CLASS TEST

S.No. : 01SPME-ABCD-07072023

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GENERAL APTITUDE

MECHANICAL ENGINEERING

Date of Test : 07/07/2023

ANSWER KEY

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

DETAILED EXPLANATIONS

1. (d)

Each of the numbers except 80 is a prime number.
Hence, 80 is the odd one out.

2. (d)

Let the two consecutive even integers be $2n$ and $(2n + 2)$.

$$\begin{aligned}(2n+2)^2 - 2n^2 &= (2n+2+2n)(2n+2-2n)\\ &= 2(4n+2)\\ &= 4(2n+1)\end{aligned}$$

$4(2n + 1)$ is divisible by 4.
The answer is (d).

3. (d)

$$\begin{aligned}\text{Ankit : Varun} &= 100 : 75\\ \text{Varun : Abhinav} &= 100 : 96\\ \therefore \quad \text{Ankit : Abhinav} &= \left(\frac{\text{Ankit}}{\text{Varun}} \times \frac{\text{Varun}}{\text{Abhinav}}\right)\\ &= \left(\frac{100}{75} \times \frac{100}{96}\right) = \frac{100}{72} = 100:72\end{aligned}$$

$\therefore$ Ankit beats Abhinav by $(100 - 72)$m = 28 m

4. (b)

$$3^{x-y} = 27 = 3^3$$

$$\Rightarrow \quad x - y = 3 \quad \text{...(i)}$$

$$3^{x+y} = 243 = 3^5$$

$$\Rightarrow \quad x + y = 5 \quad \text{...(ii)}$$

Solving (i) and (ii), we get $x = 4$

5. (d)

Let the ages of mother and daughter 10 years ago be $3x$ and x years respectively.

$$\begin{aligned}\text{Then,} \quad (3x+10)+10 &= 2[(x+10)+10]\\ \Rightarrow \quad 3x+20 &= 2x+40\\ \Rightarrow \quad x &= 20\\ \therefore \quad \text{Sum of present age} &= (3x+10)+(x+10)\\ &= 70+30\\ &= 100\end{aligned}$$

6. (d)

Garrulous means to be excessively talkative or chatty, especially on trivial matters. Option (d) is correct.

7. (d)

Option (a) : Convolute means to make an argument or a story complex and difficult to follow.
Option (b) : Convulse means to suffer a contortion in the body.
Option (c) : Constance derives from the word 'constant'.
Option (d) : Convalesce means to recover one's health over a period of time after an illness.

8. (b)

Let the cost price of the item = ₹ x

$$\text{selling price} = x \times \frac{125}{100} = 1.25x$$

$$\text{discount} = 25\%$$

$$\Rightarrow \quad \text{marked price} = 1.25x \times \frac{100}{75} = ₹\,\frac{5}{3}x$$

$$\text{New rate of discount} = 10\%$$

$$\text{New selling price} = \frac{5x}{3} \times \frac{90}{100} = ₹\,\frac{3x}{2}$$

$$\text{New profit} = \frac{3x}{2} - x = \frac{x}{2}$$

$$\text{Profit percentage} = \frac{x/2}{x} \times 100 = 50\%$$

9. (a)

The second word in the given pair is a follow up of the first word. Assail (attack) is FOLLOWED by defence i.e. ASSAIL : DEFEND is the appropriate option.

10. (c)

First month's saving = ₹ 20

Second month's saving = ₹ 20 + 4

Saving after n months = ₹ 20 + $(n - 1)4$

$$\frac{n}{2}(2 \times 20 + (n-1) \times 4) \geq 1000$$

$$40n + n(n-1) \times 4 \geq 2000$$

$$40n + 4n^2 - 4n \geq 2000$$

$$4n^2 + 36n - 2000 \geq 0$$

$$n \geq 18.30,\ -27.30$$

$$\Rightarrow \quad n = 19$$

⇒ After 19 months his savings will be greater than ₹ 1000.

