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CLASS X : SAMPLE QUESTION PAPER - 2
SUBJECT : MATHS - STANDARD (041)

Time Allowed: 3 Hours   **Maximum Marks: 80**

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION A
(Section A consists of 20 questions of 1 mark each)

1. If $5 \tan \theta - 12 = 0$, then the value of $\sin \theta$ is

   (a) $\dfrac{5}{12}$ (b) $\dfrac{12}{13}$ (c) $\dfrac{5}{13}$ (d) $\dfrac{12}{5}$

2. Extreme value of a given data

   (a) affect the median   (b) do not affect the median

   (c) nothing can be said   (d) none of these

3. If two positive integers p and q can be expressed as $p = 18\, a^2 b^4$ and $q = 20\, a^3 b^2$, where a and b are prime numbers, then LCM (p, q) is

   (a) $2a^2 b^2$ (b) $180 a^2 b^2$ (c) $12\, a^2 b^2$ (d) $180\, a^3 b^4$

4. In the given figure, $DE \parallel BC$. If $AD = 2$ units, $DB = AE = 3$ units and $EC = x$ units, then the value of x is
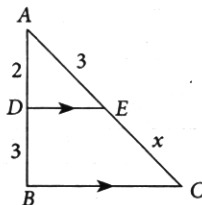
   (a) 2   (b) 3   (c) 5   (d) 9/2

5. If the distance between the points $(3, -5)$ and $(x, -5)$ is 15 units, then the values of x are

   (a) 12, -18   (b) -12, 18   (c) 18, 5   (d) -9, -12

6. In $\triangle ABC$, AD is the bisector of $\angle A$. Then, $\dfrac{ar\ (\triangle ABD)}{ar\ (\triangle ACD)}$ equals to

(a) $\dfrac{AB^2}{AC^2}$　　(b) $\dfrac{AB}{AC}$　　(c) $\dfrac{BM}{CM}$　　(d) None of these

7. If α and β are the zeroes of the polynomial $p(x) = kx^2 - 30x + 45k$ and $\alpha + \beta = \alpha\beta$, then the value of k is

(a) $-2/3$　　(b) $-3/2$　　(c) $3/2$　　(d) $2/3$

8. The greatest number which divides 281 and 1249, leaving remainder 5 and 7 respectively, is

(a) 23　　(b) 276　　(c) 138　　(d) 69

9. The value of $\tan 30° \tan 45° \tan 60°$ is equal to

(a) 1　　(b) 0　　(c) 2　　(d) none of these

10. For an event E, the correct inequality is

(a) $0 < P(E) < 1$　　(b) $0 \le P(E) < 1$　　(c) $0 < P(E) \le 1$　　(d) $0 \le P(E) \le 1$

11. $OABC$ is a square whose three vertices are $O(0, 0)$, $A(0, 5)$, $B(5, 5)$. Find the length of the diagonal.

(a) $7\sqrt{2}$ units　　(b) $7\sqrt{2}$ units　　(c) $5\sqrt{2}$ units　　(d) $3\sqrt{2}$ units

12. 144 cartons of orange juice and 90 cartons of apple juice are to be stacked in a canteen. If each stack is of the same height and if it contains cartons of the same drink, what would be the greatest number of cartons each stack would have?

(a) 16　　(b) 17　　(c) 18　　(d) 19

13. The zeroes of the quadratic polynomial $2x^2 - 3x - 9$ are

(a) $3, \dfrac{-3}{2}$　　(b) $-3, \dfrac{-3}{2}$　　(c) $-3, \dfrac{3}{2}$　　(d) $3, \dfrac{3}{2}$

14. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?

(a) 40　　(b) 240　　(c) 480　　(d) 750

15. $\left(\dfrac{2\tan 30°}{1 + \tan^2 30°}\right)$ is equal to

(a) $\sin 60°$　　(b) $\cos 60°$　　(c) $\tan 60°$　　(d) $\sin 30°$

16. A vertical pole 10 m long casts a shadow of length 5 m on the ground. At the same time, a tower casts a shadow of length 12.5 m on the ground. The height of the tower is

(a) 20 m　　(b) 22 m　　(c) 25 m　　(d) 24 m

17. $ABCD$ is a rectangle whose three vertices are $B(12, 0)$, $C(12, 5)$ and $D(0, 5)$, then find the length of one of its diagonals.

