

Class: IX
SESSION : 2022-2023
SUBJECT: Mathematics
SAMPLE QUESTION PAPER - 5
with SOLUTION

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions:

1. This Question Paper has 5 Sections A-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 subparts 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. If the area of an equilateral triangle is $16\sqrt{3} \text{ cm}^2$ then the perimeter of the triangle is : [1]
 - a) 306 cm
 - b) 12 cm
 - c) 24 cm
 - d) 48 cm
2. Signs of the abscissa and ordinate of a point in the second quadrant are respectively. [1]
 - a) (-, +)
 - b) (+, -)
 - c) (+, +)
 - d) (-, -)
3. A histogram is a pictorial representation of the grouped data in which class intervals and frequency are respectively taken along [1]
 - a) horizontal axis only
 - b) horizontal axis and vertical axis
 - c) vertical axis and horizontal axis
 - d) vertical axis only
4. The simplest rationalising factor of $\sqrt[3]{500}$, is [1]
 - a) $\sqrt{3}$
 - b) $\sqrt[3]{2}$
 - c) none of these
 - d) $\sqrt[3]{5}$
5. An equilateral triangle ABC is inscribed in a circle with centre O. The measures of $\angle BOC$ is [1]

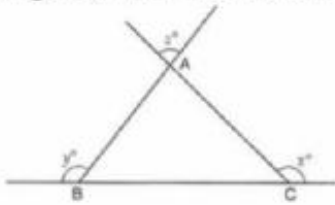
a) 90°

b) 60°

c) 30°

d) 120°

6. In figure, what is z in terms of x and y ? [1]



a) $x + y - 180^\circ$

b) $x + y + 180^\circ$

c) $x + y + 360^\circ$

d) $180^\circ - (x + y)$

7. The coefficient of x^2 in the expansion of $(x + 3)^4$ is [1]

a) 54

b) 27

c) 3

d) 1

8. How many lines pass through two points? [1]

a) many

b) three

c) two

d) only one

9. If one angle of a parallelogram is 24° less than twice the smallest angle, then the measure of the largest angle of the parallelogram is [1]

a) 112°

b) 68°

c) 176°

d) 102°

10. Which one of the following statements is true? [1]

a) The sum of two irrational numbers may be a rational number or an irrational number

b) The sum of two irrational numbers is always an integer

c) The sum of two irrational numbers is always an irrational number

d) The sum of two irrational numbers is always a rational number

11. $\sqrt{8} + 2\sqrt{32} - 5\sqrt{2}$ is equal to [1]

a) none of these

b) $\sqrt{32}$

c) $\sqrt{8}$

d) $5\sqrt{2}$

[1]

12. If two angles are supplementary and the larger is 20° less than three times the smaller, then the angles are
- a) $72\frac{1}{2}^\circ, 17\frac{1}{2}^\circ$ b) $140^\circ, 40^\circ$
c) $130^\circ, 50^\circ$ d) $62\frac{1}{2}^\circ, 27\frac{1}{2}^\circ$
13. If $(-2, 5)$ is a solution of $2x + my = 11$, then the value of 'm' is [1]
- a) -2 b) 2
c) 3 d) -3
14. Two equal circles of radius r intersect such that each passes through the centre of the other. The length of the common chord of the circles, is [1]
- a) $\frac{\sqrt{3}}{2}r$ b) $\sqrt{3}r$
c) \sqrt{r} d) $\sqrt{2}rAB$
15. The distance of the point $P(4, 3)$ from the origin is [1]
- a) 3 b) 5
c) 7 d) 4
16. Which of the following is an irrational number [1]
- a) $\sqrt{225}$ b) $7.\overline{478}$
c) $\sqrt{23}$ d) 0.3799
17. If a linear equation has solutions $(-2, 2)$, $(0, 0)$ and $(2, -2)$, then it is of the form: [1]
- a) $x + y = 0$ b) $-2x + y = 0$
c) $x - y = 0$ d) $-x + 2y = 0$
18. If $x + \frac{1}{x} = 5$, then $x^2 + \frac{1}{x^2} =$ [1]
- a) 23 b) 27
c) 25 d) 10
19. **Assertion (A):** $\sqrt{3}$ is an irrational number. [1]
Reason (R): The sum of a rational number and an irrational number is an irrational number.
- 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. Each question consists of two statements, namely, Assertion (A) and Reason (R). Choose the correct option. [1]