11. (b)

Simple interest for 2 years = ₹550

$$\text{Simple interest for 1 year} = ₹\,\frac{550}{2} = ₹\,275$$

For the first year, SI and CI are same

∴ Compound interest for 1st year = ₹275

₹(605 – 550) = ₹55 is the interest earned during the second year on ₹275

$$\therefore \quad \text{Rate of interest} = \frac{55}{275} \times 100 = 20\% \text{ pa}$$

Now,

Investment in simple interest bond,

$$\text{SI} = \frac{PRT}{100}$$

$$\Rightarrow \quad 275 = \frac{P \times 20 \times 1}{100}$$

$$\Rightarrow \quad P = ₹1375$$

$$\text{Total sum} = ₹(1375 \times 2) = ₹2750$$

12. (a)

PQR is an isosceles triangle

$$\therefore \quad \angle RPQ = \angle RQP$$

$$\text{Also} \quad \angle RPQ + \angle RQP = (180 - 64)°$$

$$\Rightarrow \quad 2\angle RPQ = 116°$$

$$\Rightarrow \quad \angle RQP = 58°$$

RQS is a right isosceles triangle; hence

$$\angle RQS = \angle RSQ = \frac{(180 - 90)°}{2} = 45°$$

Note that

$$\angle RQP + \angle RQS + \angle SQT = 180°$$

$$\Rightarrow \quad 58° + 45° + \angle SQT = 180°$$

$$\Rightarrow \quad \angle SQT = 77°$$

SQT is a right triangle, hence

$$\angle QST = 90 - 77 = 13°$$

13. (d)

While typing from 1 to 500 :

(i) 9 single digit numbers : from 1 to 9

(ii) 90 two digit numbers : from 10 to 99

Each number requires 2 key strokes

∴ 180 keystrokes

(iii) 401 three digit numbers : From 100 to 500

Each number requires 3 key strokes

∴ 1203 keystrokes

$$\text{Total} = 9 + 180 + 1203$$
$$= 1392$$

14. (a)

For the largest right circular cone to be fitted in a cube, the base of the cone will touch all the vertical faces of the cube.

∴ The diameter of base of cone = Side of cube = 20 cm

$$\therefore \quad \text{Radius} = 10 \text{ cm}$$

$$\text{Height} = 20 \text{ cm}$$

$$\text{Volume} = \frac{\pi r^2 h}{3} = \frac{1}{3} \times \pi \times 10^2 \times 20$$

$$= 2094.39 \text{ cm}^3$$

15. (c)

Let the time taken to fill the tank = T mins

After 16 minutes, part of the tank filled

$$= 16\left(\frac{1}{48}+\frac{1}{60}\right) = \frac{3}{5}$$

Balance to be filled by B alone $= 1-\frac{3}{5} = \frac{2}{5}$

$$\frac{1}{2/5} = \frac{B\times 60}{B\times T}$$

$$T = \frac{2}{5}\times 60 = 24 \text{ minutes}$$

16. (b)

Let the sum = 100, Time = 3 years

Amount due in 3 years = 200

$$100\left(1+\frac{r}{100}\right)^3 = 200$$

$$\Rightarrow \quad \left(1+\frac{r}{100}\right)^3 = 2$$

$$\Rightarrow \quad \left(1+\frac{r}{100}\right) = 2^{1/3} \qquad \ldots\text{(i)}$$

Let the amount become 16 times in n years.

$$100\left(1+\frac{r}{100}\right)^n = 1600$$

$$\left(1+\frac{r}{100}\right)^n = 16 \qquad \ldots\text{(ii)}$$

From eq. (i) and eq. (ii), we get

$$(2^{1/3})^n = 16 = 2^4$$

$$\frac{n}{3} = 4$$

$$n = 12$$

17. (d)

Total marks obtained = 84 + 80 + 76 = 240

In pie chart, if 240 marks = 360°

$$\text{Then 1 mark} = \frac{360°}{240}$$

$$\therefore \quad \text{84 marks} = \frac{360°}{240}\times 84 = 126°$$

18. (a)

Let number be x

$x = 225Q + 32$, where Q the quotient can have the values 1, 2, 3 etc.

$x = (15 \times 15)Q + (15 \times 2) + 2$

Divide x by 15, we get the remainder 2.

