ATOMIC ENERGY EDUCATION SOCIETY

ANNUAL EXAMINATION – 2019 - 20

Class – IX | Time : 3 Hours

Subject : Mathematics | Marks: 80

General Instructions:

a) All questions are compulsory

b) The question paper consists of 40 questions divided into four sections A, B, C & D.

c) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each Section D comprises 6 questions of 4 marks each.

d) There is no overall choice. However internal choices have been provided in two questions of 1mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

e)Use of calculators is not permitted.

SECTION – A

Q 1- 10 are multiple choice questions. Select the most appropriate answer from the given options.

1. Between two rational numbers there is/are (1)

   a) infinite number of rational numbers b) one and only one rational number

   c) no rational number d) no irrational number

2. The co-efficient of y in the expansion $(5 - y)^2$ is (1)

   (a) 5 (b) – 10 (c) 10 (d) –

3. How many triangles are possible having angles 60^0, 80^0 and 40^0 (1)

   a) only one b) none c) infinite d) only 3

4. An exterior angle of a triangle is 110^0 and its two interior opposite angles are equal.

   Each of these equal angles equal to (1)

   (a) 55^0 (b) 45^0 (c) 35^0 (d) can't find

5. In a cylinder, radius is halved and height is doubled. The volume will be (1)

   (a) four times (b) doubled (c) same (d) halved

6. The class mark of a class interval is 10.5 and its class size is 7. Its class interval is (1)

   (a) 7 – 14 (b) 10 – 17 (c) 11 - 18 (d) 5 – 12

7 In $\triangle ABC$, if $\angle C > \angle B$ then (1)

(a) AB = AC (b) AB > AC (c) AB < AC (d) None of these

8. Which of the following statements is true? (1)

(a) Every square is a rhombus

(b) The diagonals of a rectangle are perpendicular

(c) The diagonals of a rhombus are equal

(d) A quadrilateral is a square if all of its sides are equal.

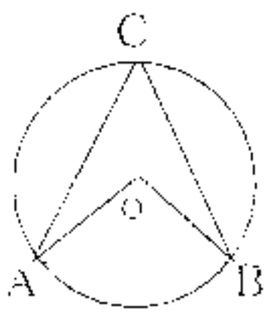
9. Which of the following is true if $\Delta PQR \cong \Delta SET$? (1)

a) PQ = SE b) QR = ST c) $\angle P = \angle T$ d) PR = SE

10. In the given fig. if $\angle OAB = 40^0$, then

$\angle ACB$ is equal to (1)

(a) 40^0 (b) 50^0 (c) 70^0 (d) 60^0

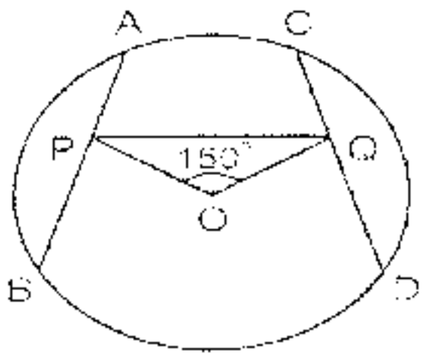


(11 – 15) Fill in the blanks:

11. The point whose ordinate is 4 and which lies on y – axis is_____ (1)

12. The line 2x + 3y = 6 cuts the x – axis at ___ and y axis at ___ (1)

13. In fig. AB and CD are two equal chords of a circle with centre O. OP and OQ are perpendiculars on chords AB and CD respectively. If $\angle POQ = 150^0$, then $\angle APQ$ is (1)



14. If E be an event, then P(E) + P (not E) = _____. (1)

OR

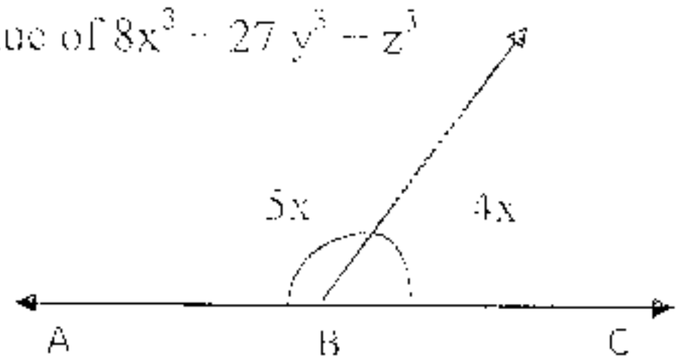
Probability of an impossible event is _

15. The total surface area of the cone whose radius is r/2 and slant height 2*l* is _____ (1)

(16 – 20) Answer the following :

