Sample/Pre-Board Paper 22

Class X Term 1 Exam Nov -Dec 2021

Mathematics (Standard) 041

Time Allowed: 90 minutes Maximum Marks: 40

General Instructions:

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

SECTION A

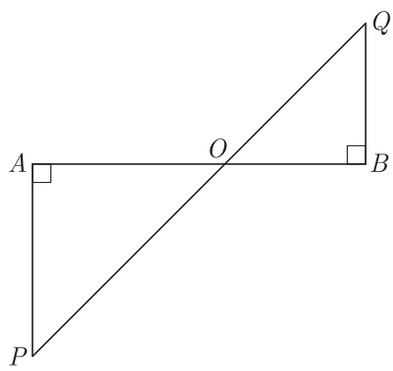
Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

1. What is the HCF of smallest primer number and the smallest composite number?

(a) 2 (b) 4

(c) 6 (d) 8

2. In the given figure, if $\angle A = 90^o, \angle B = 90^o$, $OB = 4.5$ cm $OA = 6$ cm and $AP = 4$ cm then QB will be



(a) 2 cm (b) 3 cm

(c) 4 cm (d) 6 cm

3. What is the length of the second diagonal of a rhombus, whose side is 5 cm and one of the diagonals is 6 cm?

(a) 8 cm (b) 4 cm

(c) 12 cm (d) 16 cm

4. In a right angled ΔABC right angled at B, if P and Q are points on the sides AB and BC respectively, then

(a) $AQ^2 + CP^2 = 2(AC^2 + PQ^2)$

(b) $2(AQ^2 + CP^2) = AC^2 + PQ^2$

(c) $AQ^2 + CP^2 = AC^2 + PQ^2$

(d) $AQ + CP = \frac{1}{2}(AC + PQ)$

5. Which of the following relationship is the correct?

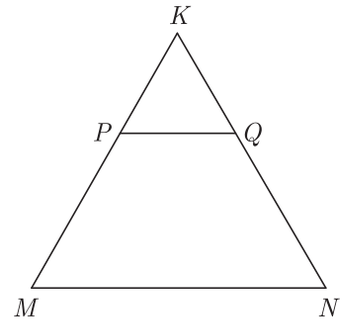
(a) $P(E) + P(\overline{E}) = 1$

(b) $P(\overline{E}) - P(E) = 1$

(c) $P(E) = 1 + P(\overline{E})$

(d) None of these

6. In the figure, PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$ cm then KQ will be



(a) 4.1 cm (b) 5.2 cm

(c) 4.8 cm (d) 5.4 cm

7. If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is

(a) 1 (b) $\frac{3}{4}$

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

8. The product of a non-zero rational and an irrational number is

(a) always irrational

(b) always rational

(c) rational or irrational

(d) one

9. What are the values of x and y for the following system of equation ?

$$8x+5y = 9$$
$$3x+2y = 4$$

(a) 2 and –5 (b) –5 and 2

(c) –2 and 5 (d) 5 and –2

10. The point which lies on the perpendicular bisector of the line segment joining the points $A(-2,-5)$ and $B(2,5)$ is

(a) (0, 0) (b) (0, 2)

(c) (2, 0) (d) $(-2,0)$

11. If α and β are the zeroes the polynomial $2x^2-4x+5$, the value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is

