**Quiz Date: 25$^{th}$ March 2020**

**Directions (1–5) :** Solve the following questions and choose the appropriate options as answer.
(a) Quantity 1 > Quantity 2
(b) Quantity 1 < Quantity 2
(c) Quantity 1 ≥ Quantity 2
(d) Quantity 1 ≤ Quantity 2
(e) No relation or Quantity 1 = Quantity 2

Q1. **Quantity 1 —** value of $x$ such that 12% of 75% of $x$ is greater than 5% of $x$ by 75.
**Quantity 2 —** litres of a 30% alcohol solution that should be added to 40 litres of a 60% alcohol solution to prepare a 50% solution.

Q2. **Quantity 1 —** Teacher's age which, when included with a group of 36 students having average age 14 yrs, increases the average by 1.
**Quantity 2 —** Teacher's age which, when excluded from a group of 24 students, reduces the average age of 16 yrs by 1.

Q3.     **Quantity I —** 'a': Ratio of efficiency of X, Y and Z is 3 : 2 : 1. X and Z together can complete the work in 15 days. X and Y started a work together and after 9 days, both left the work and remaining work is completed by Z in 'a' days.
**Quantity II —** 'b': Ratio of efficiency of X, Y and Z is 3 : 2 : 1. Y alone can complete the work in 15 days. X, Y and Z started the work alternatively starting from X . 'b' is the number of days in which the work is completed.

Q4. **Quantity 1 —** Total distance travelled by a man who travels equal distances with speeds of 3 km/hr, 4 km/hr and 5 km/hr and takes a total time of 47 minutes.
**Quantity 2 —** Distance travelled by each of A and B when A and B travel the same distance at 9 km/hr and 10 km/hr respectively and A takes 20 minutes longer than B.

Q5. **Quantity 1 —** Number of spherical balls that can be made by melting of a cylinder 28 cm high and with base radius 6 cm, each ball being 1.5 cm in diameter ?
**Quantity 2 —** value of $x$. A cube of 384 cm² surface area is melted to make $x$ number of small cubes each of 96 mm² surface area.

**Directions (6-10):** In each of these questions, two equations I and II are given. You have to solve both the equations and give answer
(a) if $x > y$
(b) if $x \geq y$
(c) if $x < y$
(d) if $x \leq y$
(e) if $x = y$ or no relation can be established between $x$ and $y$

Q6.  **I.** $(289)^{\frac{1}{2}} x - (324)^{\frac{1}{2}} = 203$
**II.** $\left(484\right)^{\frac{1}{2}} y - \left(225\right)^{\frac{1}{2}} = 183$

Q7.  **I.** 7x + 3y = 77

    **II.** 2x + 5y = $(2601)^{\frac{1}{2}}$

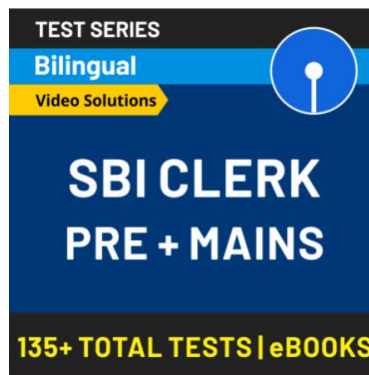Q8.  **I.** $3x^2 - (6 + \sqrt{17})x + 2\sqrt{17} = 0$
    **II.** $10y^2 - (18 + 5\sqrt{17})y + 9\sqrt{17} = 0$

Q9.  **I.** $3x^2 - 23x + 40 = 0$
    **II.** $2y^2 - 23y + 66 = 0$

Q10. **I.** $3x^2 - 4x - 32 = 0$
    **II.** $2y^2 - 17y + 36 = 0$



Q11. A train driver leaves Gorakhpur at 6 : 30 am and expects to reach at place 600 km from Gorakhpur at 2 : 30 pm. At 12:30 pm he finds that he has covered only 40% of the distance. By how much he has to increase the speed of the train in order to reach at scheduled time ?
(a) 180 km/hr
(b) 120 km/hr
(c) 150 km/hr
(d) 100 km/hr
(e) None of these

Q12. Train A with speed 60 km/h started from point P to Q and after one hour, another train B with speed 90 km/h also started from point P for Q. Train B meet train A at point R. 10 hours after crossing train A, train B reached Q and started its return journey from Q to P without any delay. This time, both the trains crossed each other at point S. What is the distance between point R and S?
(a) 780 km
(b) 660 km
(c) 600 km
(d) 720 km
(e) None of these

