CLASS TEST

S.No. : 01SKCS_ABCDEFGH_120724

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REASONING AND APTITUDE

COMPUTER SCIENCE & IT

Date of Test : 12/07/2024

ANSWER KEY

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

DETAILED EXPLANATIONS

1. (b)

Assume the three number are $a - d$, a and $a + d$, where d is the difference between two consecutive number.

Then,

$$a - d + a + a + d = 15$$
$$3a = 15$$
$$a = 5$$

Also,
$$(5 - d)^2 + 5^2 + (5 + d)^2 = 83$$
$$25 + d^2 - 10d + 25 + 25 + d^2 + 10d = 83$$
$$75 + 2d^2 = 83$$
$$2d^2 = 8$$
$$d = \pm 2$$

Then the possible smallest number $= 5 - 2 = 3$

2. (a)

Assume the current age of Shyam and Kavita are x and y years respectively.

then,
$$\frac{x}{y} = \frac{2}{6}$$
$$\frac{x}{y} = \frac{1}{3} \quad \text{...(i)}$$

5 years after, the ratio of their ages

$$\frac{x+5}{y+5} = \frac{6}{8} = \frac{3}{4}$$
$$4x + 20 = 3y + 15$$
$$3y - 4x = 5$$

From eq. (i),
$$y = 32x$$
$$\therefore \quad 3(3x) - 4x = 5$$
$$5x = 5$$
$$x = 1 \text{ year}, y = 3 \text{ year}$$

After 10 years, the average of their ages

$$= \frac{10 + x + 10 + y}{2}$$
$$= 10 + \frac{x+y}{2} = 10 + \frac{1+3}{2} = 12 \text{ years}$$

3. (a)

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{8+6+40}{\frac{1}{4}+\frac{1}{4}+\frac{1}{4}} = 54 \times \frac{4}{3} = 72 \text{ km/hr}$$

4. (a)

Initial price of a cow and a calf was Rs. 2000 and Rs. 1400.

After increment the price becomes Rs. 2400 and Rs. 1820.

Then the total cost are = 2400 × 12 + 1820 × 24 = Rs. 72,480

5. (c)

$$\text{Side of triangle } ABC = 2 \text{ cm}$$

$$\text{Area of triangle } ABC = \frac{\sqrt{3}}{4}(2)^2 = \sqrt{3} \text{ cm}^2$$

$$\text{Sector Area} = \left[\frac{\theta}{360^\circ} \times \pi(1)^2\right] \times 3 = \frac{60^\circ}{360^\circ} \times \pi(1)^2 \times 3 = \frac{\pi}{2} \text{ cm}^2$$

$$\text{Hence, shaded area} = \left[\sqrt{3} - \frac{\pi}{2}\right] \text{ cm}^2$$

6. (d)

If x is the distance which is travelled by Vikash and S_v and S_w are the speed of Vikash and water stream.

then,
$$\frac{x}{S_v + S_w} = 6 \text{ hr} \quad ...(1)$$

$$\frac{x}{S_v - S_w} = 9 \text{ hr} \quad ...(2)$$

From (1) and (2),

$$\frac{S_v - S_w}{S_v + S_w} = \frac{6}{9} = \frac{2}{3}$$

$$3S_v - 3S_w = 2S_v + 2S_w$$

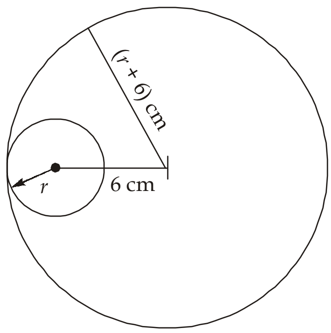
$$S_v = 5S_w$$

$$S_v = 3 \times 5$$

$$S_v = 15 \text{ km/hr}$$

7. (a)

Let r (in cm) is the radius of smaller circle, then the radius of bigger circle will be $(r + 6)$ cm



Hence,
$$\pi(r)^2 + \pi(r+6)^2 = 116\pi$$

$$r^2 + r^2 + 36 + 12r = 116$$

$$2r^2 + 12r = 80$$

$$r^2 + 6r - 40 = 0$$

$$(r + 10)(r - 4) = 0$$

$$r = 4$$

Hence, radius of bigger circle = 4 + 6 = 10 cm

8. (b)