(a) $\frac{4}{25}$ (b) $-\frac{4}{25}$

(c) $\frac{4}{5}$ (d) $-\frac{4}{5}$

12. Which of the following rational number have non-terminating repeating decimal expansion?

(a) $\frac{31}{3125}$ (b) $\frac{71}{512}$

(c) $\frac{23}{200}$ (d) None of these

13. The trigonometric ratio of $\tan A$ is equal to

(a) $\frac{\sin A}{\sqrt{1-\cos^2 A}}$ (b) $\frac{\sin A}{\sqrt{1-\sin^2 A}}$

(c) $\frac{\cos A}{\sqrt{1-\sec^2 A}}$ (d) $\frac{1}{\sqrt{1-\cot^2 A}}$

14. If $\tan(3x+30^\circ)=1$ then the value of x. will be

(a) 5°

(b) 10°

(c) 20°

(d) 30°

15. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is

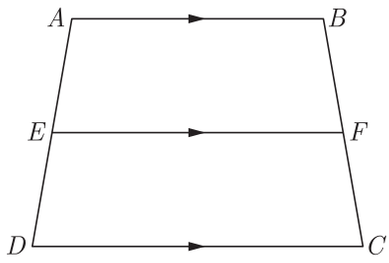
(a) 22:7

(b) 14:11

(c) 7:22

(d) 11:14

16. In the given figure, if $ABCD$ is a trapezium in which $AB \,||\, CD \,||\, EF$, then $\frac{AE}{ED} = ?$



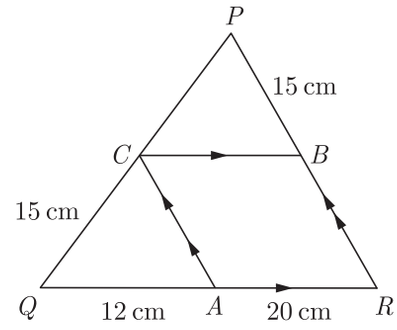
(a) $\frac{2FC}{BF}$

(b) $\frac{2BF}{FC}$

(c) $\frac{FC}{BF}$

(d) $\frac{BF}{FC}$

17. In the given figure below, $CB \,||\, QR$ and $CA \,||\, PR$. Also $AQ = 12$ cm, $AR = 20$ cm, $PB = CQ = 15$ cm. Calculate PC and BR.



The length PC is

(a) 15 cm

(b) 25 cm

(c) 12 cm

(d) 9 cm

18. $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = ?$

(a) $\sin\theta-\cos\theta$

(b) $\sec\theta-\tan\theta$

(c) $\sec\theta+\tan\theta$

(d) $\sin\theta+\cos\theta$

19. Given the linear equation $2x+3y-8=0$, select another linear equation in two variables such that the geometrical representation of the pair so formed is coincident lines.

(a) $5x+2y-9=0$

(b) $6x+9y+7=0$

(c) $4x+6y-16=0$

(d) above all

20. There are 1000 sealed envelopes in a box. 10 of them contain a cash prize of ₹ 100 each, 100 of them contain a cash prize of ₹ 50 each and 200 of them contain a cash prize of ₹ 10 each and rest do not contain any cash prize. If they are well-shuffled and an envelope is picked up out, then the probability that is contains no cash prize is

(a) 0.65

(b) 0.69

(c) 0.54

(d) 0.57

Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

21. A tile floor is to be made from 10 inch, 12 inch, and 15 inch square tiles. A design is made by alternating rows with different size tiles. The first row uses only 10 inch tiles, the second row uses only 12 inch tiles, and the third row uses only 15 inch tiles. Neglecting the grout seams, what is the shortest length of floor space that can be covered evenly by each row?

(a) 20 inch (b) 39 inch
(c) 60 inch (d) 10 inch

22. If the distance of $P(x, y)$ from $A(6, 2)$ and $B(-2, 6)$ are equal, then

(a) $x = 2y$ (b) $y = 2x$
(c) $y = 3x$ (d) $x = 3y$

23. In ΔABC, $\angle B = 90^\circ$, $BC = 5$ cm, $AC - AB = 1$, What wiil be the value of $\frac{1+\sin C}{1+\cos C}$?

(a) $\frac{31}{36}$ (b) $\frac{25}{18}$
(c) $\frac{36}{31}$ (d) $\frac{18}{25}$

24. If 2 is subtracted from the numerator and 1 is added to the denominator, a fraction becomes $\frac{1}{2}$, but when 4 is added to the numerator and 3 is subtracted from the denominator, it becomes $\frac{3}{2}$. The fraction will be

(a) $\frac{2}{11}$ (b) $\frac{7}{111}$
(c) $\frac{8}{11}$ (d) $\frac{5}{11}$

25. If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then

(a) $a = -7, b = -1$ (b) $a = 5, b = -1$
(c) $a = 2, b = -6$ (d) $a = 0, b = -6$

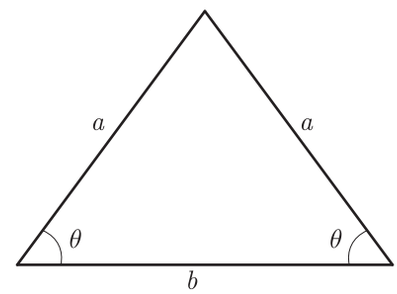
26. Jayanti throws a pair of dice and records the product of the numbers appearing on the dice. Pihu throws 1 dice and records the squares the number that appears on it. Who has the better chance of getting the number 36? Justify?

(a) Pihu has better chances because, her probability of getting square 36 is higher than Jayanti.
(b) Jayanti has better chances because, her probability of getting square 36 is higher than Pihu.
(c) Pihu has better chances because, her probability of getting square 36 is lesser than Jayanti.
(d) Jayanti has better chances because, her probability of getting square 36 is lesser than Pihu.

27. From a pack of 52 playing cards, Jacks, Queens and Kings of red colour are removed. From the remaining, a card is drawn at random.
What is the probability that drawn card is a black king ?

