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**CLASS TEST
2019-20**

**CIVIL
ENGINEERING**

Subject : Reasoning & Aptitude

Date of test : 23/02/2019

Answer Key

- | | | | | |
|--------|---------|---------|---------|---------|
| 1. (b) | 7. (b) | 13. (c) | 19. (b) | 25. (c) |
| 2. (c) | 8. (d) | 14. (b) | 20. (b) | 26. (b) |
| 3. (d) | 9. (c) | 15. (a) | 21. (d) | 27. (c) |
| 4. (d) | 10. (c) | 16. (b) | 22. (b) | 28. (c) |
| 5. (a) | 11. (d) | 17. (c) | 23. (d) | 29. (c) |
| 6. (c) | 12. (a) | 18. (a) | 24. (c) | 30. (b) |

Detailed Explanations

1. (b)

Total time = 15 min + 30 min + 120 min = 2 hour 45 min.

Total distance travelled in 2 hour 45 minutes

$$= \frac{15}{60} \times 30 + \frac{30}{60} \times 60 + 90 \times 2$$

$$= 217.5 \text{ km}$$

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$= \frac{217.5}{2.75} = 79.09 \simeq 79 \text{ km/hr.}$$

2. (c)

Possible prime numbers are 2, 3, 5, 7, 11

(1, 1) (1, 2) (1, 3) (1, 4) (1, 5) (1, 6) (2, 1) (2, 2) (2, 3) (2, 4) (2, 5) (2, 6) (3, 1) (3, 2) (3, 3) (3, 4) (3, 5)
 (3, 6) (4, 1) (4, 2) (4, 3) (4, 4) (4, 5) (4, 6) (5, 1) (5, 2) (5, 3) (5, 4) (5, 5) (5, 6) (6, 1) (6, 2) (6, 3) (6, 4)
 (6, 5) (6, 6)

$$\text{Probability} = \frac{\text{Favourable out comes}}{\text{Total out comes}}$$

$$= \frac{15}{36} = 0.417$$

3. (d)

First odd place can be filled with 3 vowels.

Second odd place can be filled with 2 Vowels.

Third odd place can be filled with 1 vowels.

Similarly even place will be filled by consonants.

$$\frac{3}{\text{odd}} \quad \frac{3}{\text{even}} \quad \frac{2}{\text{odd}} \quad \frac{2}{\text{even}} \quad \frac{1}{\text{odd}} \quad \frac{1}{\text{even}}$$

$$\text{number of ways} = 3 \times 3 \times 2 \times 2 \times 1 \times 1$$

$$= 36 \text{ ways.}$$

4. (d)

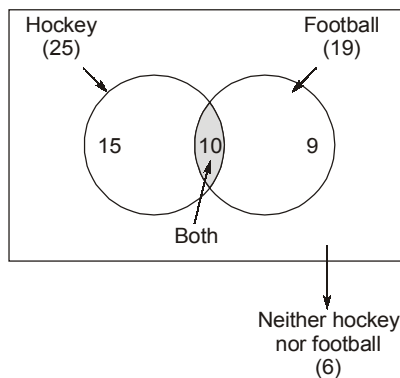
K – 11	U – 21
+ 2	– 2
M – 13	S – 19
+ 3	– 3
P – 16	P – 16
+ 4	– 4
T – 20	L – 12

Similarly

B - 2	L - 12
+ 2	- 2
D - 4	J - 10
+ 3	- 3
G - 7	G - 7
+ 4	- 4
K - 11	C - 3

5. (a)

Refer to venn diagram given below :



6. (c)

$$\frac{M + TUE + W}{3} = 39$$

$$\Rightarrow M + TUE + W = 117 \quad \dots (i)$$

$$\frac{TUE + W + TH}{3} = 41$$

$$\Rightarrow TUE + W + TH = 123 \quad \dots (ii)$$

From Equation (ii) – Equation (i)

$$TH - M = 6$$

also

$$TH = 1.20 M$$

$$1.20 M - M = 6$$

$$.20 M = 6$$

$$M = 30$$

$$TH = 1.20 M$$

$$TH = 1.20 \times 30 = 36^\circ C$$

7. (b)

4 and 1 added is becoming zero means. The given data are added on base 5.

$$\therefore (132)_5 + (333)_5 = (1020)_5$$

8. (d)

Per day work of 1 skilled worker

$$= \frac{1}{20 \times 5} = \frac{1}{100}$$

Per day work of 1 semi-skilled worker

$$= \frac{1}{8 \times 25} = \frac{1}{200}$$

Per day work of 1 unskilled work

$$= \frac{1}{10 \times 30} = \frac{1}{300}$$

Thus total per day work of 2 skilled, 6 semiskilled and 5 unskilled workers.

$$= \frac{2}{100} + \frac{6}{200} + \frac{5}{300} = \frac{12 + 18 + 10}{600}$$

$$= \frac{40}{600} = \frac{1}{15}$$

Thus time to complete the work is 15 days.

