Class- X

Mathematics-Basic (241)

Sample Question Paper 2020-21

Max. Marks: 80 **Duration:3 hours**

General Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

Part – A:

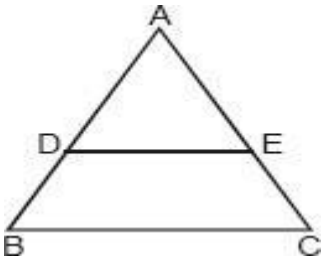
1. It consists of two sections- I and II
2. Section I has 16 questions. Internal choice is provided in 5 questions.
3. Section II has four case study-based questions. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

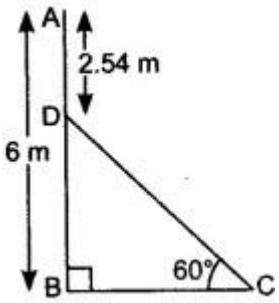
Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

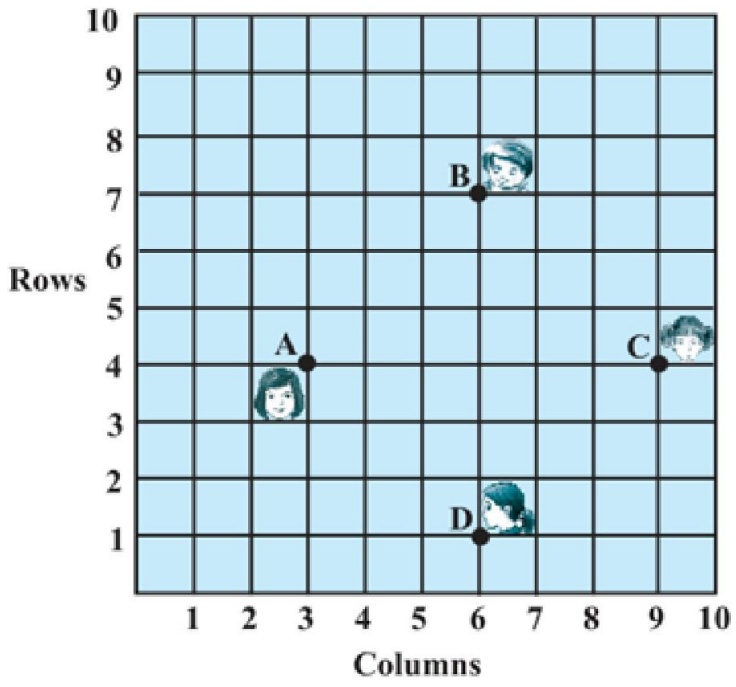
Question No.	Part-A	Marks
	Section-I	
1.	Express 98 as the product of primes. Ans. 2 × 7 × 7	1
2.	Find the value of "p" from the polynomial $x^2 + 3x + p$, if one of the zeroes of the polynomial is 2. Ans. P = -10	1

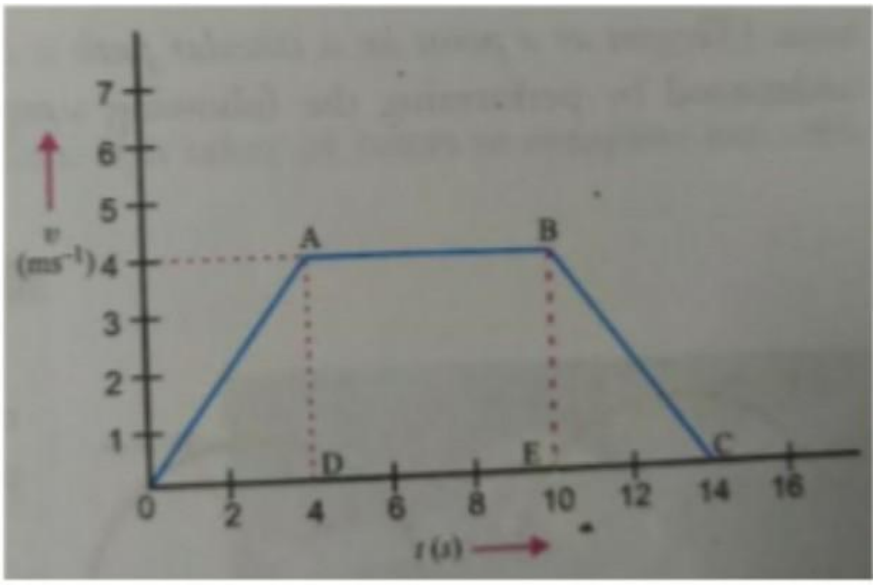
3.	HCF and LCM of two numbers are 9 and 459 respectively. If one of the numbers is 27, find the other number. Ans. 153 **OR** Explain why (17 × 5 × 11 × 3 × 2 + 2 × 11) is a composite number?	1

