

- Q 1. If $p = \frac{\sqrt{17} + \sqrt{15}}{\sqrt{17} - \sqrt{15}}$ and $q = \frac{1}{p}$, then the value of $3p^2 - 5pq + 3q^2$ is _____
- (A) 3117 (B) 3061 (C) 3177 (D) 2861
 (E) None of these

- Q 2. If $x = p^{\frac{1}{3}} + p^{-\frac{1}{3}}$ and $y = p^{\frac{1}{3}} - p^{-\frac{1}{3}}$, then find the value of
- $$\frac{(x^2 - y^2)^3}{(x^2 + y^2 + xy)(x^2 + y^2 - xy)}$$
- (A) 1 (B) 2 (C) 3 (D) 4
 (E) None of these

- Q 3. If $\sqrt{x} = a^{\frac{1}{3}} + a^{-\frac{1}{3}}$ and $\sqrt{y} = a^{\frac{1}{3}} - a^{-\frac{1}{3}}$, then find the value of $x^2 - y^2$.
- (A) $2(a^{\frac{2}{3}} + a^{-\frac{2}{3}})$ (B) $4(a^{\frac{1}{3}} + a^{-\frac{1}{3}})$
 (C) $8(a^{\frac{2}{3}} + a^{-\frac{2}{3}})$ (D) $16(a^{\frac{1}{3}} + a^{-\frac{1}{3}})$
 (E) None of these

- Q 4. $\frac{\sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{9}}{\sqrt{3}\sqrt{3}\sqrt{3}}$ equals to _____
- (A) $3^{\frac{11}{119}}$ (B) $3^{-\frac{11}{120}}$ (C) $3^{\frac{103}{119}}$ (D) $3^{\frac{105}{119}}$
 (E) None of these

- Q 5. If $a = \sqrt{\frac{\sqrt{3}-1}{\sqrt{3}+1}}$ then find the value of $a + \frac{1}{a}$.
- (A) 6 (B) $\sqrt{3}$ (C) 3 (D) $\sqrt{6}$
 (E) None of these

- Q 6. If $x = 17 + 12\sqrt{2}$ then the value of $x^{\frac{1}{4}} - x^{-\frac{1}{4}}$ is equal to _____
- (A) 0 (B) 1 (C) 2 (D) 3
 (E) None of these

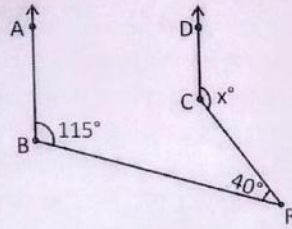
- Q 7. If in a triangle the sum of any two sides exceeds the third side by 8 cm, then its area _____
- (A) is $16\sqrt{3}\text{cm}^2$ (B) is $10\sqrt{3}\text{cm}^2$
 (C) is $9\sqrt{3}\text{cm}^2$ (D) Cannot be determined
 (E) None of these

- Q 8. A cylinder is within the cube touching all the vertical faces. A cone is inside the cylinder. If their heights are same with the same base, then the ratio of their volumes is _____
- (A) 21 : 33 : 11 (B) 42 : 23 : 11
 (C) 42 : 33 : 22 (D) 42 : 33 : 11
 (E) None of these

IX

Q 9.

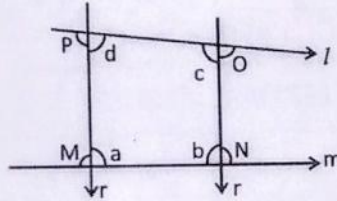
In the following figure, $AB \parallel CD$ and $\angle ABR = 115^\circ$, $\angle BRC = 40^\circ$ and $\angle RCD = x^\circ$. Find the value of x° .



- (A) 140° (B) 25°
 (C) 75° (D) 155°
 (E) None of these

Q 10.

In the given figure, if $a + c = 205^\circ$ and $O = 80^\circ$, also $N = a$, then _____



- (A) $P = 80^\circ$ (B) $M = 105^\circ$
 (C) $\frac{3}{5}(M + c) = 105^\circ$ (D) $N + d = 180^\circ$
 (E) None of these

Q 11.