9. (c)

The pure milk is 100% concentration net concentration of milk

$$= \frac{8 \times 100 + 5 \times 80}{8 + 5} = 92.30\%$$

10. (c)

New price must be increased by

$$\left[\frac{20}{100 - 20} \times 100 \right] \% = 25\%$$

11. (d)

Younger son gets

$$3600 \times \left[\frac{1}{1 - \frac{5}{11}} \right] \times \frac{5}{11} = ₹ 3000$$

Elder son gets,

$$3000 \times \left[\frac{1}{1 - \frac{5}{11}} \right] = ₹ 5500$$

12. (a)

Here,
So,

$$A + B + C + D = 500$$

$$A + B = 3(C + D)$$

$$4(C + D) = 500$$

$$C + D = 125$$

$$A + B = 375$$

also

$$B = 4C \text{ and } C = 1.5D$$

$$C + D = 125$$

$$2.5D = 125$$

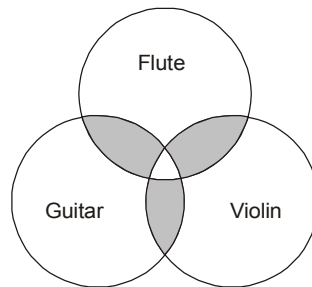
$$D = 50, C = 75$$

$$\therefore B = 300$$

13. (c)

5% can play all three instruments number of musicians who can play all three instruments

$$= 120 \times \frac{5}{100} = 6$$



Musicians who can play any two and only two instruments are 30 (shown by shaded region)
 Musicians that can play violin alone or flute alone = Total musicians – Those who can play guitar alone – Those who can play any two and only two of the instruments – those who can play all three instruments.
 $= 120 - 40 - 30 - 6 = 44$.

14. (b)

Let profit be ₹ X

Partner 1 who invested ₹ 3750 will get

$$= 0.3X + (0.4X) \times \frac{3750}{6300} = 0.5381 X$$

Partner 2 who invested ₹ 2550 will get

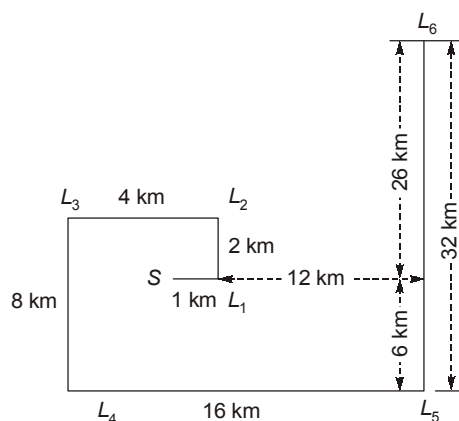
$$= 0.3X + (0.4X) \times \frac{2550}{6300} = 0.4619 X$$

∴ Partner 1 gets ₹1280 more than partner 2

$$0.5381 X = 0.4619 X + 1280$$

$$X = 16797.9$$

15. (a)



16. (b)

All buildings are houses (universal affirmative -A) and 'No house is an apartment' (universal negative -E) lead to universal negative ($A + E = E$) i.e. No building is an apartment i.e. C_2 . No house is an apartment (Universal negative -E) and 'All apartment are flats' (Universal affirmative A) Lead to 0 i.e., particular negative i.e. some flats are NOT house.

17. (c)

$$\text{Ratio} = \frac{19.44}{34.72} = \frac{1944}{3472} = \frac{14}{25}$$

18. (a)

Cost price of mixed salt per kg

$$= \frac{X \times 42 + 25 \times 24}{X + 25} \text{ paise}$$

Market Price of mixed salt per kg = 40 paise

Profit = 25 %

$$= \frac{40 - \frac{42X + 600}{X + 25}}{\frac{42X + 600}{X + 25}} = \frac{1}{4}$$

$$X = 20 \text{ kg}$$

19. (b)

n₂ i.e.

$$8 = 7 \times 1 + 1$$

$$n_3 = 18 = 8 \times 2 + 2$$

$$n_4 = 57 = 18 \times 3 + 3 = 57$$

(required number)

To verify for the remaining numbers,

$$n_5 = n_4 \times 4 + 4 = 57 \times 4 + 4 = 232 \text{ (true)}$$

$$n_6 = n_5 \times 5 + 5 = 232 \times 5 + 5 = 1165 \text{ (true)}$$

20. (b)

Let us form equations based on the given information. If 'a', 'b', 'c' are the number of marbles in the 3 boxes respectively, we can write

$$a + b + c = 249 \quad \dots \text{(i)}$$

$$5 \times (a - 36) = b + 36 \text{ or } b = 5a - 216 \quad \dots \text{(ii)}$$

$$b - 21 = 1.5 \times (c + 21) \quad \dots \text{(iii)}$$

solving (i), (ii) and (iii)

$$a = 69, b = 129, c = 51$$

To get equal number of marbles in 'A' and 'B', we have to transfer from box 'B' and the number of marbles to be transferred

$$= \frac{129 - 69}{2} = 30$$

21. (d)

$$x^2 - y^2 = 702 \text{ i.e. } (x - y)(x + y) = 702$$

Factorise 702 as $702 = 2 \times 3 \times 3 \times 3 \times 13$. Since x and y are both natural numbers, $(x - y)$ and $(x + y)$ should be both even or both should be odd. In order to get possible value of x and y , we should write 702 as a product of 2 natural numbers which should be alike i.e. both even or both odd. This is NOT possible since 702 has only 1 even factor leading to (d) as the answer.