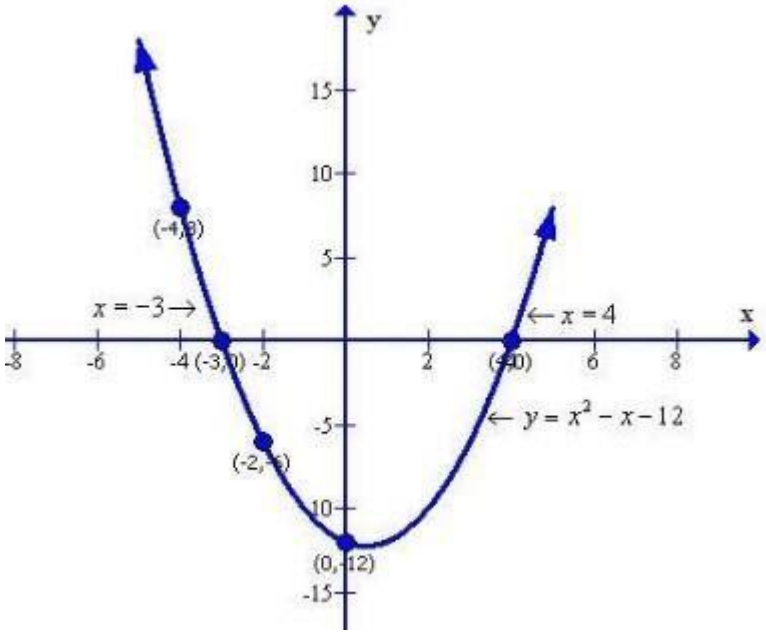
4	What will be the value of "p" for which the system of equation 2x + 3y =5 and 4x + ky = 10 has infinite number of solution? Ans. K=6	1
5	Find LCM of numbers whose prime factorization are expressible as 3×5^2 and $3^2 \times 7^2$. Ans. 11025	1
6	If the difference between the circumference and the radius of a circle is 37 cm, then using π = $22/7$, calculate the circumference (in cm) of the circle. Ans. 44cm **OR** The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. Ans. $154/3cm^2$	1
7	If the areas of two similar triangles are in ratio 25 : 64, write the ratio of their corresponding sides. Ans. 5/8 **OR** In ΔABC shown in figure, DE ∥ BC. If BC = 8 cm, DE = 6 cm and area of ΔADE = 45 cm^2, what is the area of ΔABC?  Ans. $80cm^2$	1

8.	Calculate the area of a sector of angle 60°. Given, the circle is having a radius of 6 cm. Ans 132/7 cm^2	1
9.	In Figure, AB is a 6 m high pole and CD is a ladder inclined at an angle of 60° to the horizontal and reaches up to a point D of pole. If AD = 2.54 m, find the length of the ladder. (use √3=1.73)  Ans. 4cm	1
10.	Find the radius of a circle whose circumference is equal to the sum of the circumferences of two circles of radii 15 cm and 18 cm. Ans. 33cm	1
11.	In a continuous frequency distribution, the median of the data is 21. If each observation is increased by 5, then find the new median. Ans. 26	1
12.	To divide a line segment BC internally in the ratio 2 : 3, we draw a ray AB such that ∠ ABC is an acute angle. What will be the minimum number of points to be located at equal distances, on ray AB? Ans. 5	1
13.	Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident: 2x – 3y + 6 = 0,4x – 5y + 2 = 0 Ans. intersecting **OR** Given a linear equation 3x-5y = 11. Form another linear equation in these variables such that the geometric representation of the pair so formed is intersecting lines. Ans. -3x -5y = 11	1
14.	17 cards numbered 1, 2, 3 ,……16, 17 are put in a box and mix thoroughly. One person draws a card from the box. Find the probability that the number on the card is divisible by 2 and 3 both. Ans. 2/7 **OR** A die is thrown once. What is the probability of getting a number between 3 and 6? Ans. 1/3	1

