TDS TW Mensuration

Topic	Slot A	Slot B	Slot C	Slot D	Slot E	Average
Mensuration	3			15	2	4
TSD	4	8	3	7	5	5
Time & Work	2	3	3	4	5	3
Total	9	11	6	26	12	13

1. A cylindrical water tank has a radius of 3.5 meters and a height of 10 meters. What is the volume of the tank in cubic meters?
A. 385
B. 770
C. 3850
D. 1155
E. 1954

2. A conical tent has a base diameter of 14 meters and a height of 24 meters. What is the volume of the tent in cubic meters?
A. 1232
B. 1540
C. 1231.5
D. 2463
E. 1954

3. What is the surface area of a sphere with radius 7 cm?
A. 616 cm^2
B. 308 cm^2
C. 1232 cm^2
D. 154 cm^2
E. 254 cm^2

4. A cube has an edge of 6 cm. What is the total surface area of the cube?
A. 216 cm^2
B. 144 cm^2
C. 96 cm^2
D. 36 cm^2
E. 72 cm^2

5. A train 120 meters long is running at a speed of 54 km/h. How much time will it take to cross a platform 180 meters long?

A. 12 seconds
B. 18 seconds
C. 20 seconds
D. 24 seconds
E. 30 seconds

6. In a 100-meter race, A gives B a start of 10 meters and still beats him by 5 meters. What is the ratio of their speeds (A:B)?

A. 10:9
B. 20:19
C. 19:18
D. 21:19
E. 15:13

7. Two cars start from two towns 300 km apart and move towards each other. Car A moves at 60 km/h and Car B at 90 km/h. How long will they take to meet?

A. 1.5 hours
B. 2 hours
C. 2.5 hours
D. 3 hours
E. 3.5 hours

8. A boat takes 3 hours to go 36 km downstream and 6 hours to return upstream. What is the speed of the boat in still water?

A. 6 km/h
B. 8 km/h
C. 10 km/h
D. 12 km/h
E. 14 km/h

9. A person walks from A to B at 4 km/h and returns at 6 km/h. What is his average speed for the entire journey?

A. 4.8 km/h
B. 5 km/h
C. 5.2 km/h
D. 5.5 km/h
E. 5.8 km/h

10. A project is scheduled to be completed in 60 days using 40 workers. After 24 days, only 40% of the work is finished. How many additional workers must be employed to finish the work on time?

A. 5
B. 10
C. 15
D. 0
E. 20

11. Two pipes, A and B, can fill a tank in 24 minutes and 36 minutes respectively. A third pipe C can empty the full tank in 18 minutes. If all three pipes are opened together, how long will it take to fill the tank?

A. 36 minutes
B. 48 minutes
C. 72 minutes

D. 60 minutes
E. 90 minute

12. A, B, and C can complete a task in 12, 15, and 20 days respectively. They begin together, but A leaves the work 4 days before completion. In how many days is the work completed?

A. 6 days
B. 6.5 days
C. 6.67 days
D. 7 days
E. 7.5 days

Question 1: Volume of a Cylinder

Given:

- Radius r=3.5r = 3.5r=3.5 m
- Height h=10h = 10h=10 m
- Volume of a cylinder = πr2h\pi r^2 hπr2h

Volume=227×3.52×10=227×12.25×10=22×1.75×10=385 m3\text{Volume} = \frac{22}{7} \times 3.5^2 \times 10 = \frac{22}{7} \times 12.25 \times 10 = 22 \times 1.75 \times 10 = 385 \, \text{m}^3Volume=722×3.52×10=722 ×12.25×10=22×1.75×10=385m3

Answer: A. 385

Question 2: Volume of a Cone

Given:

- Diameter = 14 m → Radius r=7r = 7r=7 m
- Height h=24h = 24h=24 m
- Volume of a cone = 13πr2h\frac{1}{3} \pi r^2 h31πr2h

Volume=13×227×72×24=13×227×49×24\text{Volume} = \frac{1}{3} \times \frac{22}{7} \times 7^2 \times 24 = \frac{1}{3} \times \frac{22}{7} \times 49 \times 24Volume=31×722×72×24=31×722×49×24 =13×22×11767=13×3696=1232 m3= \frac{1}{3} \times \frac{22 \times 1176}{7} = \frac{1}{3} \times 3696 = 1232 \, \text{m}^3=31×722×1176=31×3696=1232m3

Answer: A. 1232

Question 3: Surface Area of a Sphere

Given:

- Radius r=7r = 7r=7 cm
- Surface area of a sphere = 4πr24\pi r^24πr2

Surface Area=4×227×72=4×227×49=4×154=616 cm2\text{Surface Area} = 4 \times \frac{22}{7} \times 7^2 = 4 \times \frac{22}{7} \times 49 = 4 \times 154 = 616 \, \text{cm}^2Surface Area=4×722×72=4×722×49=4×154=616cm2

Answer: A. 616 cm²

Question 4: Surface Area of a Cube

Given:

- Side a=6a = 6a=6 cm
- Surface area of a cube = 6a26a^26a2

Surface Area=6×62=6×36=216 cm2\text{Surface Area} = 6 \times 6^2 = 6 \times 36 = 216 \, \text{cm}^2Surface Area=6×62=6×36=216cm2

Answer: A. 216 cm²

Question 1: Train and Platform

Given:

- Train length = 120 m
- Platform length = 180 m
- Speed = 54 km/h = 54×10003600=15\frac{54 \times 1000}{3600} = 15360054×1000=15 m/s
- Total distance = 120 + 180 = 300 m

Time=DistanceSpeed=30015=20 seconds\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{300}{15} = 20 \text{ seconds}Time=SpeedDistance=15300=20 seconds

✅ **Answer: C. 20 seconds**

Question 2: Race

Given:

- A gives B a 10 m start and still beats him by 5 m.
- So, when A runs 100 m, B runs only 85 m.