Q13. A train after 3 hours from starting meets with an accident which detains it from an hour. After this the train proceeds at 75% of its former speed and arrives 4 hours late. Had the

accident happened 150 km farther along the line, it would have arrived only $3\frac{1}{2}$ hours late if it travelled with 75% of its natural speed. Find natural speed of the train and total distance of journey?
(a) 100 km/hr, 1500 km
(b) 200 km/hr, 1200 km
(c) 100 km/hr, 1200 km
(d) 150 km/hr, 1200 km
(e) None of these

Q14. The ratio of time taken by boat A to cover a certain distance in upstream to time taken by boat B to cover same distance in downstream in same river is 7 : 4 respectively. The time taken by boat A to cover another distance in upstream is 75% more than the time taken by it to cover that distance in downstream in the same river. Find speed of boat B in still water is what percent of speed of boat A in still water?
(a) 150%
(b) 120%
(c) 125%
(d) 80%
(e) 100%

Q15. The distance between two stations A and B is 900 km. A train starts from A and moves towards B at an average speed of 30 km/hr. Another train starts from B, 20 minutes earlier than the train at A, and moves towards A at an average speed of 40 km/hr. How far from A will the two trains meet ?
(a) 380 km
(b) 320 km
(c) 240 km
(d) 330 km
(e) None of these

## Solutions

S1. Ans.(a)
Sol.
**Quantity 1-**
$$\frac{12}{100} \times \frac{75}{100} \times x = \frac{5}{100} \times x + 75$$
$$\Rightarrow \frac{4}{100} \times x = 75$$
$$\Rightarrow x = 1875$$
**Quantity 2 –**

30%          60%

50%

x          40

$$\frac{10}{20} = \frac{x}{40}$$

⇒ x = 20 ltrs.

S2. Ans.(a)
Sol.
**Quantity 1-**
Let age of teacher be x
$$\frac{36 \times 14 + x}{37} = 15$$
$$\Rightarrow x = 51$$
**Quantity 2-**
Let age of teacher be x
$$\frac{25 \times 16 - x}{24} = 15$$
$$\Rightarrow x = 40$$

S3. Ans.(e)
Sol.
**Quantity I**
Ratio of time to complete the work $= \frac{6}{3} : \frac{6}{2} : \frac{6}{1}$
= 2 : 3 : 6
Let X, Y and Z complete the work in 2x, 3x and 6x days respectively.
ATQ,
$$\frac{15}{2x} + \frac{15}{6x} = 1$$
⇒ x = 10
ATQ,
$$\frac{9}{20} + \frac{9}{30} + \frac{a}{60} = 1$$
$$\frac{a}{60} = 1 - \frac{27+18}{60}$$
a = 60 – 27 – 18 = 15 days.

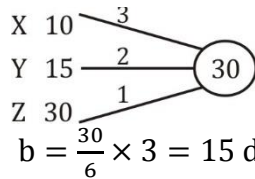**Quantity II:**
Ratio of time to complete the work = 2 : 3 : 6
3 → 15
⇒ X, Y and Z take 10, 15 and 30 days to complete the work.
ATQ

X  10 —3
Y  15 —2— 30
Z  30 —1

$b = \frac{30}{6} \times 3 = 15$ days

a=b

**Quantity I = Quantity II**

S4. Ans.(b)
Sol.
**Quantity 1**
let total distance traveled be 3x km.
ATQ
$\frac{x}{3} + \frac{x}{4} + \frac{x}{5} = \frac{47}{60}$
$\Rightarrow \frac{47x}{60} = \frac{47}{60}$
⇒ x = 1 km
Total distance, 3x = 3 km
**Quantity 2**
let the distance be x km.
ATQ
$\frac{x}{9} - \frac{x}{10} = \frac{20}{60}$
⇒ x = 30 km

S5. Ans.(b)
Sol.
**Quantity 1**
let number of spherical balls be x.
ATQ
$x \times \frac{4}{3}\pi \times \left(\frac{1.5}{2}\right)^3 = \pi \times 6 \times 6 \times 28$
$\Rightarrow x = \frac{6\times6\times28\times3\times8\times10\times10\times10}{4\times15\times15\times15}$
⇒ x = 1792
**Quantity 2**
Let side of large cube be a cm

$384 = 6a^2$

$\Rightarrow a^2 = 64$

$\Rightarrow a = 8$ cm

Let side of small cube be b mm

$96 = 6b^2$

$\Rightarrow 16 = b^2$

$\Rightarrow b = 4$ mm $= 0.4$ cm

Let total number of small cubes be x.

$8^3 = x \times (0.4)^3$

$\Rightarrow 512 = \frac{x \times 2 \times 2 \times 2}{5 \times 5 \times 5}$

$\Rightarrow x = 8000$

S6. Ans.(a)

Sol.

**I.** 17x – 18 = 203

17x = 221

$\therefore x = \frac{221}{17} = 13$

**II.** 22y – 15 = 183

22y = 198

y = 9

$\therefore x > y$

S7. Ans.(a)

Sol.