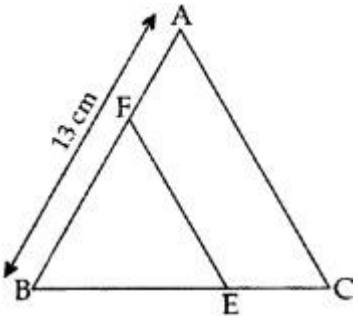
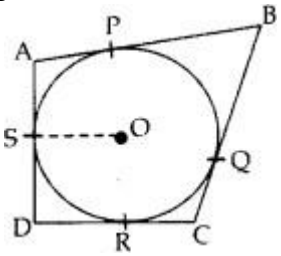
15.	A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder. Ans. 5m	1
16.	Two coins are thrown at the same time. Find the probability of getting both heads. Ans. 1/4	1
	Section-II **Case study-based questions are compulsory. Attempt any 4 sub parts from each question. Each question carries 1 mark**	
17	 Mathematics teacher of a school took her 10^{th} standard students to show Taj Mahal. It was a part of their Educational trip. The teacher narrated the facts of Taj Mahal to students. Then the teacher said in this monument one can find combination of solid figures. There are 4 pillars which are cylindrical in shape. Also 2 domes at the sides and one large doom in center, which are hemispherical.4 smaller domes at the corner on the pollers. It is a great tourist place.	
i)	If the volume of one dome is 19.404 m^3. What will be the radius of hemispherical dome? (take □ = 22/7) a) 2.1m b) 3.5m c) 4m d) none Ans a	1
ii)	Write the formula to find the volume of hemisphere. a) $\Pi r^2 h$ b) $\frac{2}{3}\pi r^3$ c) d) $2\Pi r$ Ans b	1

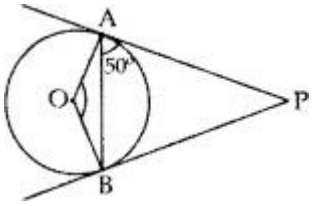
iii)	A pillar of cylindrical in shape having radius 7m and height of 14m and a dome which is hemispherical in shape, has radius 7m. which shape has more volume? a) piller b) dome c) both will same d) can not define Ans a	1
iv)	How much is the total surface area of a hemisphere if the radius of the base is 7/2m? a) 231/2 m^2 b) 231/4 m^2 c) 49/5 m^2 d) none m^2 Ans. a	1
v)	What is the ratio of surface area of sphere of radius R cm to the ratio of a sphere of radius r cm? A) $\frac{R^3}{r^3}$ b)$\frac{r^3}{R^3}$ c)$\frac{R^2}{r^2}$ d) none	1
18	In a classroom, 4 friends are seated at the points A, B, C and D as shown in Fig. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, “Don’t you think ABCD is a square?” Chameli disagrees.  	
i)	Who is correct? (a) Champa (b) Chameli (c) Both (d) None Ans. a	1
ii)	What is the distance of AB? a) 3√2 b) 2√3 c) 4√5 d) 7√3 Ans a	1

iii)	What is the distance of BC? a) $3\sqrt{2}$ b) $5\sqrt{3}$ c) $6\sqrt{5}$ d) $7\sqrt{8}$ b) Ans a	1
iv)	What are the coordinates of mid point of AC? a) (6,4) b) (4,6) c) (0,16) d) (16,4) Ans: a	1
v)	What will be the shape of ABCD? a) r e c t a n g l e b) square c) parallelogram d) rhombus Ans: b	1
19	 Arav the student of class X draw the chart of his speed with respect to time after finishing his jogging. Few questions came in his mind while observing the graph. Give answer his questions with the help of given figure.	
i)	ΔOAD and ΔEBC are which type of triangle? a) similar b) congruent c) both d) none Ans: C	1
ii)	The correct ratio of area of two similar triangles is a) Ratio of the square of corresponding median b) Ratio of the square of corresponding side c) both d) none Ans: c	1

iii)	All right angled triangles are similar, this statement is true or false a) true b) false c) can not say d) 16:81 Ans: b	1
iv)	What is the other name of basic proportionality theorem? a) Pythagoras theorem b) Thales theorem c) Converse of Thales theorem d) Converse of Pythagoras theorem Ans. b	1
v)	What is the sum of area of ΔOAD and ΔEBC ? a) 16 m^2 b) 8 m^2 c) 24 m^2 d) 32m^2 Ans. a	1
20	Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape. Answer the following questions below.  	