(a) 12 units　　(b) 13 units　　(c) 15 units　　(d) 10 units

18. The sum of all 2-digit numbers is

(a) 4900　　(b) 4905　　(c) 40009　　(d) 4096

DIRECTION : In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

19. **Assertion (A) :** The pair of linear equations $5x - 6y = 7$ and $7x - 8y = 9$ has a unique solution.

Reason (R) : Let $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ be two linear equations and if $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \ne \dfrac{c_1}{c_2}$, then the pair of equations represent parallel lines and they have no solution.

Mathematics - Standard

20. Assertion (A) : If the circumference of a circle and perimeter of a square is 44 cm, then area of the circle is 49 cm² and area of the square is 154 cm².
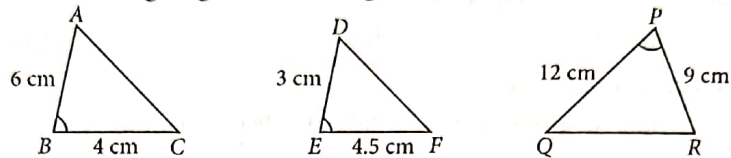
Reason (R) : If the circumference of a circle and the perimeter of a square are equal, then the area of circle is greater than the area of square.

SECTION B

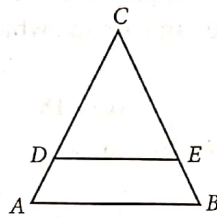*Section B consists of 5 questions of 2 marks each.*

21. How many numbers lie between 10 and 201, which when divided by 3 leave a remainder 2?

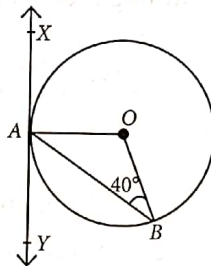22. (a) State which of the two triangles given in the figure are similar.

OR

(b) In figure, if $\dfrac{AD}{DC} = \dfrac{BE}{EC}$ and $\angle CDE = \angle CED$, prove that $\triangle CAB$ is isosceles.

23. In Fig. XAY is a tangent to the circle centred at O. If $\angle ABO = 40°$, then find $m\angle BAY$ and $m\angle AOB$.

24. (a) If one zero of the polynomial $p(x) = 6x^2 + 37x - (k - 2)$ is reciprocal of the other, then find the value of k.

OR

(b) Given, α, β are zeroes of the quadratic polynomial $x^2 - 6x + a$. Find the value of a if $3\alpha + 2\beta = 20$.

25. Two cubes each of volume 64 cm³ are joined end to end. Find the surface area of the resulting cuboid.

SECTION C

Section C consists of 6 questions of 3 marks each.

26. The rainwater from a roof of 22 m × 20 m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the vessel is just full, then find the height of the rainfall in cm.

27. Two men on either side of a cliff 75 m high observe the angles of elevation of the top of the cliff to be 30° and 60°. Find the distance between the two men.
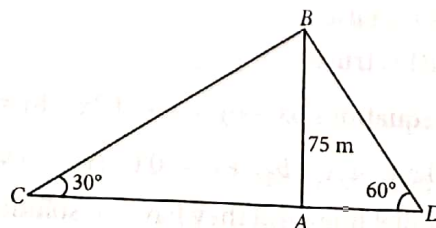
28. (a) Find the ratio in which x-axis divides the line segment joining the points P(–5, 6) and Q(–1, –3). Also, find the coordinates of the point of division.

OR

(b) If the points A(a + 4, –3b) and B(a, b) are end points of diameter AB of a circle whose centre is (3, –4). Find the value of a and b and coordinates of point A and B.

