

JSUNIL TUTORIAL : Class 10 Maths 2020 Sample Paper 02

PART-A

Section-I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Find the LCM of smallest two digit composite number and smallest single digit composite number.

OR

$4, 10 \rightarrow 2^2 \times 5^1 = 20$
 $2^3 \times 5^3 = 3 \text{ decimals}$

2. The decimal representation of $\frac{11}{2^3 \times 5}$ will terminate after how many places?

3. If the zeroes of the quadratic polynomial $ax^2 + bx + c, a \neq 0$ are equal, then what are the signs of a and c ?

Neg or positive

OR

Show that the sum of roots of quadratic equation $-x^2 + 3x - 3 = 0$ is 3.

4. The point which divides the line segment joining the points $(8, -9)$ and $(2, 3)$ in ratio $1 : 2$ internally lies in which quadrant?

$6, -5 \rightarrow \text{IV}$

OR

If HCF of 14 and 180 is expressed in the form $13m - 16$. Find the value of m .

4

5. If in two triangles DEF and $PQR, \angle D = \angle Q$ and $\angle R = \angle E$, then $\frac{DE}{PQ} = \frac{FE}{RP}$ is true? Justify

6. At one end A of diameter AB of a circle of radius 5 cm, tangent XAY is drawn to the circle. Find the length of the chord CD which is at a distance 8 cm from A and parallel to XY .

7. Find the area of a sector of angle p (in degrees) of a circle with radius R .

$\frac{\pi R^2 p}{360}$

8. Find HCF of the number $k, 2k, 3k, 4k$ and $5k$, where k is a positive integer.

5

9. The probability expressed as a percentage of a particular occurrence can never be less than 0.

Is the above statement is true or false, justify. $100\% \geq 0$

10. Two lines are given to be parallel. The equation of one of the lines is $4x + 3y = 14$, then find the equation of a second line.

$12x + 9y = 5$

11. If 7 times the 7th term of an A.P is equal to 11 times its 11th term, then find its 18th term.

0

12. Find the ratio in which the line segment joining the points $(6, 4)$ and $(1, -7)$ is divided by the x -axis.

OR

Find the coordinates of a point A , where AB is diameter of a circle whose centre is $(2, -3)$ and B is the point $(1, 4)$.

$(3, -10)$

$4:7$

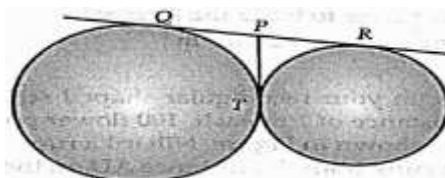
13. If the angle between two tangent drawn from an external point 'p' to a circle of radius 'r' and centre O is 60° , then find the length of OP.

$2r$

OR

In the figure, QR is a common tangent to a given circle which meet at T. Tangent at T meets QR at P. If $QP = 3.8$ cm, then find length of QR.

7.6



13. If $k + 1 = \sec^2 \theta (1 + \sin \theta) (1 - \sin \theta)$, then find the value of k . 0
14. A cylinder, a cone and a hemisphere have same base and same height. Find the ratio of their volumes. $1:\frac{1}{3}:\frac{1}{2}$
 $2:1:3$
15. A steel wire when bent in the form of a square encloses an area of 121 cm^2 . If the same wire is bent in the form of a circle, then find the circumference of the circle. 44
16. Following distribution gives cumulative frequencies of 'more than type':

Marks obtained	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20
Number of students (cumulative frequency)	30	23	8	2

Change the above data to a continuous grouped frequency distribution.

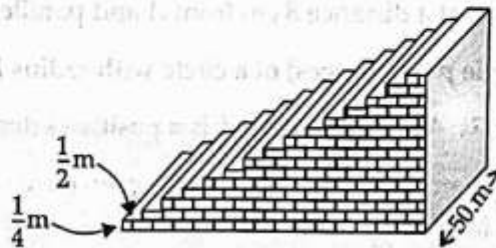
$5-10$ | $10-15$ | $15-20$ | $20-25$
 7 | 15 | 6 | 2

Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

Q17. Case Study based-1:

Small terrace at a football ground comprises of 15 steps each of which is 50 m long and built of solid concrete.



Each step has a rise of $\frac{1}{4} \text{ m}$ and a tread of $\frac{1}{2} \text{ m}$. (see figure below).

(a) What is the volume of the required concrete for step 1?

- (i) $\frac{25}{4}$ (ii) $\frac{50}{4}$ (iii) $\frac{75}{4}$ (iv) $\frac{150}{4}$

(b) What is the volume of the required concrete for step 2?