Assertion (A)	Reason (R)
ABCD is a quadrilateral in which P, Q, R and S are the midpoints of AB, BC, CD and DA respectively. Then, PQRS is a parallelogram.	The line segment joining the midpoints of any two sides of a triangle is parallel to the third side and equal to half of it.

a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

c) Assertion (A) is true and Reason (R) is false.

d) Assertion (A) is false and Reason (R) is true.

Section B

21. Consider the two 'postulates' given below: [2]

(i) Given any two distinct points A and B, there exists a third point C, which is between A and B.

(ii) There exists at least three points that are not on the same line.

Do these postulates contain any undefined terms? Are these postulates consistent? Do they follow from Euclid's postulates? Explain.

22. In fig., if $AC = BD$, then prove that $AB = CD$ [2]



23. Name the quadrant in which the following points lie : (i) (2, 3) (ii) (-3, 4) (iii) (-3, -10) [2]

24. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases. [2]

OR

The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of whitewashing its curved surface at the rate of ₹12 per m^2 .

25. Show how $\sqrt{5}$ can be represented on the number line. [2]

OR

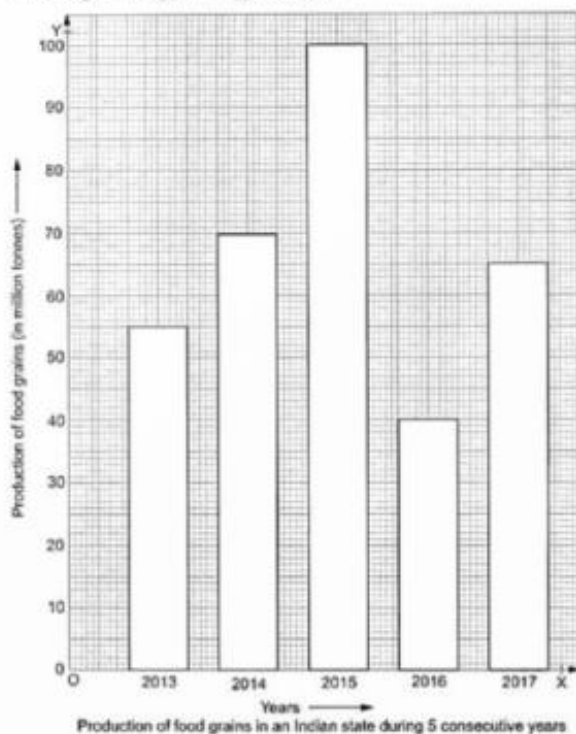
Simplify: $125^{-\frac{1}{3}} \left[125^{\frac{1}{3}} - 125^{\frac{2}{3}} \right]$.

Section C

26. Read the given bar graph and answer the questions given below: [3]

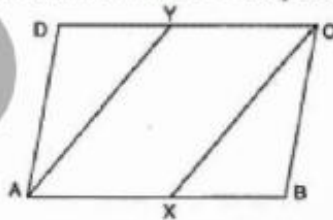
i. What information is given by the bar graph?

- ii. In which year was the production maximum?
- iii. After which year was there a sudden fall in the production?
- iv. Find the ratio between the maximum production and the minimum production during the given period.



