No. of Printed Pages/Questions: 5/38

O. P. JINDAL SCHOOL, SAVITRI NAGAR
Annual Examination (2022 – 2023)

Class: IX **MM: 80**

Subject: Mathematics **Time: 3 Hrs.**

Fifteen Minutes Extra will be for reading the Question Paper.

General Instructions:

1. This Question paper consists of five sections i,e, A, B, C, D and E. Each section is compulsory.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.
7. There is no overall choices, however Internal choice is provided in **2** questions of Section –B, 3 questions of Section-C and 2 questions of Section-D. You have to attempt only one of the alternatives in all such questions.

SECTION –A

1. The product of two irrational numbers is:
   a) Always an integer
   b) Always a rational number
   c) Always an irrational number
   d) Sometimes rational and sometimes irrational

2. Which of the following is irrational?
   a) 0.14014001400014….. b) 0.14014014014014…..
   c) 0.14010101010101…. d) 0.14001400140014

3. Which of the following is not an irrational number?
   a) $\sqrt{18}$ b) $\sqrt{50}$ c) $\sqrt{81}$ d) $\sqrt{32}$

4. The degree of $4x^3-12x^2+3x+9$ is
   a) 0 b) 1 c) 2 d) 3

5. The zero of the polynomial $f(x) = 2x+7$ is
   a) 2/7 b) -2/7 c) 7/2 d) -7/2

6. A polynomial with degree one is called:
   a) Linear polynomial b) Quadratic polynomial
   c) Monomial d) Binomial

7. The value of the polynomial $5x^2 – 6x - 3$ at $x = -1$ is ______
   a) 8 b) -4 c) -14 d) 14

8. What is the distance of the point (3,4) from X-axis?
   a) 3 b) 4 c) 5 d) none of these

9. What is another name of X-coordinate of a point.
   a) Abscissa b) Ordinate c) Coordinate d) Quadrant

10. If the ordinate of a point is positive and abscissa is negative, then where does this point lie?
    a) IInd Quadrant c) IIIrd Quadrant
    b) IVth Quadrant d) Ist Quadrant

11. The equation $x + 4 = 0$ represents a line :
    a) Parallel to x-axis c) Parallel to y-axis
    b) Passes through origin d) none of these

12. Which of the following points lies on the line $5x - 2y = 4$.
a) (2, 3) b) (-2, 3) c) (3 , 2) d) (-2 , -3)

13. Which of these statements do not satisfy Euclid's axiom?
a) Things which are equal to the same thing are equal to one another
b) If equals are added to equals, the wholes are equal.
c) If equals are subtracted from equals, the remainders are equal.
d) The whole is lesser than the part.

14. Two angles whose sum is equal to 180° are called:
a) Vertically opposite angles b) Complementary angles
c) Adjacent angles d) Supplementary angles

15. In ΔABC, $BC = AB$ and $\angle B = 80°$. Then $\angle A$ is equal to:
a) 80° b) 40° c) 50° d) 100°

16. The angles of quadrilateral are in the ratio 4:5:10:11. The angles are:
a) 36°, 60°, 108°, 156° b) 48°, 60°, 120°, 132°
c) 52°, 60°, 122°, 126° d) 60°, 60°, 120°, 120°

17. Equal _____ of the congruent circles subtend equal angles at the centres.
a) Segments b) Radii c) Chords d) None of these

18. The mode of the given data: 4, 6, 5, 9, 3, 2, 7, 7, 6, 5, 4, 9, 10, 10, 3, 4, 7, 6, 9, 9 is;
a) 7 b) 9 c) 10 d) 6

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

19. Assertion (A) : The surface area of a cube whose edge equals to 3cm is 27 cm^3.
Reason (R) : The surface area of a cube whose edge equals to a cm is $6a^2$ cm^2

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false.
(d) A is false but R is true.

20. Assertion (A) : If in a parallelogram its diagonals bisect each other at right angles and are equal, then it is a square.
Reason (R) : If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false
(d) A is false but R is true

SECTION –B

21. Expand $(x + 2y + 4z)^2$ using suitable identities:

22. If a point (-2,5) lies on the graph of the equation $5x + 3y = k$. Find the value of k.

23. Find the area of an isosceles triangle whose equal sides are 8cm and base is 6cm.

OR

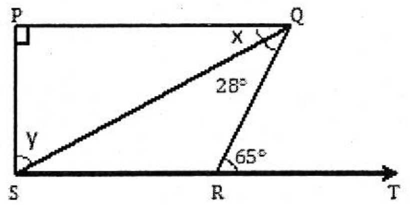
Sides of a triangle are in the ratio of 3: 4: 5 and its perimeter is 24 cm. Find its area.

24. Find the curved surface area of a cone of radius 14 cm and whose slant height is 50 cm.

OR

Find the curved surface area of a cylinder of height 24cm and diameter 7cm.

25. In figure $PQ \perp PS$, $PQ \parallel SR$, $\angle SQR = 28^\circ$ and $\angle QRT = 65^\circ$, then find the values of x and y?



