KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION
SUPPLEMENTARY EXAMINATION 2023-24
Class- IX   SUBJECT: MATHEMATICS

TIME: 3 hours   **MAX.MARKS: 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)
7. All Questions are compulsory. However, internal choice has been provided.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

Section A
Section A consists of 20 questions of 1 mark each.

1. The simplest form of 0.1233333……………..   1
   (a) $\frac{41}{330}$ (b) $\frac{37}{300}$ (c) $\frac{41}{300}$ (d) none of these

2. A rational number between $\sqrt{2}$ and $\sqrt{3}$ is   1
   (a) $\frac{\sqrt{2}+\sqrt{3}}{2}$ (b) $\frac{\sqrt{2}*\sqrt{3}}{2}$ (c) 1.5   (d) 1.8

3. In class intervals 70-85, 85-100, the number 85 is included in   1
   (a) 70-85   (b) 85-100   (c) both the intervals   (d) none of these intervals

4. If the surface area of a sphere is 144 π Sq. cm., then its volume is   1
   (a) 288 π cubic cm   (b) 188 π cubic cm
   (c) 300 π cubic cm   (d) 316 π cubic cm

5. If $x + \frac{1}{x} = 5$, then $x^2 + \frac{1}{x^2}$ is equal to   1
   (a) 25   (b) 10   (c) 23   (d) 27

6. If the angles of quadrilateral are in the ratio of 4:7:9:10 then sum of measures of the smallest   1
   angles and largest angle is
   (a) 140º   (b) 150º   (c) 168º   (d) 180º

7. 'Lines are parallel if they do not intersect' is stated in the form of   1
   (a) an axiom   (b) a definition   (c) a postulate (d) a proof

8. In a ΔPQR, if angle P is equal to angle R, PR= 5 cm and QR=4 cm, then PQ is equal to   1
   (a) 4 cm   (b) 5 cm   (c) 2 cm   (d) 2.5 cm

9. Degree of the zero polynomial is   1
   (a) 0   (b) 1   (c) any real number   (d) not defined

10. The linear equation $(2x − 5y = 7)$ has   1
    (a) A unique solution   (b) two solutions
    (c)infinitely many solutions   (d) no solutions

11. It is given that AB=BC and AD=EC. The Δ ABE≅ Δ CBD by   1
    _____congruency.
    (a) SAS
    (b) ASA
    (c) SSS
    (d) AAS
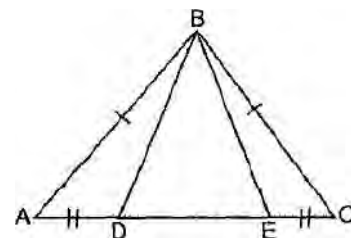
12. In the figure, it is given that O is the centre of the circle and $\angle AOC=150^0$. Find $\angle ABC$.　　　　　　　　1

   (a) 75º
   (b) 85º
   (c) 105º
   (d) 45º
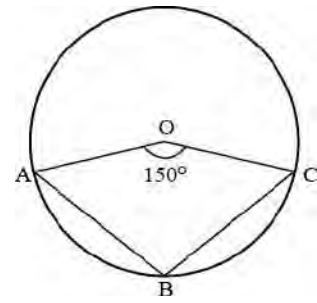
13. The value of $\sqrt{14} \times \sqrt{21}$ is equal to　　　　　　　　1
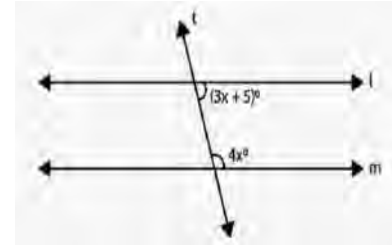   (a) $7\sqrt{6}$　　　(b) $6\sqrt{7}$　　(c) $5\sqrt{7}$　　　　(d) $\sqrt{147}$

14. The coefficient of x in $(x+3)^3$ is　　　　　　　　1
   (a) 1　　　　　(b) 9　　　(c) 18　　　　(d) 27

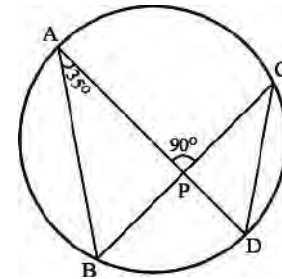15. If (4x) and (3x+5) are co-interior angles then value of x is equal to (where l and m are parallel)　1