ABC is a cyclic triangle and the bisectors of $\angle BAC$, $\angle ABC$ and $\angle BCA$ meet the circle at P, Q and R respectively. Then the angle $\angle RQP$ is _____

- (A) $90^\circ + \frac{C}{2}$ (B) $90^\circ - \frac{A}{2}$ (C) $90^\circ + \frac{B}{2}$ (D) $90^\circ - \frac{B}{2}$
 (E) None of these

Q 12.

A sphere is placed inside a right circular cylinder so as to touch the top, base and lateral surface of the cylinder. If the radius of the sphere is 7 cm, then the volume of the cylinder is _____

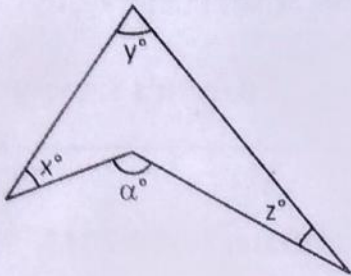
- (A) 308 cm^3 (B) 1156 cm^3
 (C) 2156 cm^3 (D) 368 cm^3
 (E) None of these

Q 13.

A square of side 'a' cm is cut from each corner of a square sheet of side 12 cm. The remaining sheet is folded to form a cuboid. If the minimum possible volume of the cuboid is M cubic cm and a is an integer, then M is _____

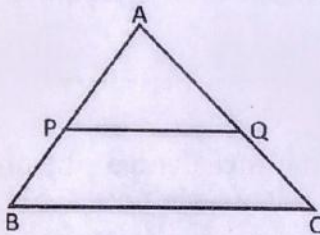
- (A) 20 (B) 64 (C) 32 (D) 16
 (E) None of these

Q14. In the shown figure, the value of α is equal to



- (A) $y + z$ (B) $x + y$ (C) $x + y + z$ (D) $\frac{x + y + z}{2}$
 (E) None of these

Q15. In the shown figure, if $PQ \parallel BC$ and $AP = 5.4$ cm, $AQ = (x + 1)$ cm, $AB = 8.1$ cm and $QC = (x - 1)$ cm, then AC equals to _____



- (A) 12 cm (B) 6 cm (C) 3 cm (D) 4 cm
 (E) None of these

Q16. In a $\triangle ABC$, if $\angle A - \angle B = 35^\circ$ and $\angle C - \angle B = 34^\circ$, then

- (A) $\angle A = 71^\circ$ (B) $\angle B = 72^\circ$
 (C) $\angle A + \angle B = 109^\circ$ (D) $\angle A + \angle C = 142^\circ$
 (E) None of these

Q17. In two triangles ACB and QPR if $AB = QR$, $\angle B = \angle Q$ and $CA = PR$ then _____

- (A) $\triangle ABC \cong \triangle PQR$ (B) $\triangle ACB \cong \triangle RPQ$
 (C) $\triangle BAC \cong \triangle QRP$ (D) $\triangle BAC \cong \triangle QPR$
 (E) None of these

Q18. Two sides of a triangle are of lengths 6.2 cm and 3.5 cm. The length of the third side of the triangle can not be _____