Given:

$$\frac{1}{\log_{xy}^{xyz}} + \frac{1}{\log_{yz}^{xyz}} + \frac{1}{\log_{zx}^{xyz}} = \log_{xyz}^{xy} + \log_{xyz}^{yz} + \log_{xyz}^{zx}$$

$$= \log_{xyz}^{(xy.yz.zx)}$$

$$= \log_{xyz}^{(xyz)^2}$$

$$= 2$$

9. (d)

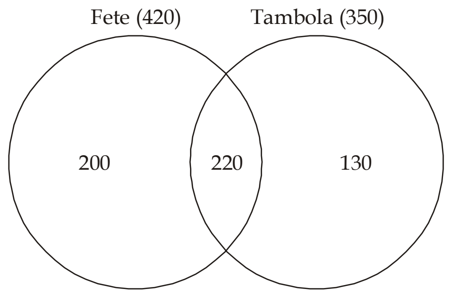
Total percentage of students who will be declared pass

$$= 13 + 12 + 6 + 8 = 39\%$$

Hence, total number of students who will be declared pass

$$= \frac{39}{100} \times 200 = 78$$

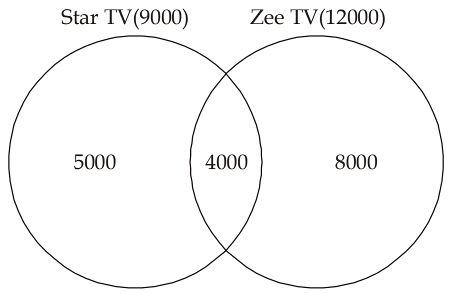
10. (b)



Hence, total number of members that the club have

$$= 200 + 220 + 130 = 550$$

11. (a)



Total number of people whose subscribe atleast one channel

$$= 5000 + 4000 + 8000 = 17000$$

Then, the people who do not subscribe any of the two channel

$$= 20000 - 17000 = 3000$$

12. (c)

The condition for both the roots of the equation $ax^2 + bx + c = 0$ are positive, if

$$\frac{-b}{a} > 0 \text{ and } \frac{c}{a} > 0$$

Given equation $x^2 - 2(k - 1)x + (2k + 1) = 0$ whose roots are positive,

$$\frac{-b}{a} = \frac{2(k-1)}{1} > 0$$

$$k > 1 \quad \text{...(i)}$$

and
$$\frac{c}{a} = \frac{2k+1}{1} > 0$$

$$k > \frac{-1}{2} \quad \text{...(ii)}$$

From (i) and (ii) k > 1

Hence, from options least value of $k = 4$

13. (c)

Let α, β be the roots of the equation, $ax^2 + bx + c = 0$

$$\therefore \quad \text{Sum of roots } (\alpha + \beta) = \frac{-b}{a}$$

$$\text{and product of roots } (\alpha\beta) = \frac{c}{a}$$

By given condition,

$$\alpha + \beta = \alpha^2 + \beta^2$$

$$\alpha + \beta = (\alpha + \beta)^2 - 2\alpha\beta$$

$$\frac{-b}{a} = \left(\frac{-b}{a}\right)^2 - 2\left(\frac{c}{a}\right)$$

$$-ba = b^2 - 2ca$$

$$2ac = b^2 + ab$$

14. (a)

$$\text{Volume of each cube} = 216 \text{ m}^3$$

$$\text{Side of each cube} = \sqrt[3]{216} = 6 \text{ m}$$

By joining the cube end to end, it will be converted into cuboid, whose l = 18 m, b = 6 m, h = 6 m

$$\text{then, the surface are of the cuboid} = 2(lb + bh + hl)$$

$$= 2(18 \times 6 + 6 \times 6 + 6 \times 18)$$

$$= 2(108 + 36 + 108) = 504 \text{ m}^2$$

15. (a)

If L_f is the length of faster train and V_f and V_s are the speed of faster and slower train which are 40 kmph and 20 kmph respectively.

then,
$$\frac{L_f}{V_f - V_s} = \frac{36}{3600}\text{hr}$$

$$\frac{L_f}{40 - 20} = \frac{1}{100}$$

$$L_f = \frac{20}{100}\text{km}$$

$$L_f = \frac{20}{100} \times 1000$$

$$L_f = 200 \text{ m}$$

16. (c)

Distance between two poles = 50 m,

Distance covered by train = 45 × 4 = 180 km

Number of poles counted by passenger = $\frac{180 \times 1000}{50}$ = 3600

17. (b)

