DELHI PUBLIC SCHOOL, VINDHYANAGAR
Pre Baord-2, 2019-20

Class: X   **Time: 3 hour**
Subject: Mathematics-Basic (241)   **Max. Mar.:80 Marks**

General Instructions:

1. All questions are compulsory
2. The question paper consists of 40 questions divided into four sections A, B, C & D.
3. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises 6 questions of 4 marks each.
4. There is no overall choice. However internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

[SECTION – A: 1 Mark]

Q1-10 are multiple choice questions. Select the most appropriate answer from the given options.

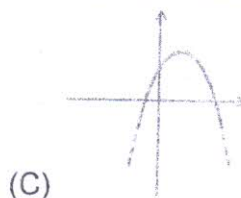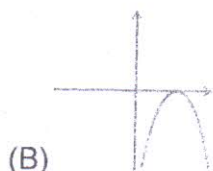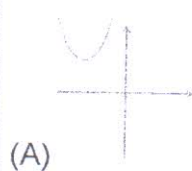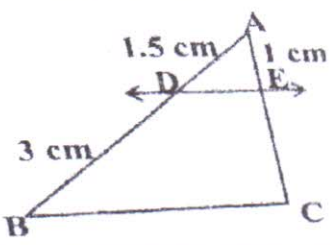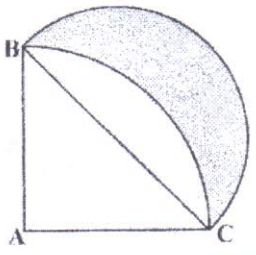|		
1	$n^2 - 1$ is divisible by 8, if n is (A) an integer (B) a natural number (C) an odd integer (D) an even integer	1
2	The following scores were obtained by eleven footballers in a goal-shoot competition: 5 3 6 8 7 8 3 9 6 3 2 4 ; The modal score was (A) 3 (B) 6 (C) 8 (D) 11	1
3	The lengths of the diagonals of a rhombus are 16 cm and 12 cm. Then, the length of the side of the rhombus is (A) 9 cm (B) 10 cm (C) 8 cm (D) 20 cm	1
4	If $a = x^3 y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is (A) xy (B) xy^2 (C) $x^3 y^3$ (D) $x^2 y^2$	1
5	If a die is thrown once then the probability of getting a prime number is? (A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{1}{6}$ (D) 1	1
6	The zeroes of the quadratic polynomial $x^2 - 9$ are: (A) 3 (B) -3 (C) ± 3 (D) ± 9	1
7	The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is (A) 10 (B) 100 (C) 504 (D) 2520	1
8	Which of the following is not the graph of a quadratic polynomial? (A) (B) (C) (D)	1

9	The distance of the point P (-3, - 4) from the x-axis is	1
	(A) 7 units (B) 5 units (C) 4 units (D) 3 units	
10	If the distance between the points (4, p) and (1, 0) is 5, then the value of p is	1
	(A) 4 (B) ± 4 (C) – 4 only (D) 0	
	(Q11 - Q15) Fill in the blanks.	
11	The point, which is equidistant from the points A (6, 5) and B (– 4, 3) on the *y*-axis is_____.	1
12	For what values of k, the quadratic equation k x (x–2) + 6 = 0 have two equal roots _____.	1
	[OR]	
	For what value of p, the pair of equations 4x+py+8=0, 2x+2y+2=0 has unique solution _____.	
13	The value of $2 \tan^2 45° + \cos^2 30° - \sin^2 60°$ is _____.	1
14	The value of $\dfrac{\tan 30}{\cot 60}$ is_____.	1.
15	The areas of two similar triangles are in the ratio 2:3 then the sides of these triangles are in the ratio_____.	1
	(Q16 - Q20) Answer the following:	
16	In Δ ABC, right-angled at B, AB = 24 cm, BC = 7 cm. Find sin A.	1
	[OR]	
	If sec θ = p for $0° < θ \le 90°$ then find the value of sin θ.	
17	Find the area of a sector of circle of radius 21 cm and central angle 120°. $\left(\text{Use } \pi = \dfrac{22}{7}\right)$.	1
18	Find the probability of getting exactly 2 heads when a coin is tossed twice.	1
19	In the given fig. If DE ‖ BC Find EC.	1
20	What is the common difference of an AP in which $a_{18} - a_{14} = 32$?	1
	[SECTION – B: 2 Marks]	
21	One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting	2
	(i) a red face card (ii) the queen of diamonds	
22	If one disc is drawn at random from the box containing 50 discs which are numbered from 1 to 50, find the probability that it bears (i) a two-digit number (ii) a perfect square number.	2
	[OR]	
	A die is thrown twice. What is the probability that 5 will come up at least once?	
23	Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.	2

24	Evaluate. $\dfrac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$	2
	[OR]	
	If sec4A = cosec (A – 20°), where 4A is an acute angle, find the value of A.	
25	The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.	2
26	Read the following passage and answer the questions that follows: A teacher told 10 students to write a polynomial on the black board. Students wrote 1. $x^2 + 2$ 2. $2x + 3$ 3. $x^3 + x^2 + 1$ 4. $x^3 + 2x^2 + 1$ 5. $x^2 - 2x + 1$ 6. $x - 3$ 7. $1 + x^2 + 0x^4$ 8. $x^2 + 2x + 1$ 9. $2x^3 - x^2$ 10. $x^4 - 1$ (i) How many students wrote quadratic polynomial? (ii) Divide the polynomial $(x^3 + x^2 + 1)$ by $(x - 3)$.	2

[SECTION – C: 3 Marks]

27	Find the zeroes of the quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and the coefficients.	3
28	Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°. **[OR]** Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ ABC = 60°. Then construct a triangle whose sides are $\dfrac{3}{4}$ of the corresponding sides of the triangle ABC.	3
29	In Figure, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region. 	3
30	Prove that by using Trigonometric Identities. $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \dfrac{1}{\sec\theta - \tan\theta}$ **[OR]** $\dfrac{\tan\theta}{1 - \cot\theta} + \dfrac{\cot\theta}{1 - \tan\theta} = 1 + \sec\theta \; \text{cosec}\,\theta$	3

31	Prove that $\sqrt{5}$ is irrational.	3
	[OR]	
	Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m, 9m + 1 or 9m + 8.	
32	Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the center of the circle.	3
33	Find the area of the quadrilateral whose vertices, taken in order, are (− 4, − 2), (− 3, − 5), (3, − 2) and (2, 3).	3
34	Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.	3
	[SECTION – D: 4 Marks]	
35	A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?	4
36	If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.	4
	[OR]	
	How many three-digit numbers are divisible by 7? Then find sum of all the numbers.	
37	The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.	4
38	Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.	4
	[OR]	
	State and prove the Pythagoras theorem.	
39	A gulab jamun, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm.	4
40	Consider the following distribution of daily wages of 50 workers of a factory.	4

Daily income(in Rs)	100-120	120-140	140-160	160-180	180-200
Numbers of workers	12	14	8	6	10

Find the mean daily wages of the workers of the factory by the Short-Cut Method.

[OR]

Draw a less than type ogive for the given data and obtain the median weight from the graph.