{3}$ cm (c) $21\sqrt{3}$ cm (d) none	1
Q.13	Find the volume of a right circular cylinder whose curved surface area is 2640 cm^2 and circumference of its base is 66 cm. (a)3465cm^3 (b)7720cm^3 (c)13860 cm^3 (d)55440cm^3	1
Q.14	If the mean and median of a set of numbers are 8.9 and 9 respectively, then the mode will be (a) 7.2 (b) 8.2 (c) 9.2 (d) 10.2	1
Q.15	Three cubes of iron whose edge are 3cm, 4cm, and 5cm respectively are Melted and formed into a single cube, the edge of the new cube formed is: (A)6cm (B) 7cm (C) 8cm (D)9cm	1
Q.16	Look at the cumulative frequency distribution table given below: Monthly income / No. of families More than ₹ 10000 — 100 More than ₹ 14000 — 85 More than ₹ 18000 — 69 More than ₹ 20000 — 50 More than ₹ 25000 — 37 More than ₹ 30000 — 15 Number of families having income range 20000 to 25000 is (a) 19 (b) 16 (c) 13 (d) 22	1
Q.17	The probability of selecting a green marble at random from a jar that contains only green, white and yellow marbles is 1/4. The probability of selecting a white marble at random from the same jar is 1/3 . If this jar contains 10 yellow marbles. The total number of marbles in the jar (A) 6 (B) 24 (C) 10 (D) NONE	1
Q.18	A bicycle wheel makes 500 revolution in moving 22 km. Find the diameter of the wheel. Take $\left(\pi = \frac{22}{7}\right)$ (a) 70 cm (b) 70 m (c) 140 cm (d) none	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. (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.	

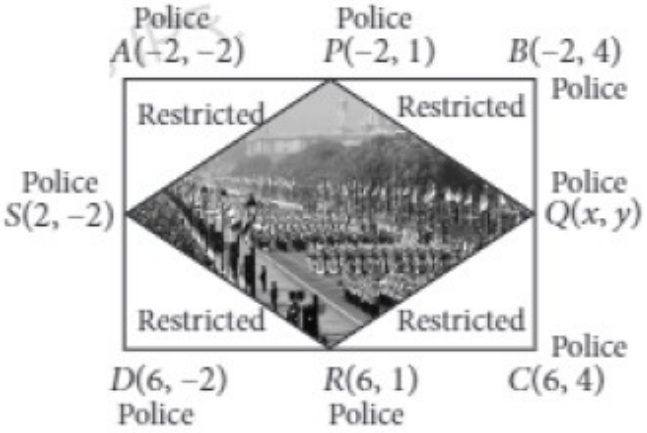
Target Mathematics by- Dr.Agyat Gupta
visit us: agyatgupta.com ; Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
Ph. : 4063585(O), 7000636110(O) Mobile : 9425109601(P)

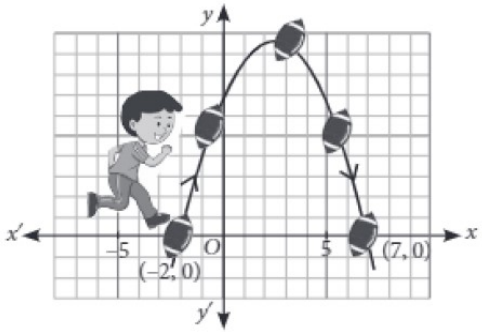
Q.19	**ASSERTION(A) :** The HCF of two numbers is 16 and their product is 3072. Then their LCM = 162 **REASON (R) :** If a,b are two positive integers, then HCF x LCM = a x b	1
Q.20	**ASSERTION(A) :** If A(2a, 4a) and B(2a, 6a) are two vertices of a equilateral triangle ABC then the vertex C is given by $\left(2a + a\sqrt{3}, 5a\right)$ **REASON (R) :** In equilateral triangle all the coordinates of three vertices can be rational.	1
	SECTION – B **This section comprises of very short answer type-questions (VSA) of 2 marks each**	
Q.21	Solve graphically the system of equations: 2x -3y = 5 ; 3x+ 4y + 1 = 0 .	2
Q.22	Any point O, inside ΔPQR, in joined to its vertices. From a point A on PO, AB is drawn so that PQ||AB and PR||AC as shown in figure  . Prove that QR||BC.	2
Q.23	If the perimeter of a sector of a circle of radius 5.7m is 27.2m, then find the area of the sector. OR Find the area of the segment PQR shown in the given figure if radius of the circle is 12 cm and $\angle POR=60^0$. Use $\left(\pi = \frac{22}{7}\right)$. 	2
Q.24	If PT is a tangent to a circle with centre O and PQ is a chord of the circle such that If $\angle TPQ = 70$ then what is the measure of $\angle POQ$.	2
Q.25	If $\sin\theta + \cos\theta = \sqrt{2}$ Prove that $\tan\theta + \cot\theta = 2$ OR Prove that $\left(1 + \cot A - \operatorname{cosec} A\right)\left(1 + \tan A + \sec A\right) = 2$.	2
	SECTION – C **(This section comprises of short answer type questions (SA) of 3 marks each)**	
Q.26	A lending library has fixed charge for the first three days and an additional	3