(a) $\frac{1}{52}$ (b) $\frac{1}{23}$
(c) $\frac{1}{26}$ (d) $\frac{2}{23}$

28. Triangle Consider the following isosceles triangle. The length of each of the two equal sides of the triangle is a, and each of the base angles has a measure of θ. The area of the triangle is

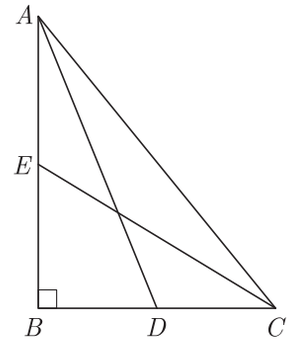


(a) $a^2 \sin\theta\cos\theta$ (b) $2a^2 \sin\theta\cos\theta$
(c) $\frac{1}{2}a^2 \sin\theta\cos\theta$ (d) $ab\sin\theta\cos\theta$

29. AB is diameter of the circle whose centre is $(2, -3)$ and B is the point $(3, 4)$. The coordinates of a point A will be

(a) $(10, -1)$ (b) $(-1, 10)$
(c) $(1, -10)$ (d) $(-10, 1)$

30. In the figure, ABC is a right triangle, right angled at B. AD and CE are two medians drawn from A and C respectively. If $AC = 5$ cm and $AD = \frac{3\sqrt{5}}{2}$ cm, the length of CE will be



(a) 4 cm (b) 6 cm
(c) $2\sqrt{5}$ cm (d) $4\sqrt{5}$ cm

31. If $A(4,3)$, $B(-1,y)$, and $C(3,4)$ are the vertices of a right triangle ABC, right angled at A, then the value of y will be

(a) –8 (b) –6

(c) –2 (d) –4

32. Given that $\sin(A+2B)=\frac{\sqrt{3}}{2}$ and $\cos(A+4B)=0$, where A and B are acute angles. The value of A is

(a) 30° (b) 45°

(c) 60° (d) 90°

33. 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

(a) 12 (b) 24

(c) 18 (d) 36

34. The length of its diagonal AC is

(a) 6 cm (b) 5 cm

(c) $\frac{9}{\sqrt{5}}$ cm (d) $\frac{12}{\sqrt{5}}$ cm

35. What is the ratio in which the line $x-3y=0$ divides the line segment joining the points $(-2,-5)$ and $(6,3)$. .

(a) 13 : 3 (b) 13 : 7

(c) 7 : 3 (d) 7 : 6

36. The wheel of a motorcycle is of radius 35 cm. How many revolutions are required to travel a distance of 11 m?

(a) 2 (b) 5

(c) 10 (d) 18

37. What is the radius of a circle whose circumference is equal to the sum of the circumference of two circles of diameter 36 cm and 20 cm

(a) 56 cm (b) 28 cm

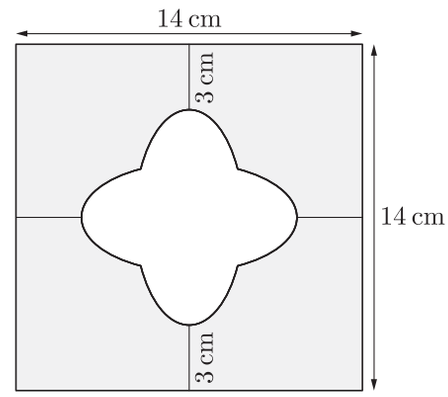
(c) 56π cm (d) 28π cm

38. If one of the zeroes of the quadratic polynomial $f(x)=14x^2-42k^2x-9$ is negative of the other, the value of k is

(a) 0 (b) 1

(c) 2 (d) 3

39. In fig., what is the area of the shaded region ($\pi=3.14$)



(a) 205 cm^2 (b) 155 cm^2

(c) 195 cm^2 (d) 104 cm^2

40. A boat covers 32 km upstream and 36 km downstream in 7 hours. Also, it covers 40 km upstream and 48 km downstream in 9 hours.
The speed of the boat in still water will be

(a) 10 km/hr (b) 8 km/hr

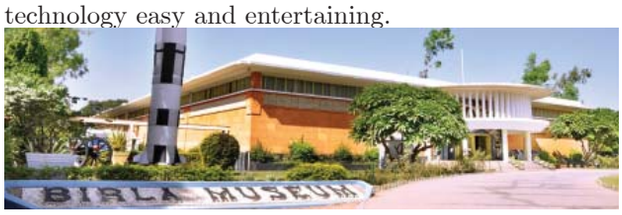
(c) 12 km/hr (d) 16 km/hr

SECTION C

Case study based questions:
Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

Case Based Questions: (41-45)

Birla Science Museum is the first Science and Technology Museum of the country, established in 1954. It houses exhibits and displays on science and technology where visitors can interact with the exhibits to make the understanding of science and technology easy and entertaining.



Birla Science Museum has set aside a children's room having planets and stars painted on the ceiling. Suppose an imaginary coordinate system is placed on the ceiling in the room with the centre of the ceiling at (0, 0,). Three particular stars are located at $S(-10,5)$, $T(3,-8)$ and $R(-7,-4)$, where the coordinates represent the distance in feet from the center of the room.