Ratio of speeds (A:B)=10085=2017\text{Ratio of speeds (A:B)} = \frac{100}{85} = \frac{20}{17}Ratio of speeds (A:B)=85100=1720

✅ **Answer: Not in the given options! Let's correct the options:**

Correct Options:
A. 20:17 ✅
B. 19:18
C. 10:9

D. 21:19
E. 15:13

✅ **Answer: A. 20:17**

Question 3: Two Cars Moving Towards Each Other

Given:

- Distance = 300 km
- Speeds = 60 km/h and 90 km/h
- Relative speed = 60 + 90 = 150 km/h

Time=300150=2 hours\text{Time} = \frac{300}{150} = 2 \text{ hours}Time=150300=2 hours

✅ **Answer: B. 2 hours**

Question 4: Boats and Streams

Given:

- Downstream: 36 km in 3 hours → Speed = 363=12\frac{36}{3} = 12336=12 km/h
- Upstream: 36 km in 6 hours → Speed = 366=6\frac{36}{6} = 6636=6 km/h

Speed in still water=12+62=9 km/h\text{Speed in still water} = \frac{12 + 6}{2} = 9 \text{ km/h}Speed in still water=212+6=9 km/h

✅ **Corrected Options:**
A. 6 km/h
B. 8 km/h
C. 9 km/h ✅
D. 10 km/h
E. 12 km/h

✅ **Answer: C. 9 km/h**

Question 5: (Average Speed)

Given:

- Speed from A to B = 4 km/h
- Speed from B to A = 6 km/h

Average speed=2×4×64+6=4810=4.8 km/h\text{Average speed} = \frac{2 \times 4 \times 6}{4 + 6} = \frac{48}{10} = 4.8 \text{ km/h}Average speed=4+62×4×6=1048=4.8 km/h

✅ **Answer: A. 4.8 km/h**

Question 1: (Mandays – Long Word Problem)

Q. A project is scheduled to be completed in 60 days using 40 workers. After 24 days, only 40% of the work is finished. How many additional workers must be employed to finish the work on time?

Options:
A. 5
B. 10
C. 15
D. 0
E. 20

Solution:
Let the total work = 1 unit (or 100%).
In 24 days, 40% is done, so remaining = 60%.

Work done in 24 days by 40 workers = 40 × 24 = 960 man-days
So, total work = 960 / 0.4 = 2400 man-days

Remaining work = 60% of 2400 = 1440 man-days
Remaining time = 60 - 24 = 36 days

Let **x** = number of **additional workers** hired.
Total workforce = 40 + x
To finish 1440 man-days in 36 days:
(40 + x) × 36 = 1440
⇒ 40 + x = 40
⇒ x = 0

✅ **Answer: D. 0**
Explanation: The progress is exactly on schedule — 40% in 24 days means the work is going at the correct rate. No extra workers are needed.

Question 2: (Pipes and Cisterns)

Q. Two pipes, A and B, can fill a tank in 24 minutes and 36 minutes respectively. A third pipe C can empty the full tank in 18 minutes. If all three pipes are opened together, how long will it take to fill the tank?

Options:
A. 36 minutes
B. 48 minutes
C. 72 minutes

D. 60 minutes
E. 90 minutes

Solution:
Let the tank capacity be **LCM(24, 36, 18) = 72 units**

- Pipe A fills 72/24 = 3 units/min
- Pipe B fills 72/36 = 2 units/min
- Pipe C **empties** 72/18 = 4 units/min

Net inflow = 3 + 2 - 4 = 1 unit/min
Time to fill the tank = 72 / 1 = **72 minutes**

✅ **Answer: C. 72 minutes**
Explanation: The combined effect of both inlets and outlet gives a net 1 unit per minute, so full tank = 72 minutes.

Question 3: (A, B, and C Working Together)

Q. A, B, and C can complete a task in 12, 15, and 20 days respectively. They start working together, but A leaves 4 days before the work is completed. In how many days is the entire work completed?

Options:
A. 6 days
B. 6.5 days
C. 6.67 days
D. 7 days
E. 7.5 days

Solution:
Let total work = LCM(12, 15, 20) = **60 units**

Rates:

- A = 60 / 12 = 5 units/day
- B = 60 / 15 = 4 units/day
- C = 60 / 20 = 3 units/day

Let total time = **x** days
⇒ A worked for (x - 4) days, B and C worked for x days

Total work = A's work + B's work + C's work
⇒ 5(x - 4) + 4x + 3x = 60
⇒ 5x - 20 + 7x = 60
⇒ 12x = 80
⇒ x = 80 / 12 = **6.67 days**

✅ **Answer: C. 6.67 days**

Explanation: A worked less than B and C, but the combined efforts complete the work just under 7 days — **6 days and 8 hours**.