29. Find the value of p, if the mean of the following distribution is 7.5.

x_i	3	5	7	9	11	13
f_i	6	8	15	p	8	4

30. (a) A takes 6 days less than B to do a work. If both A and B working together can do it in 4 days, how many days will B take to finish it?

OR

(b) The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{21}$, then find the two numbers.

31. Find the HCF of 90 and 126. Also, find their LCM and verify that LCM × HCF = Product of two numbers.

SECTION D

Section D consists of 4 questions of 5 marks each.

32. If three coins are tossed simultaneously, then what is the probability of getting

   (i) no head   (ii) one head only

   (iii) not more than 2 heads   (iv) atleast one head?

33. (a) 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 angles 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.

OR

(b) 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.

34. In the given figure, ABC is a triangle and GHED is a rectangle. BC = 12 cm, HE = 6 cm, FC = BF and altitude AF = 24 cm. Find the area of the rectangle.
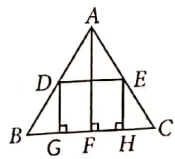
35. (a) The sum of the third and the seventh terms of an A.P. is 6 and their product is 8. Find the sum of first sixteen terms of the A.P.

OR

(b) If the sum of the first n terms of an A.P. 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.

SECTION E

Section E consists of 3 case study based questions of 4 marks each.

36. Anjali draw the shape of a sweet candy which is the shape of a quadrant OABC and a semi circular region with OB as its diameter. Ajay erase quickly the triangular part of candy. When Hemant came to know and ask Ajay, he tells Hemant that he has erased lesser portion of the candy than the portion of the candy left. The radius of the quadrant is 7 cm.

Mathematics - Standard
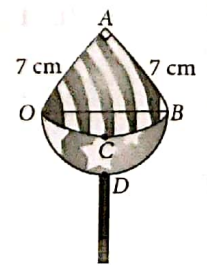
Based on the above information, answer the following questions.
(i) Find the area of candy erased by Ajay.
(ii) Find the area of candy left.
(iii) (a) Find the area of segment *OBC*.

<div align="center">OR</div>

(iii) (b) Find the perimeter of region *OABD*. (Use $\sqrt{2} = 1.41$)

37. Raghav, who is *X* standard student, often visit his father's stall to help him. His father is a fruit seller. He has some bananas and divide them into two lots *A* and *B*. On Ist day, he sold the first lot at the rate of ₹2 for 3 bananas and second lot at the rate of ₹1 per banana and got a total of ₹400. On 2nd day, he sold the first lot at the rate of ₹ 1 per banana and second lot at the rate of ₹ 4 for 5 banana's, his total collection was ₹ 460. Consider the number of bananas in two lots *A* and *B* as *x* and *y* respectively.
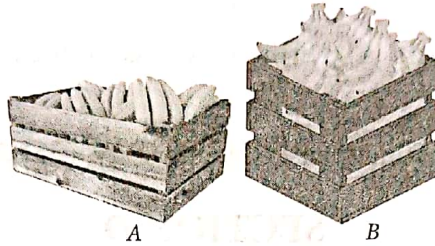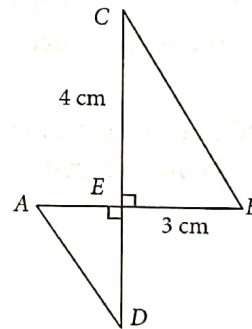

Based on the above information, answer the following questions.
(i) Represent the situation of day-I algebraically.
(ii) Represent the situation of day-II algebraically.
(iii) (a) Find the number of bananas in lot *A*.

<div align="center">OR</div>

(iii) (b) Find the number of bananas in lot *B*.

38. Ankita wants to make a toran for Diwali using some pieces of cardboard. She cut some cardboard pieces as shown below. Consider the perimeters of $\triangle ADE$ and $\triangle BCE$ are in the ratio 2 : 3.

Based on the above information, answer the following questions.
(i) If the two triangles here are similar by SAS similarity rule, then find their corresponding proportional sides.
(ii) Find the length of *AD*.
(iii) (a) Find the length of *ED*.

<div align="center">OR</div>

(b) Find the length of *CD*.