I. 7x + 3y = 77          …(i)

II. 2x + 5y = 51               ….(ii)

Multiplying equation (i) by 5 and (ii) by 3 and solving

We get,

x = 8, y = 7

$\therefore x > y$

S8. Ans.(e)

Sol.

I. $3x^2 - 6x – \sqrt{17}\, x + 2\sqrt{17} = 0$

$3x(x – 2) - \sqrt{17}(x − 2) = 0$

$x = 2$ or $\frac{\sqrt{17}}{3}$

II. $10y^2 - 18y - 5\sqrt{17}y + 9\sqrt{17} = 0$

$2y (5y – 9) − \sqrt{17} (5y – 9) = 0$

$y = \frac{9}{5}$ or $\frac{\sqrt{17}}{2}$

$\therefore$ No relation

S9. Ans.(c)

Sol.

I. $3x^2 - 23x + 40 = 0$
$3x^2 - 15x - 8x + 40 = 0$
$3x(x - 5) - 8 (x - 5) = 0$
x = 5 or $\frac{8}{3}$
II. $2y^2 - 23y + 66 = 0$
$2y^2 - 12y - 11y + 66 = 0$
$2y(y - 6) - 11(y - 6) = 0$
y = 6 or $\frac{11}{2}$
∴ x < y

S10. Ans.(d)
Sol.
I. $3x^2 - 4x - 32 = 0$
$3x^2 - 12x + 8x - 32 = 0$
$3x(x - 4) + 8 (x- 4) = 0$
x = 4 or -8/3
II. $2y^2 - 17y + 36 = 0$
$2y^2 - 9y - 8y + 36 = 0$
$y(2y - 9) -4 (2y - 9) = 0$
y= 4 or 9/2
∴ y ≥ x



S11. Ans.(e)
Sol.
Distance covered by train between 6 : 30 am and 12: 30 pm
$= \frac{40}{100} \times 600 = 240$ km
Now remaining 360 km distance to be covered in 2 hours.
So, required speed $= \frac{360}{2}$
$= \frac{180}{2}$
$= 180$ km/hr
∴ Required increment in speed = 180 – 40 = 140 km/hr

S12. Ans.(d)
Sol.
Let, train B crossed train A in x hours.
Train B started one hour later than train A.
According to the question,
60 × (x + 1) = 90 × x
⟹ x = 2 hours
Distance between point P and R
= Distance travelled by train B in 2 hours
= 90 × 2
= 180 km
Distance between train B and A when train B reached Q
= 10 × 90 – 10 × 60 = 900 – 600 = 300 km
Let train B met train A second time y hours after starting from Q
Both the trains together travelled a total distance of 300 km in y hours before crossing each other.
90y + 60y = 300
⟹ 150y = 300
⟹ y = 2 hours
Distance between R and S
= Distance travelled by train A in (10+2) hours
= 60 × 12
= 720 km

S13. Ans.(c)
Sol. Let original speed of train is x km/hr.
Then reduced speed $= \frac{3}{4}x$ km/hr
Now according to question ⟹
$\frac{150}{\frac{3}{4}x} - \frac{150}{x} = 4 - 3\frac{1}{2}$
⟹ $x = 100$ km/hr
Now assume train takes 't' hour to coves remaining distance after meeting accident then
100t = 75(t + 3)
t = 9 hours
Total time of journey at normal speed=9+3=12 hours
Then total distance of journey = 100 × (9 + 3)
= 1200 km.

S14. Ans.(e)
Sol.
Let total distance be D km.
And, speed of boat A in still water be x km/hr
Speed of boat B in still water be y km/hr
Speed of stream be r km/hr
ATQ -

$\frac{D}{x-r} : \frac{D}{y+r} = \frac{7}{4}$

Or, $\frac{y+r}{x-r} = \frac{7}{4}$ ... ... ... ... ...(i)

Also, for another distance $D_1$,

$\frac{D_1}{x-r} = \frac{7}{4}\left(\frac{D_1}{x+r}\right)$

or, $4x + 4r = 7x - 7r$

or, $3x = 11r$ ... ... ... ... $(ii)$

From (i) and (ii)

$\frac{y+r}{\frac{11r}{3}-r} = \frac{7}{4}$

$3y = 11r$ ... ... ... ... ... $(iii)$

From $(ii)$ & $(iii)$,

Required percentage= 100%

S15. Ans.(a)

Sol. Distance covered by 2ⁿᵈ train in 20 minutes $= \frac{20}{60} \times 40 = \frac{40}{3}$ km

Remaining distance $= 900 - \frac{40}{3} = \frac{2660}{3}$ km

Time after which they will meet $= \frac{\frac{2660}{3}}{70}$ hours

Distance covered by A in this time $= \frac{2660}{210} \times 30 = 380$ km

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