- (A) 9.2 cm (B) 8.5 cm (C) 2.8 cm (D) 2.6 cm
 (E) None of these

- Q19. Ram's income is 20% more than Sunil. How much percent is Sunil's income less than Ram's?
- (A) $8\frac{2}{3}\%$ (B) $16\frac{2}{3}\%$ (C) 20% (D) 80%
 (E) None of these
- Q20. A person purchased an article and sold it at a loss of 10%. If he had brought it for 20% less and sold it for ₹55 more, he would have made a profit of 40%. The cost price of the article is _____.
- (A) ₹285 (B) ₹240 (C) ₹225 (D) ₹250
 (E) None of these
- Q21. The price of refined oil is raised by 10%. Find out by how much percent a housewife must reduce her consumption of oil so as not to increase her expenditure?
- (A) $7\frac{1}{11}\%$ (B) $9\frac{1}{11}\%$
 (C) $3\frac{1}{8}\%$ (D) $7\frac{1}{8}\%$
 (E) None of these
- Q22. A man covered a distance of 3990 km partly by air, partly by sea and remaining by land. The time spent in air, on sea and on land is in the ratio 1 : 16 : 2 and the ratio of average speeds is 20 : 1 : 3 respectively. If total average speed is 42 km/hr, then the distance covered by sea is _____
- (A) 1602 kms (B) 1520 kms
 (C) 1620 kms (D) 1500 kms
 (E) None of these
- Q23. P is four times as fast as Q and Q is six times as fast as R. If a certain distance is covered by Q in 28 minutes, then the time taken by C to cover the same distance is _____
- (A) 2 : 48 hrs (B) 2 : 28 hrs
 (C) 2 : 50 hrs (D) 2 : 55 hrs
 (E) None of these

Q24. In a quadrilateral with distinct sides, if diagonals AC and BD intersect at right angle, then which of the following is true?

- (A) $AB^2 + BC^2 = CD^2 + DA^2$ (B) $AB^2 + CD^2 = BC^2 + DA^2$
(C) $AB^2 + AD^2 = BC^2 + CD^2$ (D) $AB^2 + BC^2 = 2(CD^2 + DA)^2$
(E) None of these

Q25. On which dates of April, 2001, did Wednesday fall?

- (A) 1st, 8th, 15th, 22nd, 29th (B) 2nd, 9th, 16th, 23rd, 30th
(C) 3rd, 10th, 17th, 24th (D) 4th, 11th, 18th, 25th
(E) None of these

Q26. If $\log_a(ab) = x$, then $\log_b(ab)$ is:

- (A) $\frac{1}{x}$ (B) $\frac{x}{x+1}$ (C) $\frac{x}{1-x}$ (D) $\frac{x}{x-1}$
(E) None of these

Q27. Which of the following quantity is an integer?

- (A) $[(\sqrt{2} + \sqrt{3})/(\sqrt{3} - \sqrt{2})] + \sqrt{6}$ (B) $[(\sqrt{2} + \sqrt{3})/(\sqrt{3} - \sqrt{2})] + 2\sqrt{6}$
(C) $[(\sqrt{2} + \sqrt{3})/(\sqrt{2} - \sqrt{3})] + 2\sqrt{6}$ (D) $[(\sqrt{2} + \sqrt{3})/(\sqrt{2} - \sqrt{3})] + \sqrt{6}$
(E) None of these

Q28. If the mean of 6 observations $x, x + 3, x + 6, x + 9, x + 12, x + 15$ is 18. Find the mean of first 4 observations.

- (A) 45 (B) 36 (C) 25 (D) 15
(E) None of these

Q29. A tent of height 77 dm is in the form of a right circular cylinder of diameter 36 m and height 44 dm surmounted by a right circular cone. Find the cost

of the canvas at ₹ 3.50 per m^2 . (Use $\pi = \frac{22}{7}$).

- (A) ₹ 5965.80 (B) ₹ 6365.80 (C) ₹ 6965.80 (D) ₹ 5365.80
(E) None of these

Q 30. If $a(x) = 6x^4 - 3x^2 - 7x + 4$ and $b(y) = 2y^4 - 3y^3 - 6y + 3$, then find the value of $\left[\frac{5}{2} \cdot a(2) + \frac{7}{3} \cdot b(3)\right]$.

- (A) 739 (B) 593 (C) 469 (D) 339
(E) None of these

Q 31. If $x = \frac{5 - \sqrt{21}}{2}$, then find the value of $\left(x^3 + \frac{1}{x^3}\right) - 5\left(x^2 + \frac{1}{x^2}\right) + \left(x + \frac{1}{x}\right)$.