Time taken by both the pipes when they are opened simultaneously,

$$\Rightarrow \quad \frac{1}{14} + \frac{1}{16} = \frac{1}{t_1}$$

$$t_1 = \frac{112}{15} \text{hrs}$$

Let's assume to leakage it will take t_2 hr to fill the tank

then,
$$t_2 = t_1 + \frac{32}{60} \text{hr}$$

$$t_2 = \frac{112}{15} + \frac{8}{15} \text{hr}$$

$$t_2 = 8 \text{ hr}$$

If x is the rate of then leakage,

then

$$\Rightarrow \quad \frac{1}{14} + \frac{1}{16} - \frac{1}{x} = \frac{1}{8}$$

$$\Rightarrow \quad \frac{15}{112} - \frac{1}{x} = \frac{1}{8}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{15}{112} - \frac{1}{8}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{1}{112}$$

$$\Rightarrow \quad x = 112 \text{ hr}$$

18. (c)

Given:

A, B and C independently can finish the work in 24, 32 and 60 days respectively.

Let's assume x days more are required to complete the whole work.

then, $$\left(\frac{1}{24} + \frac{1}{32} + \frac{1}{60}\right) \times 6 + \left(\frac{1}{32} + \frac{1}{60}\right) \times 2 + x \times \frac{1}{60} = 1$$

$$\Rightarrow \left(\frac{1}{2^3 \times 3} + \frac{1}{2^5} + \frac{1}{2^2 \times 3 \times 5}\right) \times 6 + \left(\frac{1}{2^5} + \frac{1}{2^2 \times 3 \times 5}\right) \times 2 + \frac{x}{60} = 1$$

$$\Rightarrow \left(\frac{2^2\times5+3\times5+2^3}{2^5\times3\times5}\right)\times6+\left(\frac{3\times5+2^3}{2^5\times3\times5}\right)\times2+\frac{x}{60} = 1$$

$$\left(\frac{43\times6+23\times2}{2^5\times15}\right)+\frac{x}{60} = 1$$

$$\Rightarrow \frac{19}{30}+\frac{x}{60} = 1$$

$$\Rightarrow \frac{x}{60} = \frac{11}{30}$$

$$\Rightarrow x = 22 \text{ days}$$

19. (b)

Let's assume Ashok, Mohan and Binod independently can finish the work in x days, y days and z days respectively.

Then, $$\frac{1}{x}+\frac{1}{y} = \frac{1}{12} \quad \text{...(i)}$$

$$\frac{1}{y}+\frac{1}{z} = \frac{1}{15} \quad \text{...(ii)}$$

$$\frac{1}{x} = 2\left(\frac{1}{z}\right) \quad \text{...(iii)}$$

From (i), (ii) and (iii)

$$z = 60 \text{ days}, x = 30 \text{ days, and } y = 20 \text{ days}$$

20. (b)

Let, the cost price of 50 mangoes = Rs. x = selling price of 40 mangoes

∴ Cost price of one mango = Rs. $\frac{x}{50}$

Selling price of one mango = Rs. $\frac{x}{40}$

$$\text{Profit\%} = \frac{S.P.-C.P}{C.P}\times100$$

$$= \frac{\frac{x}{40}-\frac{x}{50}}{\frac{x}{50}}\times100 = \left(\frac{5}{4}-1\right)\times100 = 25\%$$

21. (c)

Let the total number of voter = x

Among these voters $\frac{4x}{5}$ wants to vote for person A and $\frac{x}{5}$ wants to vote for person B.

On election days,

Total number of voters who vote for person A = $\frac{4x}{5}\times0.9 = \frac{3.6x}{5}$

Total number of voters who vote for person is = $\frac{x}{5}\times 0.8 = \frac{0.8x}{5}$

$$\therefore \quad \frac{3.6x}{5} = 216$$

$$x = 300$$

So, on election day total number of votes polled

$$= \frac{3.6x}{5} + \frac{0.8x}{5}$$

$$= \frac{3.6\times 300}{5} + \frac{0.8\times 300}{5} = 216 + 48 = 264$$

22. (c)

When the grapes become dry, then the weight of their water part gets reduced, but weight of other parts remains the same.

Let the weight of dry grapes is x kg.

then $\quad 20 \times 0.1 = x \times 0.8$

$$x = \frac{2}{0.8}$$

$$x = 2.5 \text{ kg}$$

23. (c)

Let the length of the middle sized piece is x cm.

