

EVERWIN VIDHYASHRAM
HALF YEARLY ASSESSMENT
MATHEMATICS

Marks:80
Time:3 hrs
20x1=20

16.09.19
Std: X

I. Answer the following:

- Find the value of $\cos 89^\circ \cos 88^\circ \cos 90^\circ = \underline{\hspace{2cm}}$.
a. 0 b. 1 c. $\frac{3}{2}$ d. $\frac{1}{\sqrt{2}}$
- The perimeter of 2 similar-triangles are 40cm and 50cm. Then the ratio of the areas of the first and second triangle is _____.
a. 4:5 b. 5:4 c. 25:16 d. 16:25
- The height of the tower is 100m when the angle of elevation of sun is 30° , then shadow of the tower is _____.
a. $100\sqrt{3}$ b. 100m c. $100(\sqrt{3}-1)m$ d. $100/\sqrt{3}m$
- If an event occurs surely, then its probability is _____.
a. 0 b. 1 c. $\frac{1}{2}$ d. $\frac{3}{4}$
- The distance between the points (0,3) and (-2,0)
a. $\sqrt{14}$ b. $\sqrt{15}$ c. $\sqrt{13}$ d. $\sqrt{5}$
- The width of the class interval 40-50 is _____.
a. 40 b. 50 c. 45 d. 10
- If in triangles ABC and EDF $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar when
a. $\angle B = \angle E$ b. $\angle A = \angle D$ c. $\angle B = \angle D$ d. $\angle A = \angle E$
- The mean of n observations $x_1, x_2, x_3, \dots, x_n$ is \bar{x} . If each observation is divided by P, then the mean of the new observation is _____.
a. $\frac{\bar{x}}{p}$ b. $p\bar{x}$ c. \bar{x} d. $p+\bar{x}$
- The sum of first 'n' terms of the series a, 3a, 5a, is _____.
a. na b. $(2n-1)a$ c. n^2a d. n^2a^2
- Which of the following is true?
a. $0 \leq P(E) < 1$ b. $P(E) > 1$ c. $P(E) < 0$ d. $0 \leq P(E) \leq 1$

11. If the system of equations $Kx-5y=2$, $6x+2y=7$ has no solution, then K = _____.

- a. -10 b. -5 c. -6 d. -15
12. If the equation $x^2+4x+k=0$ has real and distinct roots then
a. $K < 4$ b. $K > 4$ c. $K \geq 4$ d. $K \leq 4$
13. If a pair of linear equations in two variables is consistent, then the lines represented by two equations are _____.
a. intersecting b. parallel
c. always coincident d. intersecting or coincident
14. The distance of the point (4,7) from the x axis is _____.
a. 4 b. 7 c. 11 d. $\sqrt{65}$
15. $\triangle ABC \sim \triangle DEF$, If $BC = 3cm$, $EF=4cm$ and $ar(\triangle ABC) = 54cm^2$, then $ar(\triangle DEF) = \underline{\hspace{2cm}}$.
a. $108cm^2$ b. $96cm^2$ c. $48cm^2$ d. $100cm^2$
16. If $P(E) = 0.05$, then $P(\text{not } E) = \underline{\hspace{2cm}}$.
a. -0.05 b. 0.5 c. 0.9 d. 0.95
17. In a single throw of a die, the probability of getting a multiple of 3 is _____.
a. $\frac{1}{2}$ b. $\frac{1}{3}$ c. $\frac{1}{6}$ d. $\frac{2}{3}$
18. The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is _____.
a. 45° b. 30° c. 60° d. 90°
19. A ladder makes an angle of 60° with the ground when placed against a wall. If the foot of the ladder is 2m away from the wall, then the length of the ladder (in metres) is _____.
a. $\frac{4}{\sqrt{3}}$ b. $4\sqrt{3}$ c. $2\sqrt{2}$ d. 4

20. In a right circular cone, the cross-section made by a plane parallel to the base is a _____.

- a. Circle b. Frustum of a cone c. Sphere d. Hemisphere.

II. Answer the following :

$$6 \times 2 = 12$$

21. Two cubes each of volume 27cm^3 are joined end to end to form a solid. Find the surface area of the resulting cuboid.

22. Solve for: $x: \frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6} \quad x \neq 3, -5$

23. Find the altitude of an equilateral triangle when each of its side is 'a' cm.

24. Three consecutive natural numbers are such that the square of the middle number exceeds the difference of the squares of the other two by 60. Find the numbers.

25. If the mid point of the line segment joining $A \left[\frac{x}{2}, \frac{y+1}{2} \right]$ and

$B(x+1, y-3)$ is $C(5, -2)$. Find x and y .

26. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting neither a red card nor a queen.

III. Answer the following:

$$8 \times 3 = 24$$

27. In ΔABC , $DE \parallel BC$. If $AD = x + 2$, $DB = 3x + 16$, $AE = x$ and $EC = 3x + 5$ then find x .

28. Prove that: $\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{1 - 2\cos^2 A}$

29. If S_n denotes the sum of first n terms of an AP.

Prove that $S_{12} = 3(S_8 - S_4)$.

30. From a pack of 52 playing cards Jacks, Queens and Kings of red colour are removed from the remaining, a card is drawn at random. Find the probability that drawn card is:

- (i) a black king
(ii) a card of red colour
(iii) a card of black colour

31. A solid metallic cone of radius 2cm and height 8cm is melted into a sphere. Find the radius of the sphere.

32. Calculate the mean of the following frequency distribution.

Class	10-30	30-50	50-70	70-90	90-110
Frequency	15	18	25	10	2

33. Simplify: $\frac{\sin \theta \sec(90^\circ - \theta) \tan \theta}{\operatorname{Cosec}(90^\circ - \theta) \cos \theta \cot(90^\circ - \theta)}$

34. Solve for $x: \frac{2}{x+1} + \frac{3}{2(x-2)} = \frac{23}{5x}$, $x \neq 0, -1, 2$

IV. Answer the following:

$$6 \times 4 = 24$$

35. From a point P on the ground the angle of elevation of the top of a tower is 30° and that of the top of a flagstaff on the top of the tower is 60° . If the length of the flagstaff is 5m, find the height of the tower.

36. A drinking glass is in the shape of a frustum of a cone of height 14cm the diameters of its two circular ends are 4cm and 2cm. Find the capacity of the glass.

37. The following distribution gives the daily income of 50 workers of a factory.

Daily Income in (Rs)	No. of workers
100-120	12
120-140	14
140-160	8
160-180	6
180-200	10

Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.

38. If m^{th} term of an A.P is $\frac{1}{n}$ and n^{th} term is $\frac{1}{m}$. Find the sum of first mn terms.

39. State and prove Pythagoras theorem.

40. Prove that $(\operatorname{Cosec} \theta + \cot \theta)^2 = \frac{\sec \theta + 1}{\sec \theta - 1}$