   (a) 25º
   (b) 30º
   (c) 40º
   (d) 45º

16. In the figure, chords AD and BC intersect each other at right angles ata point P. If $\angle DAB=35^0$, then $\angle ADC=$　　　　1
   (a) 35º
   (b) 45º
   (c) 55º
   (d) 65º

17. If (2,0) is a solution of the linear equation 2x+3y=k, then the value of k is　　1
   (a) 4　　　　　(b) 6　　(c) 5　　　　(d) 2

18. If $x = \sqrt{5}+2$, then $x - \dfrac{1}{x}$ equals　　　　1
   (a) $2\sqrt{5}$　　　　(b) 4　　(c) 2　　(d) $\sqrt{5}$

19. **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　　　　.**　1

   Statement A (Assertion): A cylinder and a right circular cone have the same base and same height. If the volume of the cone is 25 cubic units, then the volume of the cylinder is 75 cubic units.
   Statement R (Reason): A cylinder and a right circular cone have the same base and sameheight. The volume of cone is three times the volume of cylinder.
) Both assertion (A) and reason (R) are true and reason (R) is the correct explanationof assertion (A)
) 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.

20. **Statement A (Assertion):** $\sqrt{2}$ is an irrational number.　　　　1
   Statement R (Reason): The decimal expansion of $\sqrt{2}$ is non-terminating non-recurring.
   (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

) 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.

Section B

21. Show $\sqrt{5}$ on number line.   2

22. If $(x - a)$ is a $factor$ of $(x) = x^3 - 3x^2a + 2a^2x + b$, then find the value of 'b'.   2

23. If AC = BD, then prove that AB = CD.   2
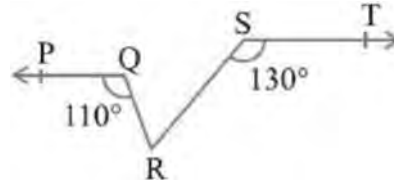

Or

Write any four postulates given by Euclid.

24. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm.   2

25. In given Figure, lines PQ and RS intersect each other at point O.   2
If $\angle$ POR: $\angle$ ROQ = 5:7, find all the angles.
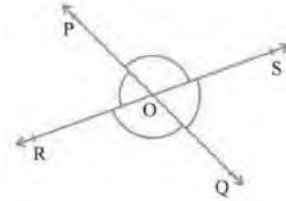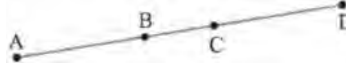
Or

In given figure, if PQ $\parallel$ ST, $\angle$ PQR = 110° and $\angle$ RST = 130°, find $\angle$ QRS.


Section C

26. If $\dfrac{5 - \sqrt{3}}{2 + \sqrt{3}} = x + y\sqrt{3}$, then find the value of x and y.   3

27. Use factor theorem to find whether polynomial g(x) is a factor of polynomial f(x) or, not: 3
f(x) = x^3 – 6 x^2 + 11x – 6, g(x) = x^2 – 3x + 2

OR

Factorise: $x^3 - 23x^2 + 142x - 120$

28. Give the equations of two lines passing through (2, 14). How many more such lines are there, and why?   3

29. In given figure, AB $\parallel$ CD and CD $\parallel$ EF. Also EA $\perp$AB. If $\angle$ BEF = 55°, find the values of x, y and z.   3


OR
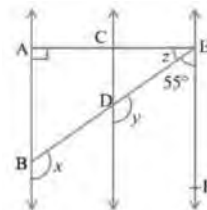
In given figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB $\parallel$ CD.
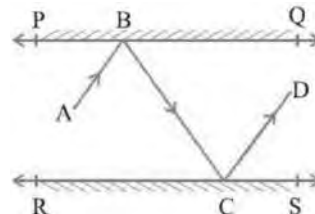
30. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see Figure). Show that:
    (i) $\triangle$ AMC $\cong$ $\triangle$ BMD
    (ii) $\angle$ DBC is a right angle.
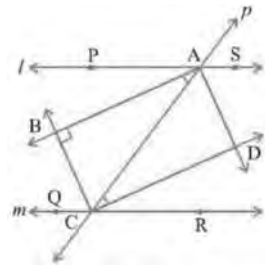   (iii) $\triangle$ DBC $\cong$ $\triangle$ ACB
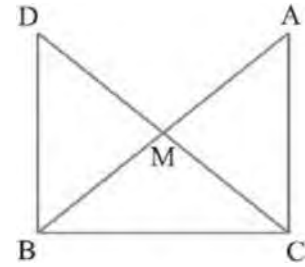
3

31. Without actually calculating the cubes, find the value of each of the following: also write the identity which will be used.
    (i) $(-12)^3 + (7)^3 + (5)^3$
    (ii)$(28)^3 + (-15)^3 + (-13)^3$
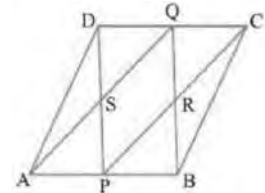
3

Section D

32. Two parallel lines l and m are intersected by a transversal p (see Figure). Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.