Then, length of largest piece = $3x$ cm

Length of shortest piece = $(3x - 46)$cm

$\Rightarrow \quad 3x + x + 3x - 46 = 80$

$\Rightarrow \quad 7x = 126$

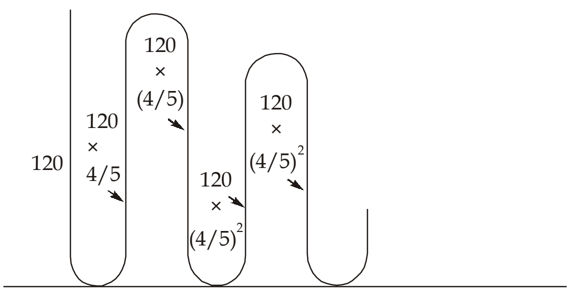
$\Rightarrow \quad x = 18$

Length of the shortest piece = $3x - 46$

$= 54 - 46 = 8$ cm

24. (c)

Initial height = 120 m



Total distance

$$= 120 + 2\times\left[120\times\frac{4}{5} + 120\times\left(\frac{4}{5}\right)^2 + 120\times\left(\frac{4}{5}\right)^3 \ldots\right]$$

$$= 120 + 2\times 120\times\frac{4}{5}\left[1 + \left(\frac{4}{5}\right) + \left(\frac{4}{5}\right)^2 + \ldots\right]$$

$$= 120 + 192 \times \frac{1}{1-\frac{4}{5}} = 120 + 192 \times 5 = 1080 \text{ meters}$$

25. (b)

$$\log_{10}^{\sqrt{x}} = \frac{1}{2}\log_{10}^{x}$$

∴ The equation becomes,

$$\log_{10}^{x} - \frac{1}{2}\log_{10}^{x} = 2\log_{x}^{10}$$

$$\Rightarrow \quad \frac{1}{2}\log_{10}^{x} = \frac{2}{\log_{10}^{x}}$$

$$\Rightarrow \quad \left(\log_{10}^{x}\right)^2 = 4$$

$$\Rightarrow \quad \log_{10}^{x} = 2 \text{ or } \log_{10}^{x} = -2$$

$$\Rightarrow \quad x = 100 \text{ or } x = \frac{1}{100}$$

From the given options x can taken the only value equal to 100.

26. (d)

Let equal sides of the isosceles triangle be x,

Then $x^2 + x^2 = 10^2$

$$x = 5\sqrt{2} \text{ cm}$$

So, $$\text{Final area} = 8 \times \left(\frac{1}{8} \times \pi \times 10^2 - \frac{1}{2} 5\sqrt{2} \times 5\sqrt{2}\right)$$

$$= \pi \times 10^2 - 4 \times 25 \times 2$$

$$= 100\pi - 200$$

$$\text{Area} = 114.16 \text{ cm}^2$$

27. (b)

We note that there are 3 consonants M, C and T and 3 vowels E, A and O. Since no two vowels have to be together the possible choice for vowels are the places marked as 'X'.

X M X C X T X,

These vowels can arranged in $^4P_3$ ways and 3 consonants can be arranged in 3! ways. Hence, the required number of ways = 3! × $^4P_3$

$$= 3! \times \frac{4!}{1!} = 144$$

28. (d)

$$\frac{2.32^3 + 1.44^3 + 2.88^3 - 3 \times 2.32 \times 1.44 \times 2.88}{2.32^2 + 1.44^2 + 4 \times 1.44^2 - 2 \times 1.44^2 - 2.32 \times 1.44 - 2.32 \times 2.88}$$

$$\frac{2.32^3 + 1.44^3 + 2.88^3 - 3 \times 2.32 \times 1.44 \times 2.88}{2.32^2 + 1.44^2 + 2.88^2 - 2.88 \times 1.44 - 2.32 \times 1.44 - 2.32 \times 2.88}$$

$$\Rightarrow \quad \frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ca} = a+b+c$$

$$2.32 + 1.44 + 2.88 = 6.64$$

29. (a)

$$\text{man} \times \text{day} = 40 \times 400 = 16000$$

After 32 days $\Rightarrow$ $32 \times 400 = 12800$

So, Remaining, man × day = 3200

$\therefore$ $80 \times \text{Day} = 3200$

$$\text{Day} = 40 \text{ days}$$

30. (c)

$$\frac{\alpha}{\beta}+\frac{\beta}{\alpha} = \frac{\alpha^2+\beta^2}{\alpha\beta} = \frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta} = \frac{(\alpha+\beta)^2}{\alpha\beta}-2$$

$$= \frac{(12/8)^2}{a/8}-2 = \frac{144}{8a}-2 = \frac{18}{a}-2$$

Minimum value = –2 (When $a \to \infty$)

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