16. If $2x + 3y + z = 0$, then find the value of $8x^3 + 27y^3 + z^3$ (1)

17. In fig, find the value of x.



OR

If the supplementary angle of an angle is 3 times of its complementary angle, find the angle

18. Find the decimal expansion of 31/16. (1)

19. Find the mode of the data 4, 9 .5, 4, 9, 5, 4, 5, 9, 5. (1)

20. If $\frac{x}{y} + \frac{y}{x} = -1$ $(x, y \neq 0)$, then find the value of $x^3 - y^3$. (1)

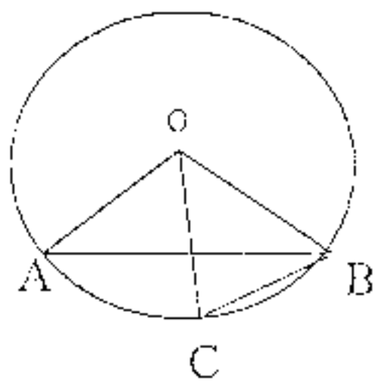
SECTION – B

21. If the area of an equilateral triangle is $16\sqrt{3}$ cm^2, then find the perimeter of the triangle. (2)

OR

Find the area of an isosceles triangle whose two equal sides are 10 cm each and third side is 8 cm.

22. In the given fig. $\angle OAB = 30^0$ and $\angle OCB = 57^0$. Find $\angle ABC$ (2)



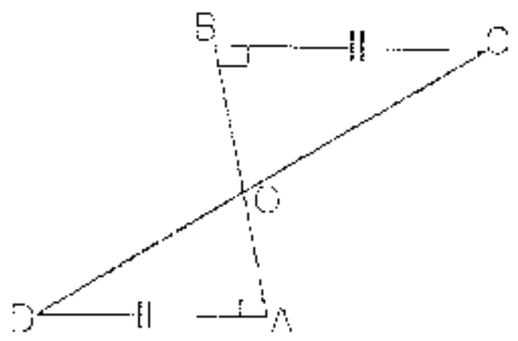
23. The angles of a quadrilaterals are in the ratio 3 : 5 : 9 : 13. Find the angles of the quadrilateral. (2)

24. If $x - \frac{1}{x} = 4$ then find the value of $x^2 + \frac{1}{x^2}$. (2)

OR

Find the value of k, if $x - 1$ is a factor of $p(x)$ i.e. $p(x) = x^2 + x + k$

25. AD and BC are equal perpendiculars to a line segment AB as given in fig. below. Show that CD bisects AB. (2)



26. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of the base of the cylinder. (2)

SECTION C

27. Locate $\sqrt{10}$ on the number line. (3)

OR

Find four different irrational numbers between $\frac{5}{7}$ and $\frac{9}{11}$.

28. Two sides of a triangle are 9 m, 40 m and the perimeter is 90 m. Find the area of the triangle. (3)

29. Without plotting the points, write the quadrant in which following points will lie (3)

(a) Point whose ordinate is -7 and abscissa is 1

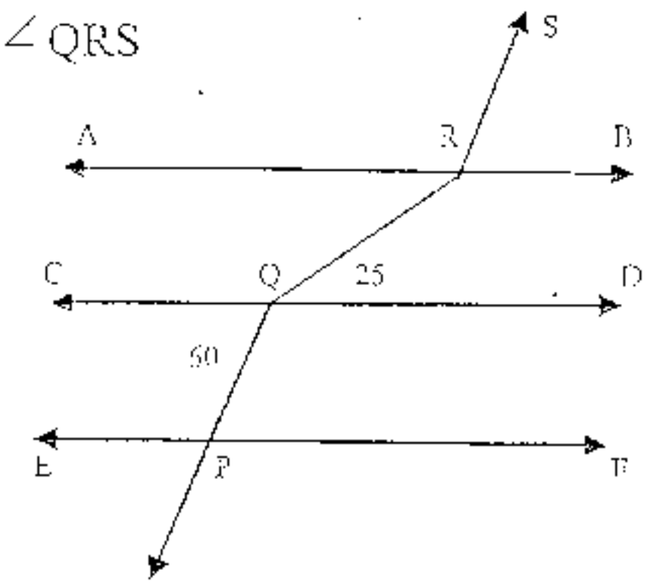
(b) Point whose abscissa is -4 and ordinate is 4

