

CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-4

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
- (iii) 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 of 6 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choices have been provided in two questions of 1 mark 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.
- (v) Use of calculators is not permitted.

SECTION A

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

- Q1. Out of one digit prime numbers, one number is selected at random. The probability of selecting an even number is [1]
 (a) $\frac{1}{2}$ (b) $\frac{1}{4}$
 (c) $\frac{4}{9}$ (d) $\frac{2}{5}$
- Q2. If the equation $(m^2 + n^2)x^2 - 2(mp + nq)x + p^2 + q^2 = 0$ has equal roots, then [1]
 (a) $mp = nq$ (b) $mq = np$
 (c) $mn = pq$ (d) $mq = \sqrt{np}$
- Q3. If $x = p \sec \theta$ and $y = q \tan \theta$, then [1]
 (a) $x^2 - y^2 = p^2 q^2$ (b) $x^2 q^2 - y^2 p^2 = pq$
 (c) $x^2 q^2 - y^2 p^2 = \frac{1}{p^2 q^2}$ (d) $x^2 q^2 - y^2 p^2 = p^2 q^2$
- Q4. The value of x, for which the polynomials $x^2 - 1$ and $x^2 - 2x + 1$ vanish simultaneously, is [1]
 (a) 2 (b) -2
 (c) -1 (d) 1
- Q5. The base radii of a cone and a cylinder are equal. If their curved surface areas are also equal, then the ratio of the slant height of the cone to the height of the cylinder is [1]
 (a) 2 : 1 (b) 1 : 2
 (c) 1 : 3 (d) 3 : 1
- Q6. For finding the popular size of ready-made garments, which central tendency is used? [1]
 (a) Mean (b) Median
 (c) Mode (d) Both Mean and Mode
- Q7. If n is an even natural number, then the largest natural number by which $n(n + 1)(n + 2)$ is divisible, is [1]
 (a) 6 (b) 8
 (c) 12 (d) 24
- Q8. If the common difference of an AP is 5, then what is $a_{18} - a_{13}$? [1]
 (a) 5 (b) 20
 (c) 25 (d) 30

- Q9. X 's salary is half that of Y 's. If X got a 50% rise in his salary and Y got 25% rise in his salary, then the percentage increase in combined salaries of both is [1]
- (a) 30 (b) $33\frac{1}{3}$
 (c) $37\frac{1}{2}$ (d) 75

- Q10. The area of a circular ring formed by two concentric circles whose radii are 5.7 cm and 4.3 cm respectively is (Take $\pi = 3.1416$) [1]
- (a) 43.98 sq. cm. (b) 53.67 sq. cm.
 (c) 47.24 sq. cm. (d) 38.54 sq. cm.

(Q.11-Q.15) Fill in the blanks.

- Q11. If the volume of a cube is 64 cm^3 , then its surface area is [1]
- Q12. $(1, 2), (4, y), (x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, then the value of x and y are [1]

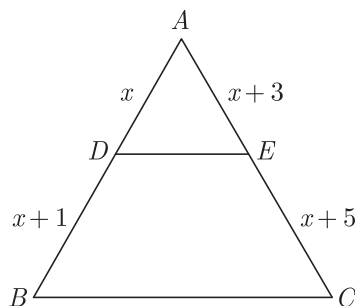
OR

If $x - y = 2$ then point (x, y) is equidistant from $(7, 1)$ and (.....)

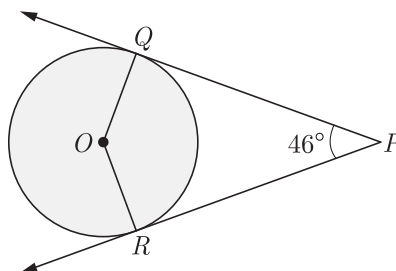
- Q13. L.C.M. of 96 and 404 is [1]
- Q14. In a right triangle ABC , right angled at B , if $\tan A = 1$, $\sin A \cos A = \dots\dots\dots$ [1]
- Q15. If the area of a circle is 154 cm^2 , then its circumference is [1]

(Q.16-Q.20) Answer the following

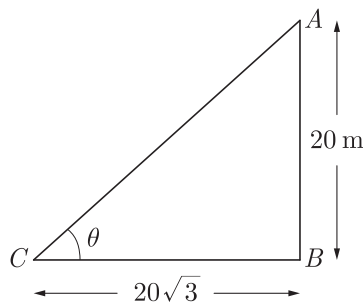
- Q16. To divide a line segment AB in the ratio 5:7, first AX is drawn, so that $\angle BAX$ is an acute angle and then at equal distance, points are marked on the ray AX , find the minimum number of these points. [1]
- Q17. In $\Delta ABC, DE \parallel BC$, find the value of x . [1]