27. If $a = xy^{p-1}$, $b = xy^{q-1}$ and $c = xy^{r-1}$, prove that $a^{q-r} b^{r-p} c^{p-q} = 1$ [3]

28. In the given figure, ABCD is a parallelogram and X, Y are the mid-points of the sides AB and DC respectively. Show that quadrilateral AXCY is a parallelogram. [3]



29. Find four solutions for the following equation : $12x + 5y = 0$ [3]

30. Factorize: $6x^2 + 5x - 6$ [3]

31. Below are the scores of two groups of Class IV students on a test of reading ability : [3]

Class interval	Group A	Group B
50-52	4	2
47-49	10	3
44-46	15	4
41-43	18	8

Class interval	Group A	Group B
38-40	20	12
35-37	12	17
32-34	13	22
Total	92	68

Construct a frequency polygon for each of these groups on the same axes.

OR

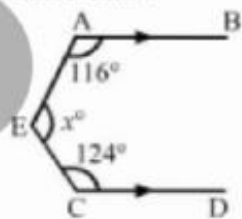
Various modes of transport used by 1850 students of a school are given below:

School bus	Private bus	Bicycle	Rickshaw	By foot
640	360	490	210	150

Draw a bar graph to represent the above data.

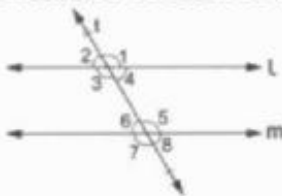
Section D

32. A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m. [5]
- How many students can sit in the tent if a student on an average, occupies $\frac{5}{7} \text{ m}^2$ on the ground?
 - Find the volume of the cone.
33. In each of the figures given below, $AB \parallel CD$. Find the value of x° in each other case. [5]



OR

In the given figure, $l \parallel m$ and a transversal t cuts them. If $\angle 1 = 120^\circ$, find the measure of each of the remaining marked angles.



34. Show that $(x + 4)$, $(x - 3)$ and $(x - 7)$ are the factors of $x^3 - 6x^2 - 19x + 84$ [5]
35. The perimeter of a triangular field is 420 m and its sides are in the ratio 6 : 7 : 8. [5]
Find the area of the triangular field.

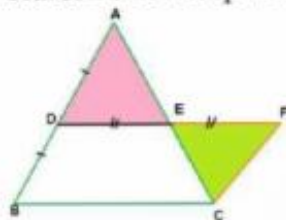
OR

Calculate the area of the triangle whose sides are 18 cm, 24 cm and 30 cm in length. Also, find the length of the altitude corresponding to the smallest side.

Section E

36. **Read the text carefully and answer the questions:** [4]

Haresh and Deep were trying to prove a theorem. For this they did the following



- i. Draw a triangle ABC
- ii. D and E are found as the mid points of AB and AC
- iii. DE was joined and DE was extended to F so $DE = EF$
- iv. FC was joined.

- (i) $\triangle ADE$ and $\triangle EFC$ are congruent by which criteria?
- (ii) Show that $CF \parallel AB$.

OR

Show that $DF = BC$ and $DF \parallel BC$.

- (iii) Show that $CF = BD$.

37. **Read the text carefully and answer the questions:**

Rainwater harvesting system is a technology that collects and stores rainwater for human use.

Anup decided to do rainwater harvesting. He collected rainwater in the underground tank at the rate of $30 \text{ cm}^3/\text{sec}$.



- (i) What will be the equation formed if the volume of water collected in x seconds is taken as $y \text{ cm}^3$? and also find amount of water collected in 2 hours?
- (ii) Write the equation in standard form.
- (iii) How much water will be collected in 60 sec?

OR

How much time will it take to collect water in 900 cm^3 ?

38. **Read the text carefully and answer the questions:**

[4]

There is a race competition between all students of a sports academy, so that the sports committee can choose better students for a marathon. The race track in the academy is in the form of a ring whose inner most circumference is 264 m and the outer most circumference is 308 m.



- (i) Find the radius of the outer most circle.
- (ii) Find the radius of the inner most circle.

OR

Find the area of the racetrack.

- (iii) Find the width of the track.