5

OR

ABCD is a parallelogram in which P and Q are mid-points of opposite sides AB and CD (see Figure). If AQ intersects DP at S and BQ intersects CP at R, show that:
    (i) APCQ is a parallelogram.
    (ii) DPBQ is a parallelogram.

33. Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip?

5

OR

A circular park of radius 20m is situated in a colony. Three boys Ankur, Syed and David are sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone.

34. A right triangle ABC with sides 5 cm, 12 cm and 13 cm.
    (a) If the triangle ABC is revolved about the side 12 cm, then find the volume of the solid so obtained.   2
    (b) If the triangle ABC is revolved about the side 5 cm, then find the volume of the solid so obtained.   2
    (c) Find the ratio of the volumes of the two solids obtained   1

35. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below:

Represent the data of both the teams on the same graph by frequency polygons.

5

| Number of balls	Team A	Team B
1-6	2	5
7-12	1	6
13-18	8	2
19-24	9	10
25-30	4	5
31-36	5	6
37-42	6	3
43-48	10	4
49-54	6	8
55-60	2	10

Section E

36. The class IX students of KENDRIYA VIDYALAYA in Lucknow have been allotted a rectangular plot of land for their gardening activity. Saplings of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular lawn in the plot as shown in the figure. The students are to sow the seeds of flowering plants on the remaining area of the plot.   1
   (a) Taking A as origin, find the coordinates of the P   1
   (b) Taking A as origin, find the coordinates of the R   2
   (c) Taking B as origin, find the coordinates of the Q
   Or
   Taking C as origin, find the coordinates of the R
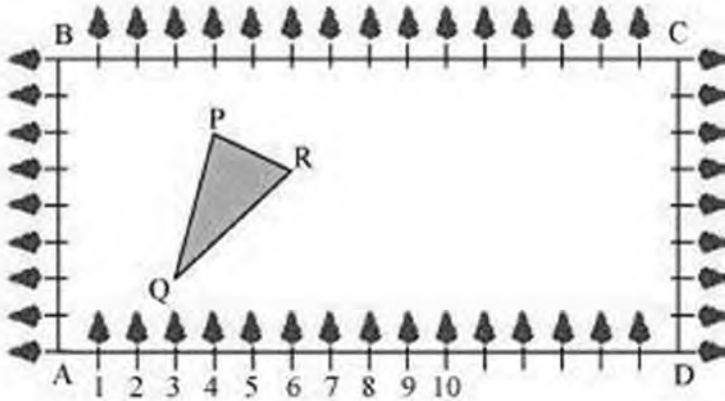
37. Teachers and students of class 9th of a school had gone to Nandan Kanan park for study tour. After visiting different places of Nandan Kanan, lastly, they visited bird sanctuary and deer park. Rohan is a clever boy and keen observer. He put the question to his friends 'how many birds are there and how many deer are there (at particular time) in Nandan Kanan ?'. Rahul's friend, Nitish gave the correct answer as follows
   Nitish answered 'the total numbers have 1000 eyes add 1400 legs .'
   i.   If x & y be the number of birds and deer speculatively, what is the equation of total numbers of eyes?   1
   ii.   What is the equation of total number of legs?
   iii. How many birds are there in zoo? 1
   Or
   How many deer are there in the zoo?   2

38. To beautify park in a city, City Municipal Corporation decided to make triangular flower bedin park The dimensions of a triangular flower beds are 75m× 80m×85m. Based on the information answers of following questions

1

1
2

    i.   If the triangular flower bed is to be fenced with two parallel wire one below the other than find the length of the wire?

    ii.   The area of each flower bed is………Sq.m.

    iii.   If each triangular bed is an equilateral triangle of side 60 m, then find its area.

Or

If each triangular bed is in the form of an isosceles triangle with base 60 m and equal sides of length 40 m each, then what is the area of a flower bed?