- Q18. If PQ and PR are two tangents to a circle with center O . If $\angle QPR = 46^\circ$ then find $\angle QOR$. [1]



- Q19. In figure, a tower AB is 20 m high and BC , its shadow on the ground, is $20\sqrt{3}$ m long. find the Sun's altitude. [1]

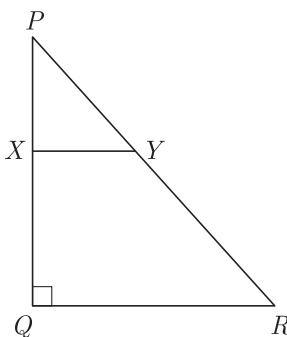


- Q20. The radius of sphere is r cm. It is divided into two equal parts. Find the whole surface of two parts. [1]

SECTION B

- Q21. Is the system of linear equations $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ consistent? Justify your answer. [2]

- Q22. In the given figure, PQR is a triangle right angled at Q and $XY \parallel QR$. If $PQ = 6$ cm, $PY = 4$ cm and $PX : XQ = 1 : 2$. Calculate the length of PR and QR . [2]



OR

In an equilateral triangle ABC , AD is drawn perpendicular to BC meeting BC in D . Prove that $AD^2 = 3BD^2$.

- Q23. Find the ratio in which the point $(-3, k)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of k . [2]

- Q24. Find the number of plates, 1.5 cm in diameter and 0.2 cm thick, that can be fitted completely inside a right circular of height 10 cm and diameter 4.5 cm. [2]

OR

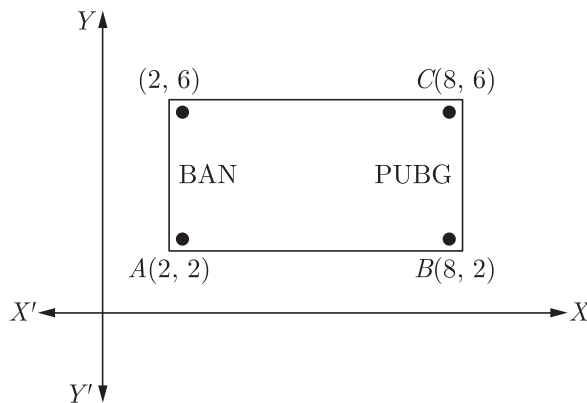
A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel ?

- Q25. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel ? [2]

- Q26. Read the following passage and the question that follows:

One tends to become lazy. Also, starting at your mobile screen for long hours can affect your eyesight and give you headaches . Those who are addicted to playing PUBG can get easily stressed out or face anxiety issues in public due to lack of social interaction.

To raise social awareness about ill effects of playing PUBG, a school decided to start “BAN PUBG” campaign, students are asked to prepare campaign board in the shape of rectangle (as shown in the figure).



- (i) Find the area of the board.
- (ii) If cost of 1 cm^2 of board is ₹8, then find the cost of board. [2]

SECTION C

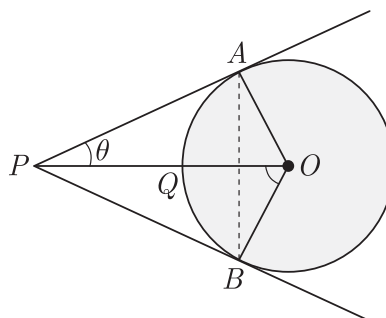
Q27. The tenth term of an A.P., is -37 and the sum of its first six terms is -27 . Find the sum of its first eight terms. [3]

Q28. If one the zero of a polynomial $3x^2 - 8x + 2k + 1$ is seven times the other, find the value of k . [3]

OR

Show that $\frac{1}{2}$ and $\frac{-3}{2}$ are the zeroes of the polynomial $4x^2 + 4x - 3$ and verify relationship between zeroes and coefficients of the polynomial.

Q29. In the given figure, OP is equal to the diameter of a circle with center O and PA and PB are tangents. Prove that ABP is an equilateral triangle. [3]



Q30. The vertices of ΔABC are $A(6, -2)$, $B(0, -6)$ and $C(4, 8)$. Find the co-ordinates of mid-points of AB , BC and AC . [3]

OR

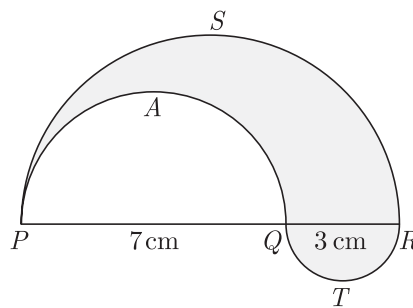
Find the ratio in which the point $p(m, 6)$ divides the line segment joining the points $A(-4, 3)$ and $B(2, 8)$. Also find the value of m .

Q31. An aeroplane, when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. (Use $\sqrt{3} = 1.73$) [3]

OR

Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as 30° and 60° . find the distance between the two men. (Use $\sqrt{3} = 1.73$)

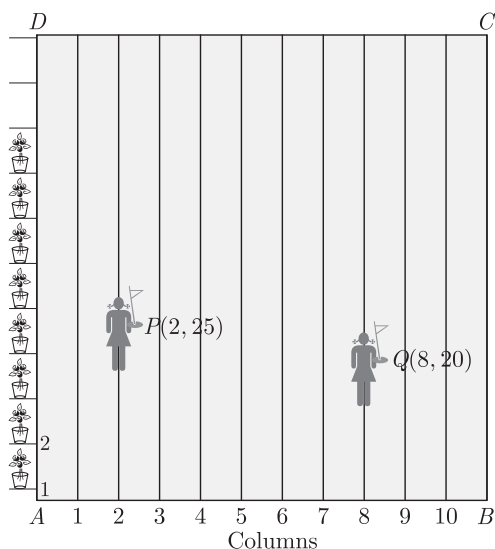
Q32. In the fig., PSR , RTQ and PAQ are three semi-circles of diameters 10 cm , 3 cm and 7 cm region. Use $\pi = \frac{22}{7}$. [3]



Q33. Read the following passage and the question that follows:

To conduct Sport Day activities, in your rectangular shaped school ground $ABCD$, lines have been draw with chalk power at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD , as shown in figure. Niharika runs $\frac{1}{4}$ th the distance AD in the 2nd line and posts a green flag. Preet runs $\frac{1}{5}$ th the distance AD on the eight^s line and posts a red flag. [3]

- (i) What is the distance between both the flags?
- (ii) If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?
- (iii) Which mathematical concept is used in the above problem?



Q34. A solid right-circular cone of height 60 cm and radius 30 cm is dropped in a right-circular cylinder full of water of height 180 cm and radius 60 cm. Find the volume of water left in the cylinder in cubic metre. Use $\pi = \frac{22}{7}$ [3]

SECTION D

Q35. For Uttarakhand flood victims two sections A and B of class contributed Rs. 1,500. If the contribution of X-A was Rs. 100 less than that of X-B, find graphically the amounts contributed by both the sections. [4]

Q36. Prove that $n^2 - n$ is divisible by 2 for every positive integer n . [4]

OR

If d is the HCF of 30 and 72, find the value of x and y satisfying $d = 30x + 72y$.

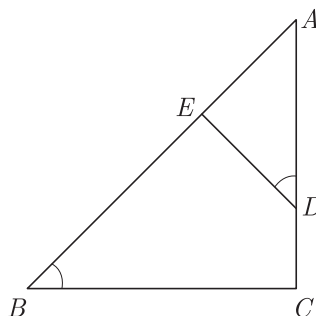
Q37. If $\cos \theta + \sin \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, prove that $q(p^2 - 1) = 2p$ [4]

Q38. Two pipes running together can fill a tank in $11\frac{1}{9}$ minutes. If one pipe takes 5 minutes more than the other to fill the tank, find the time in which each pipe would fill the tank separately. [4]

OR

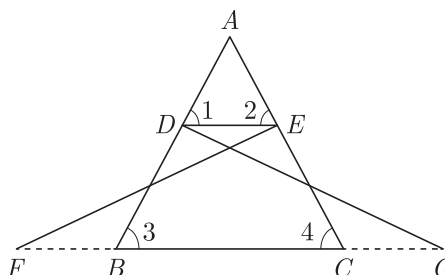
The perimeter of a right triangle is 60 cm. Its hypotenuse is 25 cm. Find the area of the triangle.

Q39. In ΔABC , if $\angle ADE = \angle B$, then prove that $\Delta ADE \sim \Delta ABC$. Also, if $AD = 7.6$ cm, $AE = 7.2$ cm, $BE = 4.2$ cm and $BC = 8.4$ cm, then find DE . [4]



OR

In the following figure, $\Delta FEC \cong \Delta GBD$ and $\angle 1 = \angle 2$. Prove that $\Delta ADE \cong \Delta ABC$.



Q40. Find the value of x and y , if the median for the following data is 31. [4]

Classes	0- 10	10- 20	20- 30	30- 40	40- 50	50- 60	Total
Frequency	5	x	6	y	6	5	40

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