SAMPLE PAPER 2024-25

CLASS : X

Time : 03.00 Hours

MATHEMATICS (041)

M. M. : 80

General Instructions :

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 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.

SECTION - A

1. The exponent of 5 in prime factorisation of 3750 is

   (a) 3   (b) 4

   (c) 5   (d) 6

2. If one of the zeroes of the Quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

   (a) 10   (b) -10

   (c) -7   (d) -2

3. If k+2, 4k-6 and 3k-2 are three consecutive terms of A.P., then the value of k is

   (a) 3   (b) -3

   (c) 4   (d) -4

4. The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are

   (a) Intersecting   (b) Parallel

   (c) Coincident   (d) either intersecting or parallel

5. The roots of the quadratic equation $x^2 - 0.04 = 0$ are.

   (a) ± 0.2 (b) ± 0.02

   (c) 0.4   (d) 2

6. The line segment joining the Points p(-3,2) and Q(5,7) is divided by the y-axis in the ratio

   (a) 3 : 1   (b) 3 : 4

   (c) 3 : 2   (d) 3 : 5

7. The distance of the point (-1, 7) from x-axis is

(a) -1
(b) 7

(c) 6
(d) $\sqrt{50}$

8. In the figure, if $DE \parallel BC$, AD=3cm, BD=4cm, and BC=14cm, then DE equals
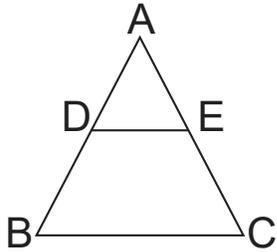
(a) 7cm
(b) 6cm

(c) 4cm
(d) 3cm

9. The length of tangent drawn to a circle of radius 9cm from a point 41cm away from the centre is

(a) 40cm
(b) 9cm

(c) 41cm
(d) 50cm

10. In the given figure, AB=BC=10cm. If AC=7cm then length of PB is
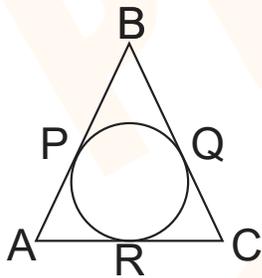
(a) 3.5cm
(b) 7cm

(c) 6.5cm
(d) 5cm

11. If $\sin\theta + \cos\theta = \sqrt{2}$, then $\tan\theta + \cot\theta =$

(a) 1
(b) 3

(c) 2
(d) 4

12. $\left(1 + tan^2\theta\right).\cos^2\theta =$

(a) $\dfrac{1}{\sin^2\theta - \cos^2\theta}$
(b) $\sec^2\theta$

(c) 1
(d) $\dfrac{1}{2}$

13. The angle of deperession of a car, standing on the ground, from the top of a 75m high tower, is 30º. The distance of car from the base of tower is :-

(a) $25\sqrt{3}$ m

(b) $50\sqrt{3}$ m

(c) $75\sqrt{3}$ m

(d) 150m

14. The number of revolutions made by a circular wheel of radius 0.25m. in rolling a distance of 11km is.

(a) 2800

(b) 4000

(c) 5500

(d) 7000

15. The volume of right circular cone whose base area is 156cm^2 and vertical height is 8cm is

(a) 2496cm^3

(b) 1248cm^3

(c) 1664cm^3

(d) 416cm^3

16. The probability of getting a king from a well shuffled deck of 52 cards is -

(a) $\dfrac{1}{12}$

(b) $\dfrac{1}{13}$

(c) $\dfrac{12}{13}$

(d) $\dfrac{1}{2}$

17. A coin is tossed thrice, What is the probabiliy of geting head on first toss is.

(a) $\dfrac{1}{2}$

(b) $\dfrac{2}{3}$

(c) $\dfrac{5}{8}$

(d) None of these

18. The upper limit of Modal class is

Classes	0-15	15-30	30-45	45-60	60-75	75-90
Frequency	17	20	18	21	15	9

(a) 45

(b) 60

(c) 15

(d) 30

Q. No. 19 - 20, A Statement of Assertion (A) is followed by a Statement of Reason (R). Choose the correct option out of the following.

(a) Both Assertion (A) and Reason (R) are true; and Reason (R) is the corrct 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)** : Common difference of the AP -5,-1,3,7 is 4.

   Reason (R) : Common difference of A.P. a, a+d, a+2d is given by $d = a_2 - a_1$

20. **Assertion (A)** : If the volme of two spheres are in the ratio 27:8, then their surface areas are in ratio 3:2.

   **Reason (R)** : Volume of sphere $= \dfrac{4}{3}\pi r^3$ and its surface area $= 4\pi r^2$

SECTION - B

21. Prove that $3 - 2\sqrt{5}$ is irrational given that $\sqrt{5}$ is irraional.

22. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

23. Prove that $\dfrac{1 + \sec A}{\sec A} = \dfrac{\sin^2 A}{1 - \cos A}$

OR

Find the value of x if $\quad 2\cos ec^2 30^\circ + x\sin^2 60^\circ - \dfrac{3}{4}\tan^2 30^\circ = 10$

24. In the given figure, ABC is a triangle In which $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, then find the value of x.
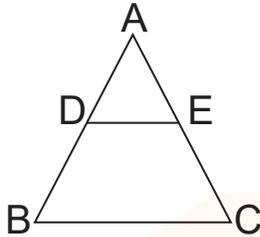
25. Find the area of minor segment of a circle of radius 14cm, when its central Angle is 60º.

OR

The length of minute hand of a clock is 6cm. find the area swept by it. When it moves from 7:05pm to7:40pm.

SECTION - C

26. M and N are positive Integers such that $M = p^2 q^3 r$ and $N = p^3 q^2$ where, p,q,r are prime numbers. Find $\text{LCM}(M, N)$ and $\text{HCF}(M, N)$

27. If α, β are zeroes of quadratic polynomial $5x^2 + 5x + 1$. Find the value of

1. $\alpha^2 + \beta^2$

2. $\dfrac{1}{\alpha} + \dfrac{1}{\beta}$

28. The sum of a two digit number and the number obtained by reversing the digits is 66. If the digits of the number is differ by 2. Find the number.
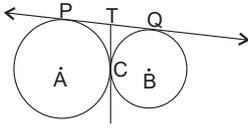
OR

A fraction becomes $\dfrac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\dfrac{1}{2}$, when 1 is subtracted from denominator. Find the fraction.

29. Prove that parallelogram circumscribing a circle is rhombus.

OR

Two circles touch each other at point C. Prove that common tangent to the circle at C, bisects the common tangent at P and Q

30. If $1 + \sin^2 \theta = 3 \sin \theta \cos \theta$, then prove that $\tan \theta = 1 \, \text{or} \, \dfrac{1}{2}$.

31. The Median of the following frequency distribution is 32.5. find the value of f_1 and f_2.

Class	0-10	Oct-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	F_1	5	9	12	F_2	3	2	40

SECTION - D

32. A motor boat whose speed is 18km/h in still water takes 1 hr. more to go 24km upstream than to return down stream to the same spot. find the speed of stream.

OR

The values of K for which the quadratic equation $(k + 4) x^2 + (k + 1) x + 1 = 0$ has equal roots. Also find the roots.

33. $\triangle ABC$ is right angled at c. If P is the length of the perpandicular from C to AB. and a,b,c are the lengths of the sides opposite $\angle A, \angle B$ and $\angle C$ respectively, than prove that

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

OR

State and Prove Thales Theorem.

34. A solid iron pole consists of a cylinder of height 220cm and base diameter 24cm. Which is surmounted by another cylinder of height 60cm and radius 8cm. Find mass of the pole. Given that 1cm³ of iron has 8gm mass.

35. The marks obtained by 110 students in an examination are given below

Marks	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No. of Students	14	16	28	23	18	8	3

Find Mean & Mode marks of the students.

SECTION - E

36. Read the following passage and answer the following questions :

Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs.1,18,000 by paying every month starting with the first instalment of Rs. 1000. If he increases the instalment by Rs. 100 every month, answer the following ;

(i) Find the amount paid by him in 30th instalment.

(ii) If total instalments are 40 then amount paid in the last instalment?

(iii) How much the amount will he pay in 30 instalments?

OR

Find the ratio of the 1st instalment to the last instalment.

37. Read the following passage and answer the following questions :

One evening, Kaushik was in a park. Children were playing circket. Birds were singing on a nearby tree of height 80m. He observed a bird on the tree at an angle of elevation of 45º. When a sixer was hit, a ball flew through the tree frightening the bird to fly away. In 2 seconds, he observed the bird flying at the same height at an angle of elevation of 30º and the ball flying towards him at the same height at an angle of elevation of 60º.

(i) At what distance from the foot of the tree was he observing the bird sitting on the tree?

(ii) How far did the bird fly in the mentioned time?

OR

After hitting the tree, how far did the ball travel in the sky when Kaushik saw the ball?

(iii) What is the speed of the bird in m/min if it had flown $20\left(\sqrt{3}+1\right)$ m?

38. Read the following passage and answer the following questions :

In order to conduct sports day activities in your school, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from each other along AD, as shown in given figure below. Niharika runs $\dfrac{1}{4}^{th}$ the distance AD on the 2nd line and posts a green (G) flag. Preet runs $\dfrac{1}{5}^{th}$ disane AD on the eighth line and posts a red (R) flag.

(i) Find the position of green flag?

(ii) Find the position of red flag?

(iii) What is the distance between both the flags?

OR

If Rashmi has to post a blue flag exactly halfway between the line segemnt joining the two flags, where shoud she post her flag?

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ROUGH WORK