i)	What is the shape of the curve of quadratic polynomial? a) Spiral b) ellipse c) linear d) Parabola Ans d	1
ii)	What is the degree of quadratic polynomial? a) 2 b) 3 d) not defined d) none Ans. a	1
iii)	How many zeroes of the quadratic polynomial has? a) 2 b) 3 c) 4 d) all are true Ans. a	1
iii)	The zeroes of the polynomial are a) -3, 4 b) -1, 3 c) 3, 5 d) -4, 2 Ans. a	1
iv)	What will be the polynomial for the given shape? a) x^2+2x-3 b) x^2-x-12 c) x^2-2x-3 d) x^2+2x+3 Ans. b	1
v)	What is the other name of quadratic formula? a) middle term splitting method b) sridharacharya formula c) prime factorization method d) none Ans. b	1

	Part –B **All questions are compulsory. In case of internal choices, attempt anyone.**	
21	Find the points on x axis which is equidistant from (2, -5) and (-2, 9). Ans. (-7,0) **OR** Find a relation between x and y such that the point (x, y) is equidistant from the points (7,1) and (3,5) Ans. X= y +2	2
22	In the figure, EF || AC, BC = 10 cm, AB = 13 cm and EC = 2 cm, find AF.  Ans. 2.6cm	2
23	In the given figure, a circle is inscribed in a quadrilateral ABCD touching its sides AB, BC, CD and AD at P, Q, R and S respectively. If the radius DA of the circle is 10 cm, BC = 38 cm, PB = 27 cm and AD ⊥ CD, then calculate the length of CD.  Ans CD =21cm	2

24	Draw a line segment AB of length 7 cm. Using ruler and compasses, find a point P on AB such that AP/AB=3/5.	2
25	If 3 cot A = 4, find sinA, cosA. Ans.3/5, 4/5 **OR** If cot θ = 7/8, evaluate: (i) (1+sinθ)(1−sinθ)/(1+cosθ)(1−cosθ) Ans.49/64	2
26	If the sum of the first n terms of an AP is $4n - n^2$, what is the first term (that is S_1)? What is the sum of first two terms? What is the second term? Similarly find the 3rd, the 10th and the nth terms. Ans.3, 4, 1, -1, -15, 5-2n	2
	Part –B **All questions are compulsory. In case of internal choices, attempt anyone.**	
27	Prove that $2 + 3\sqrt{5}$ is an irrational number.	3
28	From an external point P, tangents PA and PB are drawn to a circle with center 0. If ∠ PAB = 50°, then find ∠ AOB.  Ans. 100	3

29	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. Ans. 6km, 4km	3
30	If 65% of the population have black eyes.25% have brown eyes and remaining have blue eyes. What is the probability that a person selected at random has (1) Blue eyes (2) Brown or Black eyes (3) Blue or Black eyes Ans. 1/10, 9/10, 3/4 **OR** Find the probability of having 53 Sundays in a leap year and non leap year. Ans. 2/7, 1/7	3
31	The sum of the radius of base and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 sq. cm, find the volume of the cylinder. (Use π = $22/7$) Ans. 4620cm^3	3
32	If sec θ + tan θ = p, then find the value of cosecθ. Ans p^2 +1/p^2 -1	3
33	A fraction becomes 9/11, if 2 is added to both the numerator and the denominator. If 3 is added to both the numerator and the denominator it becomes 5/6.Find the fraction. Ans. 7/9 **OR** Divide 39 into two parts such that their product is 324. Ans 27 and 12	3
	Part –B **All questions are compulsory. In case of internal choices, attempt anyone.**	
34	The angle of elevation of the top of a hill at the foot of tower is 60°. and the angle of elevation of top of the tower from the foot of the hill is 30°. If the tower is 50 m high what is the height of the hill? Ans. 150m **OR** Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angle of elevation of the top of the poles are 60°. and 30°. respectively. Find the height of the poles and the distances of the point from the poles. Ans. Height of the pole is 20√3m, distance of the points from the pole is 60m, 20m	5

<table>
<tr><td>35</td><td>The sum of three numbers in A.P. is 12 and sum of their cubes is 288. Find the numbers.
Ans. 2,4,6 or 6,4,2</td><td>5</td></tr>
<tr><td>36</td><td>The mean of the following frequency distribution is 53. But the frequencies f_1 and f_2 in the classes 20-40 and 60-80 are missing. Find the missing frequencies:

<table><tr><th>Classes</th><th>Frequencies</th></tr><tr><td>0-20</td><td>15</td></tr><tr><td>20-40</td><td>f1</td></tr><tr><td>40-60</td><td>21</td></tr><tr><td>60-80</td><td>f2</td></tr><tr><td>80-100</td><td>17</td></tr><tr><td>Total</td><td>100</td></tr></table>
Ans f1 = 18, f2 = 29.</td><td>5</td></tr>
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