41. What is the distance between $S(-10,5)$ and $T(3,-8)$?

(a) $4\sqrt{29}$ (b) $2\sqrt{29}$

(c) $13\sqrt{2}$ (d) $16\sqrt{3}$

42. What is the distance between $R(-7,-4)$ and $T(3,-8)$?

(a) $4\sqrt{29}$

(b) $2\sqrt{29}$

(c) $8\sqrt{15}$

(d) $16\sqrt{3}$

43. What is the distance between $S(-10,5)$ and $R(-7,-4)$?

(a) $4\sqrt{15}$

(b) $3\sqrt{10}$

(c) $8\sqrt{15}$

(d) $16\sqrt{3}$

44. Which star is farthest from the center of the room?

(a) $S(-10,5)$

(b) $T(3,-8)$

(c) $R(-7,-4)$

(d) All are at same distance

45. The distance of the point $P(-3,-4)$ from the x-axis (in units) is

(a) 3

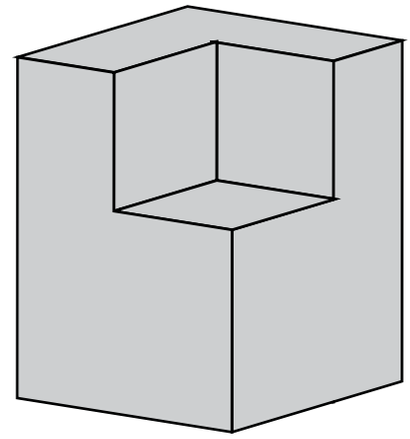
(b) -3

(c) 4

(d) 5

Case Based Questions: (46-50)

A cuboidal solid of base x by $x+1$ is shown in figure. Height of original solid is $x+2$. A small cuboidal solid of base $x-2$ by $x-2$ and height 2 is cut from this solid as shown in figure.



46. Which of the following is correct polynomial for the volume of remaining solid?

(a) $x^3+x^2-10x-8$ (b) $x^3+x^2-10x+8$

(c) $x^3+x^2+10x+8$ (d) $x^3+x^2+10x-8$

47. What is the volume of remaining solid at $x=8$ inch?

(a) 432 cubic inch (b) 648 cubic inch

(c) 712 cubic inch (d) 568 cubic inch

48. What is the volume of remaining solid at $x=10$ inch?

(a) 1242 cubic inch (b) 1458 cubic inch

(c) 1712 cubic inch (d) 1192 cubic inch

49. If one zero of the quadratic polynomial x^2+3x+k is 2, then the value of k is

(a) 10 (b) -10

(c) -7 (d) -2

50. If -1 is a zero of the polynomial $f(x)=x^2-7x-8$, then other zero is

(a) 4 (b) 8

(c) 1 (d) –4

SAMPLE PAPER - 17 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(a)	Ch-1	37
2	(b)	Ch-3	32
3	(a)	Ch-4	S-137
4	(c)	Ch-4	6
5	(a)	Ch-8	25
6	(c)	Ch-4	33
7	(c)	Ch-6	12
8	(a)	Ch-1	S-4
9	(c)	Ch-3	51
10	(a)	Ch-5	30
11	(c)	Ch-2	S-37
12	(d)	Ch-1	21
13	(b)	Ch-6	57
14	(a)	Ch-6	38
15	(b)	Ch-7	18
16	(d)	Ch-4	45
17	(b)	Ch-4	D-57
18	(b)	Ch-6	47
19	(c)	Ch-3	S-6
20	(b)	Ch-8	30
21	(c)	Ch-1	53
22	(b)	Ch-5	64
23	(b)	Ch-6	73
24	(c)	Ch-3	78
25	(d)	Ch-2	16

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(a)	Ch-8	138
27	(b)	Ch-8	D-93
28	(a)	Ch-6	140
29	(c)	Ch-5	S-13
30	(c)	Ch-4	134
31	(c)	Ch-5	47
32	(a)	Ch-6	95
33	(c)	Ch-1	S-27
34	(d)	Ch-4	D-82
35	(a)	Ch-5	89
36	(b)	Ch-7	S-7
37	(b)	Ch-7	S-17
38	(a)	Ch-2	S-34
39	(b)	Ch-7	S-27
40	(a)	Ch-3	D-92
41	(c)	Ch-5	143
42	(a)	Ch-5	144
43	(b)	Ch-5	145
44	(a)	Ch-5	146
45	(c)	Ch-5	9
46	(d)	Ch-2	76
47	(b)	Ch-2	77
48	(d)	Ch-2	78
49	(b)	Ch-2	4
50	(b)	Ch-2	33

*** S- = Self Test Question, * D- = Direction Based Question**