Q1. If the sum of the diameters of two circles is 40 cm and the difference of their radii is 6 cm, then the ratio of the area of the smaller circle to that of the bigger circle is:
(a) 49:16
(b) 49:169
(c) 169:49
(d) 1:4

Q2. Find the angle of elevation of the Sun when the length of the shadow of a pole is $\sqrt{3}$ times the height of the pole.
(a) 30°

(b) 45°
(c) 60°

(d) 90°

Q3. The speed of stream is 4/5 of the speed of a boat in still water. If the boat covers 198 km in 11 hours in downstream, then find the difference of time taken by boat to cover 60 km in upstream and 36 km downstream.
(a) 24 h
(b) 26 h
(c) 28 h
(d) 20 h
Q4. Match the following columns

Column – I	Column – II
(A) Volume of cone is	I. $\frac{4}{3}\pi r^3$
(B) Curved surface area of cylinder is	II. $\frac{1}{3}\pi r^2 h$
(C) Total surface area of cone	III. $2\pi rh$
(D) Volume of sphere is	IV. $\pi r(l + r)$

Choose the correct option from the following:

(a) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(b) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(c) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(d) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

Q5. If 40 boys can do a piece of work in 18 days working 6 hours per day, how many more boys are required to do the same work in 12 days working 4 hours per day?

(a) 50

(b) 56

(c) 40

(d) 45

Q6. Two different dice are tossed together. Find the probability that the product of the number on the top of the dice is 6.

(a) $\frac{1}{4}$
(b) $\frac{1}{6}$
(c) $\frac{3}{4}$
(d) $\frac{1}{9}$

Q7. If the volume of a cube is 64 cm^3, then the diagonal of cube is
(a) 4 cm
(b) $4\sqrt{3}$ cm
(c) $\sqrt{3}$ cm
(d) $\frac{1}{\sqrt{3}}$ cm

Q8. The price of a refrigerator is Rs 22,000. A shopkeeper marks its price 15% above its cost price and gives a discount of 8%. The discount is

(a) Rs.3214

(b) Rs. 3035

(c) Rs. 2024

(d) Rs. 3024

Q9. A class of 25 students took an English test. 15 students had an average score of 80. The other students had an average score of 60. What is the average score of the whole class?

(a) 62

(b) 72

(c) 65

(d) 75

Q10. If a solid sphere of radius 20 cm is moulded into 8 solid spherical balls of equal radius, then the radius of each ball will be:

(a) 10cm

(b) 12cm

(c) 5cm

(d) 15cm

Solutions:

S1. Ans. (c)

Sol. Let, $r_1, d_1 \; and \; A_1$ be the radius, diameter and Area of bigger circle respectively.
Similarly, $r_2, d_2 \; and \; A_2$ be the radius, diameter and Area of smaller circle respectively.
Given,
$d_1 + d_2 = 40$
As we know, d = 2r then above equation become,

$r_1 + r_2 = 20$ ....(1)
Also given,
$r_1 - r_2 = 6$ ....(2)
On solving eqn (1) and (2) we get,
$r_1 = 13, r_2 = 7$
Ratio is
$\frac{A_1}{A_2} = \frac{\pi r_1^2}{\pi r_2^2}$
Ratio of area of the smaller circle to that of the bigger circle is
$\frac{\pi(13)^2}{\pi(7)^2} = \frac{169}{49}$
= 169:49
S2. Ans. (a)

Sol. Given

The height of the pole is the opposite side (h),

The length of the shadow is the adjacent side ($\sqrt{3}$h),

The angle of elevation is θ.

Now, we have

$$\tan\theta = \frac{P}{B} = \frac{h}{\sqrt{3}h} = \frac{1}{\sqrt{3}}$$

$$\tan\theta = \frac{1}{\sqrt{3}}$$

$$\theta = 30°$$

The angle of elevation of the Sun is 30°.

S3. Ans. (c)
Sol. Let the speed of the boat in still water = 5s
So, speed of the stream = 4s
ATQ,
(5s +4s) = 198/11
9s = 18
s=2
Required time = $\frac{60}{5s-4s} - \frac{36}{5s+4s} = 30 - 2 = 28$ hours
S4. Ans. (c)

Sol. We have

(A) Volume of cone $= \frac{1}{3}\pi r^2 h$

(B) Curved surface area of cylinder $= 2\pi rh$

(C) Total surface area of cone $= \pi r(l + r)$

(D) Volume of sphere $= \frac{4}{3}\pi r^3$

S5. Ans. (a)

Sol. We have

Total work $= 40 \times 18 \times 6 = 4320$

Let x more boys required

$(x + 40) \times 12 \times 4 = 4320$

$x + 40 = \frac{4320}{48}$

$x + 40 = 90$

$x = 50$

The number of additional boys required is 50.

S6. Ans. (d)
Sol. Product of 6 are {(1, 6), (2, 3), (6, 1), (3, 2)}
No. of possible outcomes $= 4$
Total number of chances $= 6 \times 6 = 36$
P(Product $= 6$)$= \frac{4}{36} = \frac{1}{9}$
S7. Ans. (b)

Sol. The volume of a cube is given by

$V = a^3$

where a is the side length of the cube.

$a^3 = 64\ cm^3$

$a^3 = 4^3$

$a = 4$ cm

The formula for the diagonal of a cube is

Diagonal $= a\sqrt{3}$ cm

$= 4\sqrt{3}$ cm

S8. Ans. (c)

Sol. Cost price of a refrigerator = 22000
MP of the refrigerator = 22000 × (115/100) = 25,300
Discount in price after getting 8% discount = 25300 × (8/100) = Rs. 2,024

S9. Ans. (b)

Sol. Given:

Total students = 25

Group 1: 15 students with an average score of 80

Group 2: 10 students with an average score of 60

$$\text{Average score} = \frac{\sum(\text{Group size} \times \text{average score})}{\text{Total students}}$$

Total sum of scores for each group:

Sum of scores for Group 1 = 15 × 80 = 1200

Sum of scores for Group 2= 10 × 60 = 600

Total sum of all scores = 1200 + 600 = 1800

$$\text{Overall average score} = \frac{1800}{25} = 72$$

Thus, the average score of the whole class is 72.

S10. Ans. (a)

Sol. Given:

Radius of bigger sphere =20cm

Number of smaller sphere = 8

We have

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

When sphere is melted and carved into smaller balls the volume remains same.

Hence

Volume of bigger sphere = n × Volume of smaller ball

ATQ.

$$\frac{4}{3} \times \frac{22}{7} \times 20 \times 20 \times 20 = 8 \times \frac{4}{3} \times \frac{22}{7} \times r^3$$

$$r^3 = 1000$$

$$r = 10cm$$

Thus, the radius of the smaller ball is 10 cm.