- (i) $\frac{25}{4}$ (ii) $\frac{50}{4}$ (iii) $\frac{75}{4}$ (iv) $\frac{150}{4}$

(c) What is the volume of the required concrete for step 3?

- (i) $\frac{25}{4}$ (ii) $\frac{50}{4}$ (iii) $\frac{75}{4}$ (iv) $\frac{150}{4}$

(d) The given problem is based on which mathematical concept?

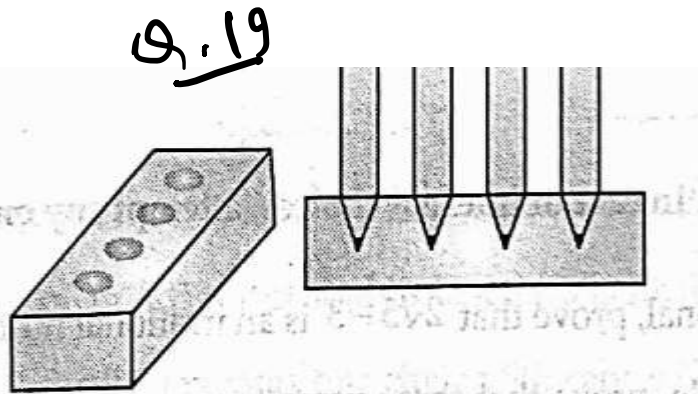
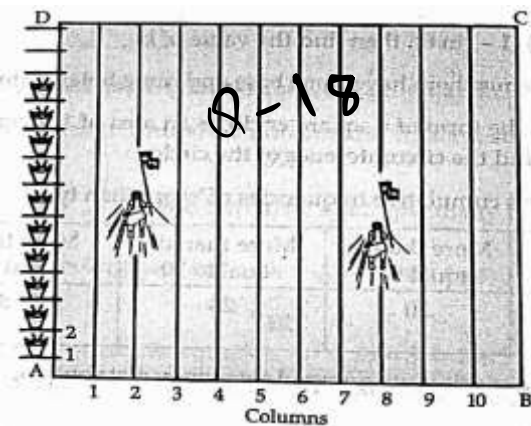
- (i) AP (ii) surface areas and volumes
(iii) Height and Distances (iv) None of these

(e) What is the total volume of concrete to build the terrace?

- (i) 750 m^3 (ii) 500 m^3 (iii) 570 m^3 (iv) 1000 m^3

Q18. Case Study based-2:

To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder 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 on the second line and posts a green flag. Preet runs $\frac{1}{5}$ th the distance AD on the eighth line and posts a red flag.



- (a) At what distance Niharika posted the green flag from the starting point of second line?
 (i) 20 m ✓(ii) 25 m (iii) 100 m (iv) 50 m
- (b) At what distance Preet posted the green flag from the starting point of eighth line?
 ✓(i) 20 m (ii) 25 m (iii) 100 m (iv) 50 m
- (c) What is the distance between both the flags?
 ✓(i) $\sqrt{61}$ m (ii) $\sqrt{101}$ m (iii) $\sqrt{51}$ m (iv) $\sqrt{11}$ m
- (d) If Rashmi has to post a blue flag exactly halfway between the line segments joining the two flags, where should she post her flag?
 ✓(i) (5, 22.5) (ii) (22.5, 5) (iii) (5, 5) (iv) none of these
- (e) The given problem is based on which mathematical concept?
 (i) Lines ✓(ii) surface areas and volumes
 (iii) Triangles (iv) None of these

Q19. Case Study based-3 :

A carpenter made a wooden pen stand. It is in the shape of cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. (See Figure).

- (a) What is the volume of cuboid?
 ✓(i) 525 cm^3 (ii) 225 cm^3 (iii) 552 cm^3 (iv) 255 cm^3
- (b) What is the volume of cone?
 (i) $\frac{11}{3} \text{ cm}^3$ ✓(ii) $\frac{11}{30} \text{ cm}^3$ (iii) $\frac{3}{11} \text{ cm}^3$ (iv) $\frac{30}{11} \text{ cm}^3$
- (c) What is the total volume of conical depressions?
 (i) 1.74 cm^3 (ii) 1.44 cm^3 ✓(iii) 1.47 cm^3 (iv) 1.77 cm^3
- (d) What is the volume of wood in the entire stand?
 (i) 522.35 cm^3 (ii) 532.53 cm^3 (iii) 523.35 cm^3 ✓(iv) 523.53 cm^3
- (e) The given problem is based on which mathematical concept?
 (i) Triangle (ii) Lines ✓
 (iii) Height and Distances (iv) None of these

Q20. Case Study based-4 :

The maximum bowling speeds, in km per hour, of 33 players at a cricket coaching centre are given as follows.

Speed (in km/h)	85 – 100	100 – 115	115 – 130	130 – 145
Number of players	11	9	8	5

(a) What is the modal class of the given data?

- (i) 85-100 (ii) 100-115 (iii) 115-130 (iv) 130-145

(b) What is the value of class interval for the given data set?

- (i) 10 (ii) 15 (iii) 5 (iv) 20

(c) What is the median class of the given data?

- (i) 85-100 (ii) 100-115 (iii) 115-130 (iv) 130-145

(d) What is the median blowing speed?

- (i) 109.17 km/hr (ii) 109.71 km/hr
 (iii) 107.17 km/hr (iv) 109.19 km/hr

(e) What is the sum of lower limit of modal class and upper limit of median class?

- (i) 100 (ii) 200 (iii) 300 (iv) 400

PART-B

Section-III

All questions are compulsory. In case of internal choices, attempt any one.

AI 21. Given that $\sqrt{5}$ is irrational, prove that $2\sqrt{5} - 3$ is an irrational number.

AI 22. In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

AI 23. Find the value of :

$\sin 30^\circ \cdot \cos 60^\circ + \cos 30^\circ \cdot \sin 60^\circ$ Is it equal to $\sin 90^\circ$ or $\cos 90^\circ$?

OR

$1 = \sin 90^\circ$

AI Prove that : $\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \operatorname{cosec} A - \cot A$

AI 24. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

8/3

AI 25. A paper is in the form of a rectangle $ABCD$ in which $AB = 20$ cm and $BC = 14$ cm. A semi-circular portion with BC as diameter is cut off. Find the area of the remaining part. (Use $\pi = \frac{22}{7}$)

203

OR

AI If the perimeter of a protractor is 72 cm, calculate its area. (Use $\pi = \frac{22}{7}$)

308

26. Find the mean of first five odd multiples of 5.

25

Section-IV

All questions are compulsory. In case of internal choices, attempt any one.

27. Find the zeroes of the following polynomial : $5\sqrt{5}x^2 + 30x + 8\sqrt{5}$

$-\frac{4}{\sqrt{5}}, -\frac{2\sqrt{5}}{5}$

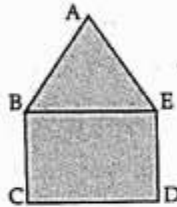
OR

Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the coefficients. $2/3, -1/4$

Q28. Represent the following pair of linear equations graphically and hence comment on the condition of consistency of this pair. $x - 5y = 6, 2x - 10y = 12$. **coincident, many sol.**

OR

In the figure, ABCDE is a pentagon with $BE \parallel CD$ and $BC \parallel DE$. BC is perpendicular to CD. $AB = 5$ cm, $BE = 7$ cm, $BC = x - y$ and $CD = x + y$. If the perimeter of ABCDE is 27 cm. find the value of x and y , given $x, y \neq 0$.



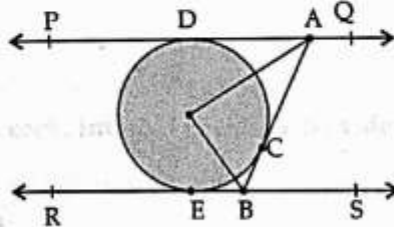
$x = 6$
 $y = 1$

if

29. $ad \neq bc$, then prove that the equation. $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots.

30. If the sum of the first 14 terms of an A.P. is 1050 and its first term is 10, find its 20th term. $d = 10, t_{20} = 200$

31. In Figure PQ and RS are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting PQ at A and RS at B. Prove that $\angle AOB = 90^\circ$.



Q32. $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$

33. A box consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Ramesh, a shopkeeper will buy only those shirts which are good but 'Kewal' another shopkeeper will not buy shirts with major defects. A shirt is taken out of the box at random. What is the probability that :

(i) Ramesh will buy the selected shirt ?

$88/100$

(ii) 'Kewal' will buy the selected shirt ?

$96/100$

Q34. Amit, standing on a horizontal plane, find a bird flying at a distance of 200 m from him at an elevation of 30° . Deepak standing on the roof of a 50 m high building, find the angle of elevation of the same bird to be 45° . Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.

OR

$50\sqrt{2}$

The angle of depression of two ships from an aeroplane flying at the height of 7500 m are 30° and 45° . If both the ships are in the same line that one ship is exactly behind the other, find the side such distance between the ships.

$7500(\sqrt{3}-1)$

35. A hemispherical portion is cut from one face of a cubical block, such that diameter 'r' of hemisphere is equal to the edge of cube. Find the surface area of the remaining solid.

$6l^2 + \frac{\pi r^2}{4} = 184.18l^2$

36. Given, Solve for x : $\left(\frac{2x}{x-5}\right)^2 + 5\left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$

$x = 15004$