(c) Point whose abscissa is 2 and ordinate is 5

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

31. In the given fig. AB ‖ CD ‖ EF and PQ ‖ RS, $\angle RQD = 25^0$ and $\angle CQP = 60^0$. (3)

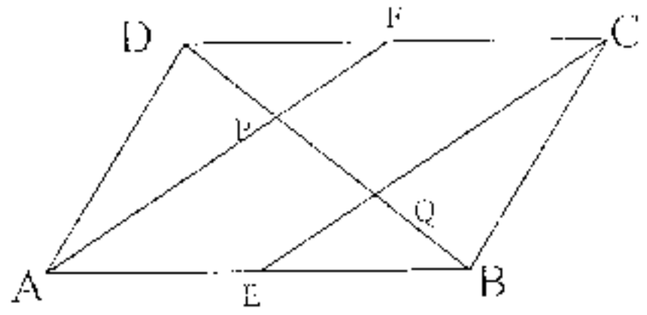
Find $\angle QRS$



32. " Parallelograms which are on the same base and between the same parallels are equal in area". Prove it. (3)

(OR)

In a parallelogram ABCD, E and F are the midpoints of sides AB and CD respectively. Show that the line segment AF and EC trisect the diagonal BD.



33. Give the geometrical representation of $2x + 9 = 0$ as an equation (3)

a. In one variable b. In two variables

34. A recent survey found that the ages of workers in a factory are distributed as follows. (3)

Age (in years)	20 – 29	30 – 39	40 – 49	50 – 59	60 and above
No. of workers	38	27	86	46	3

If a person is selected at random, find the probability that the person is

(a) 40 years or more

(b) Below 40 years.

(c) Below 50 but over 39 years.

(OR)

Cards with numbers 1, 2, 3, ---------- 100 are placed in a box and mixed thoroughly. One card is drawn. What is the probability that the card is drawn is

(a) A prime number less than 30?

(b) A multiple of 5 and 7?

(c) A multiple of 8?

SECTION D

35. Factorize: (i) $4x^2 + 9y^2 - 16z^2 + 12xy - 24yz - 16x$

(ii) $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy - 4\sqrt{2}yz - 8x$ (4)

OR

Use the factor theorem to determine whether $g(x)$ is a factor of $p(x)$ in each of the following.

(i) $p(x) = 2x^2 - x^2 - 2x - 1, g(x) = x + 1$

(ii) $p(x) = 2x^2 + 3x^2 - 3x - 1, g(x) = x + 2$

36. Construct a triangle ABC in which BC = 7 cm, $\angle B = 75^0$ and AB + AC = 13cm (4)

OR

Construct a triangle PQR in which $\angle Q = 60^0$, $\angle R = 45^0$ and PQ = QR = RP = 11cm

37. Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle. (4)

38. Draw the graphs of the lines following linear equation in two variables $2x - 5y = 9$. (4)

39. The volume of a right circular cone is 9856 cm^3. If the diameter of the base is 28 cm. Find (4)

(i) height of the cone (2)

(ii) slant height of the cone (1)

(iii) curved surface area of the cone (1)

OR

The length, breadth and height of a room are 5m, 4m and 3m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of Rs. 7.5 per square metre

40. The following table gives the life times of 400 neon lamps. (4)

Life time (in hours)	300 – 400	400 – 500	500 – 600	600 – 700	700 – 800	800 – 900	900 – 1000
No of Lamps	14	56	60	86	74	62	48

(i) Represent the above information with the help of a histogram. (3)

(ii) How many lamps have a lifetime of 700 or more hours (1)

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