- (A) 1 (B) 110 (C) 23 (D) 0
(E) None of these

Q 32. If $\frac{4}{2 + \sqrt{3} + \sqrt{7}} = \sqrt{a} + \sqrt{b} - \sqrt{c}$, then:

- (A) $a = 1, b = \frac{4}{3}, c = \frac{7}{3}$ (B) $a = 1, b = \frac{2}{3}, c = \frac{7}{9}$
(C) $a = \frac{2}{3}, b = 1, c = \frac{7}{3}$ (D) $a = 7, b = \frac{4}{3}, c = \frac{3}{7}$
(E) None of these

Q 33. The height of right circular cone is 20 cm and the radius of its base is 4.5 cm. It is cut off through the mid-point of its height parallel to the base. Find the ratio of the volume of the upper part to that of the lower part.

- (A) 3 : 7 (B) 7 : 3 (C) 7 : 1 (D) 1 : 7
(E) None of these

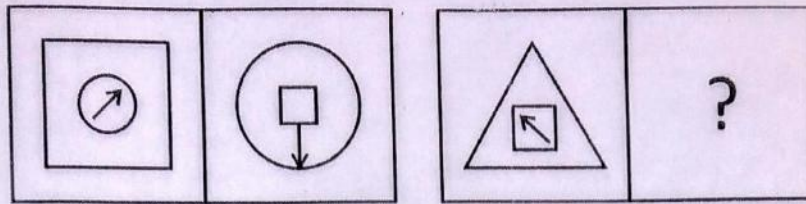
Q 34. The area bounded by y-axis, $2x + 3y = 12$ and $x - y = 1$ is....

- (A) 7.5 square unit (B) 13.5 square unit
(C) 4.5 square unit (D) 75 square unit
(E) None of these

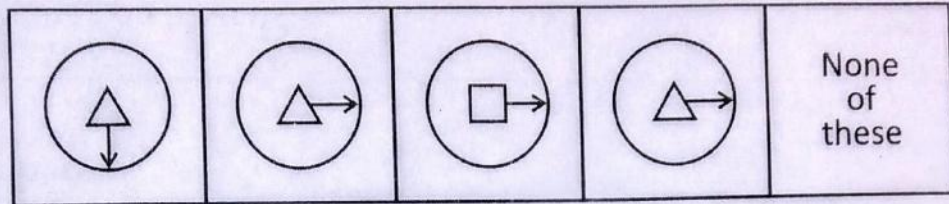
Q 35. A square of side a cm is cut from each corner of a square sheet of side 12 cm. The remaining sheet is folded to form a cuboid. If the minimum possible volume of the cuboid is M cubic cm & a is an integer, then M is

- (A) 20 (B) 64 (C) 32 (D) 16
(E) None of these

Q 36. Problem figures:



Answer figures:



(A)

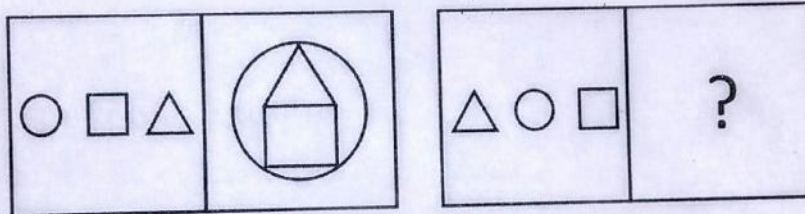
(B)

(C)

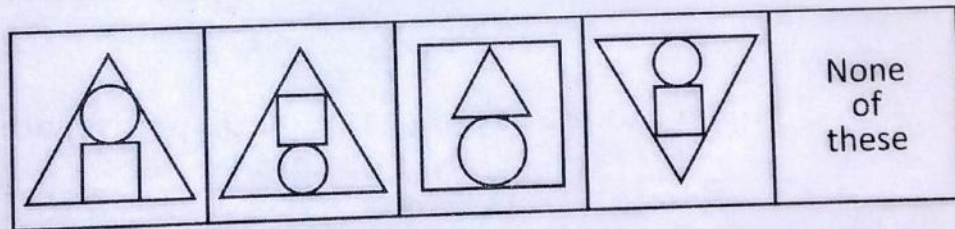
(D)

(E)

Q 37. Problem figures:



Answer figures:



(A)

(B)

(C)

(D)

(E)

Q 38. Problem figures:

