Royal Secondary School - Dhoraji

Date :- 16-01-25
Marks :- 80
Time :- 3:00 Hour

Sub:- Basic Maths

Std - 10ᵗʰ E.M.

Instructions :

(1) This question paper consists 54 question in four section A, B, C & D.

(2) Questions consists general option.

(3) Number indicating on right side of section are marks of the questions.

(4) If required draw the figure.

(5) Write new section from new page. Also write answer in order.

(6) Use of calculator, smart watch or digital watch is prohibited.

(7) Writing should be readable.

SECTION - A

♦ Answer the questions as indicated in instruction : (Question no. 1-24) (Each carries 1 mark) **[24]**

♦ Following question are multiple choice question : (Question no. 1-6) (Each carries 1 mark)

1. If the graph of $y = mx + 3$ passes through point $(2, 11)$, then m = ...

   A. 4   B. -4   C. $\dfrac{1}{4}$ D. $-\dfrac{1}{4}$

2. If the equation $2x^2 - kx + k = 0$ has equal roots, then k=.......

   A. 0   B. 4   C. 8   D. 0 or 8

3. $2k + 1, 13, 5k - 3$ are consecutive terms of an AP then find k.

   (A) 17   (B) 13   (C) 4   (D) 9

4. The distance of $M(x, y)$ from the origin $O(0, 0)$ is ....

   (A) $x^2 + y^2$ (B) $\sqrt{x^2 + y^2}$ (C) $\sqrt{x^2 - y^2}$ (D) $|x - y|$

5. $\cos^4 \theta - \sin^4 \theta = ...$

   (A) $2\cos^2 \theta + 1$ (B) $2\sin^2 \theta + 1$ (C) $2\cos^2 \theta - 1$ (D) $2\sin^2 \theta - 1$

6. In the formula $M = l + \dfrac{\left(\dfrac{n}{2} - cf\right)}{f} \times h$ for the median, $l = ...$

   A. lower limit of the median class
   B. cumulative frequency of the class preceding the median class
   C. frequency of the median class
   D. total frequency

♦ Fill in the blanks with approprite answes : (Question no. 7-12) (Each carries 1 mark)

7. Find the probability that in one digit natural numbers, the number selected is an even. $\left(\dfrac{4}{9}, \dfrac{1}{9}, 0\right)$

8. $a = pq^2$ and $b = p^3q$ where p and q are prime numbers then LCM (a,b) = ... (p^2q^3, p^3q^2, p^2q^2)

9. The sum of a number and its reciprocal is $\dfrac{17}{4}$. The quadratic equation in standard form with integer coefficients is.....

10. The common point of a circle and the tangent is called .... (mid point, point of contact, circumcentre)

11. For observations $1, 2, 3, 4$; $\sum_{i=1}^{4} x_i^2 = \ldots\ldots$. $(30, 20, 10)$

12. $\cos\theta = \dfrac{1}{2}$ then $\sin\theta \cdot \operatorname{cosec}\theta = \ldots\ldots$ $(1, 3, 5)$

♦ **State whether the following statements are true or false : (Question no. 13-16) (Each carries 1 mark)**

13. If 3 is one zero of polynomial $p(x) = x^2 - 7x + k$ then $k = 24$

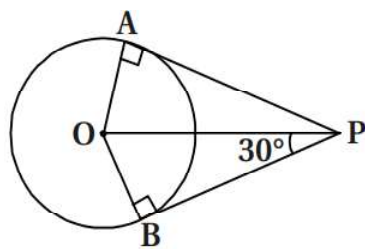**14.** The equation $x^2 - 5x + 6 = 0$ has real & equal roots.

15. $\sqrt{8}$ is an irrational number.

16. Probability of an event that Sun rises in east is 1.

♦ **Answer the questions in one sentence : (Question no. 17-20) (Each carries 1 mark)**

17. Find 31st term of an AP $101, 96, 91, \ldots$

18. PA and PB are tangents from an external point P to the circle with centre O. If $\angle OPB = 30°$ then find $\angle AOB$.

19. Find the modal class of following distribution.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	7	15	13	17	10

20. What is the probability of certain (sure) event ?

♦ **Match the following : (Question no. 21-24) (Each carries 1 mark)**

Match the following with correct alternative :

	PART A	PART B
21	The curved surface area of a cone is	(a) $2\pi rl$
		(b) πrl
22	Total surface area of a sphere is	(c) $4\pi r^2$
		(d) $3\pi r^2$

Match the following with correct alternative :

	PART A	PART B
23	An orange with radius r is divided into four equal parts. The total surface area of each part is	(a) πr^2
		(b) $2\pi r^2$
24	Total surface are of a closed hemisphere is	(c) $3\pi r^2$
		(d) $4\pi r^2$

SECTION - B

♦ **Answer any 9 questions out of 13 questions (Question no. 25-37) (Each carries 2 mark)** **[18]**
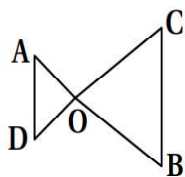
25. Prove that $3 + 2\sqrt{5}$ is irrational.