SECTION –C

26. Find the values of a and b if $\frac{\sqrt{3}+1}{\sqrt{3}-1} = a+b\sqrt{3}$

OR

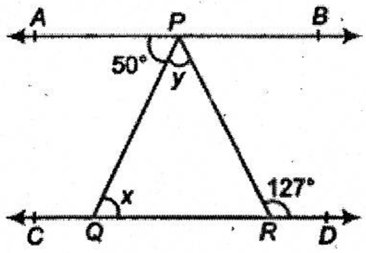
Represent $\sqrt{6.4}$ on a number line.

27. Factorise: $x^3 + 6x^2 + 11x + 6$

OR

Find the value of k, if $x - 1$ is a factor of $p(x) = 4x^3 + 3x^2 - kx - 10$.

28. In figure, if $AB \parallel CD$, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find x and y. Also find $\angle BPR$



29. Construct a ABC in which BC = 9 cm, $\angle B = 45^\circ$ and AB – AC = 2.5 cm. Also write the steps of constructions

30. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of the playground in m^2.

OR

Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find
(i) radius of the base and
(ii) total surface area of the cone.

31. Find the Mean, Median and Mode of the following data.
6, 2, 5, 9, 8, 2, 5, 6, 1, 5, 7, 5, 3, 5, 1, 8, 5, 2, 3, 4

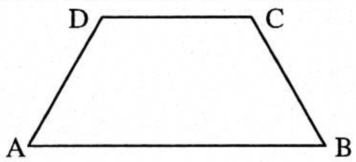
SECTION –D

32. A circular park of radius 20 m 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.

33. Show that the diagonals of a rhombus bisect each other and are perpendicular to each other.

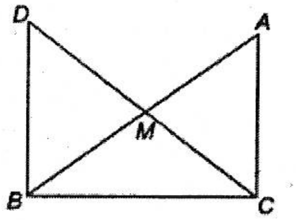
OR

ABCD is a trapezium in which $AB \parallel CD$ and AD = BC (see figure).



Show that
(i) $\angle A = \angle B$
(ii) $\angle C = \angle D$
(iii) $\angle ABC \cong \angle BAD$
(iv) Diagonal AC = Diagonal BD

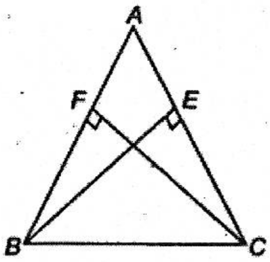
34. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see figure).



Show that
(i) ΔAMC ≅ ΔBMD
(ii) ∠DBC is a right angle
(iii) ΔDBC ≅ ΔACB

OR

ΔABC is a triangle in which altitudes BE and CF are drawn to sides AC and AB respectively are equal. (see figure). Show that ΔABC is an isosceles triangle.



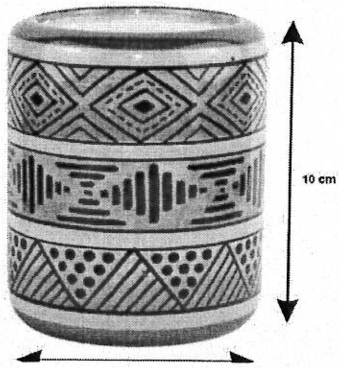
35. Construct a histogram and frequency polygon for the following frequency distribution :

Weight (in kg)	Number of persons
40 – 45	11
45 - 50	24
50 - 55	30
55 - 60	19
60 - 65	9
65 - 70	7

SECTION - E

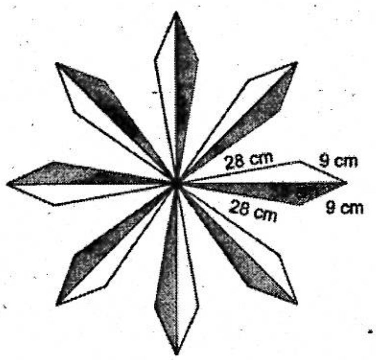
Read the passage given below and answer the questions accordingly:

36. The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 7cm and height 10 cm. The Vidyalaya was to supply the competitors with cardboard. There were 35 competitors in all for the competition.



i) What is the curved surface area of one pen holder?
ii) How much cardboard was required for 1 such pen holder?
iii) How much cardboard was required to be bought for the competition?
iv) What is the volume of 1 pen holder?

37. A floral design on a floor is made up of 16 triangular tiles of equal area and comprises two colours - white and black as shown in the figure. The sides of each triangular tile are 35 cm, 28 cm and 9 cm. There are 22 such designs on the floor. The design is to be polished at the rate of Rs 4 per cm^2. (use $\sqrt{6} = 2.45$)



i) Which formula is used to find the area of triangular tile? Write the formula.
ii) What is the area of a single triangular tile?
iii) What is the area of 1 floral design?
iv) What is the cost of polishing each floral design at the rate of Rs 4 per cm^2.

38. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000-10000	0	305	27	2
10000-13000	1	535	29	1
13000-16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is
i) earning Rs. 10000-13000 per month and owning exactly 2 vehicles.
ii) earning Rs. 16000 or more per month and owning exactly 1 vehicle
iii) earning less than Rs. 7000 per month and does not own any vehicle.
iv) earning Rs. 13000-16000 per month and owning more than 2 vehicles.

Sadhna