22. (b)

$$\text{Reduction in expenses on food} = 4.33\% \text{ of } 24\% \text{ i.e. } \frac{13}{3} \% \text{ of } 24\% = .24 \times \frac{13}{3} = 1.04\%$$

Reduction in expenses of clothing = 4% of 9% = $.04 \times 9 = .36\%$

Total reduction = $1.04 + 0.36 = 1.4\%$

Since, the annual income is ₹18,00,000

i.e. ₹1,50,000 per month,

Increase in monthly installment of loan is 1.4 % of 1,50,000 = ₹2100 per month

23. (d)

Let x and y be the time for which tap 'A' and 'B' are opened.

we have $x + y = 90$

$$90x + 60y = 6000$$

Solving (i) and (ii), gives $x = 20$ and $y = 70$

⇒ Difference in the duration for which 'A' and 'B' are opened = $70 - 20 = 50$ min

24. (c)

One a van or a LCV leaves the parking lot, the number of vehicles remaining is 99 and required probability = $30/99$.

25. (c)

Since Rahul leaves half an hour later, Raja would have covered 27 km driving at 54 km/hr. At this instant, Distance between Raja and Rahul = $279 - 27 = 252$ km.

$$\text{Now, Rahul speed} = 54 + \frac{54}{3} = 72 \text{ km/hr}$$

$$\text{effective speed} = 54 + 72 = 126 \text{ km/hr}$$

$$\text{which means they will meet after } \frac{252}{126}$$

$$= 2 \text{ hour}$$

from 7 : 30 AM. during this time Raja covered = $27 + 108 = 135$ km from Delhi.

26. (b)

Fuel consumed per km will be least when mileage (Kilometers per liters) mentioned on 'y' axis of graph will be maximum irrespective of number of kilometers travelled.

From the graph ('y' axis) we can observe that mileage (kilometers per liters) is maximum when vehicle is driven at 45 km per hour. Hence the stretch which 'Q' covered at 45 kmph, mileage was highest and fuel consumption per kilometer was lowest.

27. (c)

$$5 + 55 + 555 + \dots$$

$$= 5[1 + 11 + 111 + \dots]$$

$$= \frac{5}{9}[9 + 99 + 999 + \dots]$$

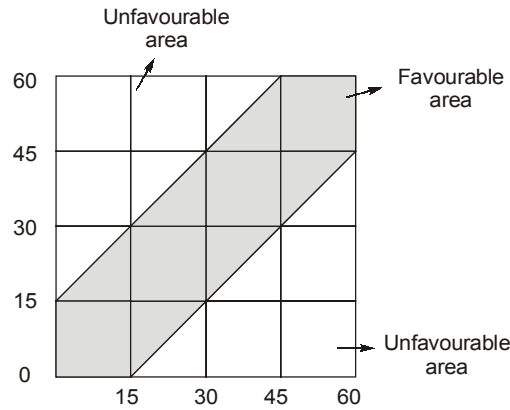
$$= \frac{5}{9}[(10 - 1) + (10^2 - 1) + (10^3 - 1) + \dots]$$

$$= \frac{5}{9}[(10 + 10^2 + 10^3 + \dots - 10^n) - (1 + 1 + 1 + \dots)]$$

$$= \frac{5}{81}[10^{n+1} - 9n - 10]$$

28. (c)

Probability that A of B will meet will be given by the graphical representation where shaded region represents favourable area :



$$\text{Required Probability} = \frac{\text{favourable area}}{\text{total area}} = \frac{7}{16}$$

29. (c)

Let area of triangle PQR be 'A'

$$\frac{SP}{PQ} = \frac{1}{1+3} = \frac{1}{4}$$

$$\frac{QT}{QR} = \frac{2}{2+5} = \frac{2}{7}$$

∴ Area of Δ QTS

$$\begin{aligned} &= \frac{1}{2} \times SQ \times QT = \frac{1}{2} \times \left(\frac{1}{4}PQ\right) \times \left(\frac{2}{7}QR\right) \\ &= \frac{1}{4} \times \frac{2}{7} \times \left(\frac{1}{2} \times PQ \times QR\right) = \frac{1}{14} \times \text{area of } \Delta PQR \end{aligned}$$

given 20 cm²

$$= \frac{1}{14} \times A$$

$$A = 14 \times 20 = 280 \text{ cm}^2.$$

30. (b)

We have :

Items : Shirts Trousers Ties

Number : 3 4 6

So total number of dressing will be

$$3 \times 4 \times 6 = 72 \text{ ways.}$$