Target Mathematics by- Dr.Agyat Gupta
visit us: agyatgupta.com ; Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
Ph. : 4063585(O), 7000636110(O) Mobile : 9425109601(P)

	charge for each day thereafter. Mona paid ₹27 for a book kept for 7 days, while Tanvy paid ₹21 for the book she kept for 5 days find the fixed charge and the charge for each extra day. OR For what value of k, the system of equations x + 2y = 5, 3x + ky + 15 = 0 has (i) a unique solution, (ii) no solution?	
Q.27	Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$.	3
Q.28	Two circle with center O and O' of radii 3cm and 4cm respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ. OR  In figure , O is the center of the circle and TP is the tangent to the circle from an eternal point T. If $\angle PBT = 30°$, prove that $BA : AT = 2 : 1$.	3
Q.29	In a simultaneous throw of a pair of dice, find the probability of getting product of the number is a prime number .	3
Q.30	An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?	3
Q.31	Two ships are sailing in the sea on the either side of the light-house, the angles of depression of two ships as observed from the top of the light-house are 60° and 45° . If the distance between the ships is $200\left(\frac{\sqrt{3}+1}{\sqrt{3}}\right)$, find the height of the light-house.	3
	SECTION – D **(This section comprises of long answer-type questions (LA) of 5 marks each)**	
Q.32	Out of the group of swans, $7/2$ times the square root of the total number are playing on the shore of the tank. The two remaining ones are playing in the water. Find the total number of swans. OR Solve for x : $9x^2 - 9(a+b)x + \left[2a^2 + 5ab + 2b^2\right] = 0.$	5

Q.33	In fig. $\angle BAC = 90^o$ and segment $AD \perp BC$. Prove that (i) $AB^2 = BD \times BC$ (ii) $AC^2 = CD \times BC$ (iii) $AB^2 + AC^2 = BC^2$  	5
Q.34	Water in a rectangular reservoir having base 80 m by 60 m is 6.5 m deep. In what time can the water be emptied by a pipe of which the cross-section is a square of side 20 cm, if the water runs through the pipe at the rate of 15 km/hr. OR A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 100cm and the diameter of the hemispherical ends is 28cm, find the total surface area of the solid.	5
Q.35	From the following frequency, prepare the 'more than' ogive. Score | Number of candidates 400 – 450 | 20 450 – 500 | 35 500 – 550 | 40 550 – 600 | 32 600 – 650 | 24 650 – 700 | 27 700 – 750 | 18 750 – 800 | 34 Total | 230 Also, find the median.	5
	SECTION – E (This section comprises of 3 case study / passage – based questions of 4 marks each with two sub parts (i),(ii),(iii) of marks 1, 1, 2 respectively.The third case study question has two sub – parts of 2 marks each.)	
Q.36	**CASE STUDY: 1** **Republic Day Parade Programme:** In order to facilitate smooth passage of the parade, movement of the traffic on certain road leading to the route of the Parade and Tableaux always restricted. To avoid traffic on the road Delhi Police decided to construct a rectangular route plan, as shown in figure.	

	 Based on the above information, answer the following questions.	
i.	If Q is the mid-point of BC, then coordinates of Q are (a) $(2,4)$ (b) $(2,-4)$ (c) $(1,-1)$ (d) $(-1,1)$	1
ii.	Quadrilateral $PQRS$ is a (a) Trapezium (b) Square (c) Rectangle (d) Rhombus	1
iii.	What is the length of route $PQRS$? (a) 20 units (b) 25 units (c) 35 units (d) 45 units OR What is the length of route $ABCD$? (a) 26 units (b) 27 units (c) 28 units (d) 29 units	2
Q.37	**Case Study - 2** **Treasure Hunt Game-** While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forms an A.P. If the number on the n^{th} spot is $20 + 4n$, then answer the following questions to help the player in spotting the clues. 	
i.	Which number is on the first spot? (a) 20 (b) 24 (c) 16 (d) 28	1
ii.	Which number is on the $(n-2)^{th}$ spot? (a) $16 + 4n$ (b) $24 + 4n$ (c) $12 + 4n$ (d) $28 + 4n$	1
iii.	What is the sum of all the numbers on the first 10 spots? (a) 410 (b) 420 (c) 480 (d) 410 OR	2

	Which spot is numbered as 116? (a) 5^{th} (b) 8^{th} (c) 9^{th} (d) 24^{th}	
Q.38	**CASE STUDY - 3** In a soccer match, the path of the soccer ball in a kick is recorded as shown in the following graph. Based on the above information, answer the following questions.  Based on the above information, answer the following questions.	
i.	The shape of the path of the soccer ball is. (a) Circle (b) Parabola (c) Line (d) None of these	1
ii.	The axis of symmetry of the given parabola is (a) *y*-axis (b) *x*-axis (c) Line parallel to *y*-axis (d) Line parallel to *x*-axis	1
iii.	Which of the following polynomial has -2 and -3 as its zeroes (a) x^2-5x-5 (b) x^2+5x-6 (C) x^2+6x-5 (d) x^2+5x+6 OR For what value of '*x*', the value of the polynomial $f(x)=(x-3)^2+9$ is 9? (a) 1 (b)2 (C)3 (d) NONE	2
	**********	
	"मेहनत करो, सफलता खुद आपके पास आएगी।"	