26. Solve the pair of equations : $\dfrac{2}{\sqrt{x}} + \dfrac{3}{\sqrt{y}} = 2 ; \dfrac{4}{\sqrt{x}} - \dfrac{9}{\sqrt{y}} = -1$

27. Find the roots by factorisation : $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

28. Find the sum of first 20 multiples of 7.

29. In the given figure, OA × OB = OC × OD then prove that $\angle A = \angle C$ and $\angle B = \angle D$


30. If A, B and C are interior angles of triangle ABC, then show that $\sin^2 \dfrac{A}{2} + \sin^2 \left(\dfrac{B+C}{2} \right) = 1$.

31. If $\sin(A - B) = \dfrac{1}{2}, \cos(A + B) = \dfrac{1}{2}, 0^o < A + B \le 90^o, A > B$, find A and B.

32. Prove that the parallelogram circumscribing a circle is a rhombus.

33. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (see Fig.). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.
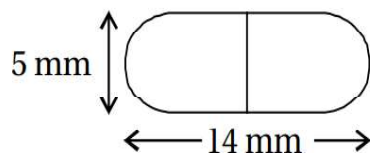
34. The mean of following frequency distribution is 2.6 then find y

x	1	2	3	4	5
f	4	5	y	1	2

35. From the following grouped data find $\dfrac{n}{2} - cf$.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	15	13	17	10

36. A die is tossed once. Find the probability of getting (i) an odd number (ii) Greater than 5.

37.

Marks scored	20	25	28	29	33	38	42	43
Frequency	6	20	24	28	15	4	2	1

a) Find the probability of the students getting more than 40 marks.

b) Find the probability of the students getting less than 30 marks.

SECTION - C

♦ **Answer any 6 questions out of 9 questions (Question no. 38-46) (Each carries 3 mark)** [18]

38. Solve the given pair of equations by Elimination Mthod :

$s - t = 3$ ....(i)

$\dfrac{s}{3} + \dfrac{t}{2} = 6$ .....(ii)

39. Solve the given pair of equations by Substitution Method :

$\dfrac{3x}{2} - \dfrac{5y}{3} = -2$ .....(i)

$\dfrac{x}{3} + \dfrac{5y}{2} = \dfrac{13}{6}$ .....(ii)

40. Find the sum : $7 + 10\dfrac{1}{2} + 14..... + 84$

41. Find the ratio in which the line segment joining A(1, –5) and B(–4, 5) is divided by the X-axis. Also find the coordinates of the point of division.

42. If the points A(6, 1), B(8, 2), C(9, 4) and D(P, 3) are the vertices of a parallelogram, taken in order. Find the value of 'P'.

43. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

44. The length of the tangent drawn from the point 10 cm from the centre of a circle is 8 cm then find diameter of the circle.

45. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18. Find the missing frequency f.

Daily pocket allowance (in ₹)	11 – 13	13 – 15	15 – 17	17 – 19	19 – 21	21 – 23	23 – 25
Number of children	7	6	9	13	f	5	4

46. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears,

(i) a two digit number

(ii) a perfect square number

(iii) a number divisible by 5.

SECTION - D

♦ **Answer any 5 questions out of 8 questions (Question no. 47-54) (Each carries 4 mark)** [20]

47. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

48. Nitya has to send her daughter to school after 12 weeks. She requires Rs. 3,150 for the same. She saves Rs. 100 in the first week and then increased her weekly saving by Rs. 30. Find whether Nitya will be able to fulfil her requirements.

49. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.
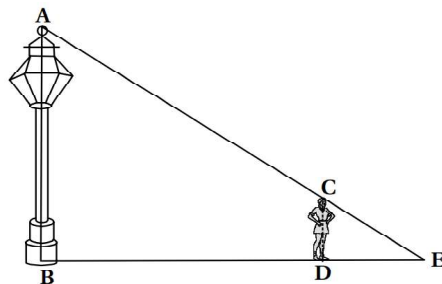
50. Prove that , In two triangles corresponding angles are equal, then their corresponding sides are in the same ratio and hence the two triangles are similar. (AAA condition)

51. The mean of the following 125 observations is 22.12. Find the missing frequencies.

Class	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44
Frequency	3	8	12	f_1	35	21	f_2	6	2

52. In the following table daily expense of food of 25 families in certain area is shown. Find the average daily expense using step deviation method.

Daily expense (in ₹)	100 – 150	150 – 200	200 – 250	250 – 300	300 – 350
Frequency	4	5	12	2	2

53. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

(i) a king of red colour   (ii) a face card

(iii) a red face card   (iv) the jack of hearts

(v) a spade   (vi) the queen of diamonds

54. Marks obtained by students from 100 marks are given below

Marks	0-34	35-50	51-70	71-90	91-100
No. of Students	7	10	14	11	8
Result	F	D	C	B	A

Find the probability that student gets

(i) F grade   (ii) A grade   (iii) C or D grade