19. **(c)**

$$\text{Child } 1 = 1 \text{ Candy}$$
$$\text{Child } 2 = 2 \text{ Candies}$$
$$\text{Child } 3 = 3 \text{ Candies}$$

And so on, until we find that child 9 has been given 9 candies. We now want to subtract all the candies assigned to the first 9 children from our 220 candies, and given the rest to child 10.

$220 - (9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) = 175$ candies

20. **(b)**

Let the numbers be P and Q

$$\frac{P}{Q} = \frac{4}{3} \qquad \ldots(i)$$

Let $P = 4y, Q = 3y$

Now $\dfrac{4y + x}{3y + x} = \dfrac{5}{4}$

$$16y + 4x = 15y + 5x$$

$\Rightarrow$ $y = x$

Sum of new numbers $= 5x + 4x = 117$

$\Rightarrow$ $9x = 117$

$\Rightarrow$ $x = 13$

21. **(c)**

Sum of angles in n sided polygon $= (n - 2)\, 180°$

In hexagon $n = 6$

$\therefore$ Sum $= (6 - 2)180 = 720°$

$$\text{Each angle} = \frac{720°}{6} = 120°$$

Now, in ΔCDE. $CD = DE$, so it is an isosceles triangle. The angle at $D = 120°$, so other two angles must be 30° each. So $\angle DEC = \angle DCE = 30°$.

Now, $\angle CDG = \angle DCG = 30°$

$\therefore$ $\angle DGC = 180° - 30° - 30° = 120°$

$\angle DGE = 180° - \angle DGC = 180° - 120° = 60°$

22. **(b)**

$$90 = 2 \times 3 \times 3 \times 5$$
$$18 = 2 \times 3 \times 3$$

$\Rightarrow$ $Q = 2 \times 3 \times 3 = 18$

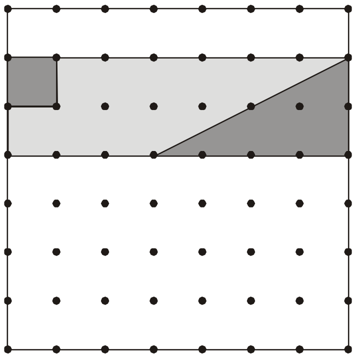
$$51 = 3 \times 17$$
$$34 = 2 \times 17$$

$\Rightarrow$ $P = 2 \times 3 \times 17 = 102$

$$P + Q = 18 + 102 = 120$$

23. **(c)**

We can spend time figuring out the areas of the three individual irregular shapes. Instead, let us rearrange the three to form this :



Here we see that the shaded area is 2/7 of the whole square.

$$\text{Shaded area} = \frac{84 \times 2}{7} = 24$$

24. (c)

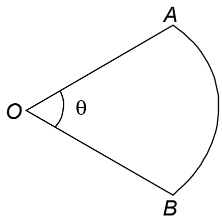
$$\text{Sum of all integers from 1 to 156} = \frac{156 \times 157}{2} = 12246 \quad \text{...(i)}$$

$$\text{Sum of all integers from 1 to 45} = \frac{45 \times 46}{2} = 1035 \quad \text{...(ii)}$$

Subtracting equation (ii) from (i), we get

$$= 12246 - 1035 = 11211$$

25. (d)



$$\text{The area of sector } OAB = \pi r^2 \times \frac{\theta}{360°} = \pi(10)^2 \times \frac{\theta}{360°} = 80$$

$$\text{From here,} \quad \left(\frac{\theta}{360°}\right) = \frac{80}{\pi \times (10)^2}$$

$$\text{Length of arc } AB = 2\pi r \times \frac{\theta}{360°}$$

$$= 2\pi \times 10 \times \frac{80}{\pi \times (10)^2} = 16 \text{ cm}$$

Perimeter of platform = 16 + 10 + 10 = 36 cm

Length of the wire required = 3 × 36 = 108 cm

26. (d)

According to the given information,

$$\frac{23}{100} = \frac{10 \times 2 + 20 \times 3 + 30 \times x}{100 \times (2 + 3 + x)}$$

$$23 = \frac{20 + 60 + 30 \times x}{5 + x}$$

$$23(5 + x) = 80 + 30x$$

$$7x = 35$$

$$x = 5$$

27. **(b)**

Probability that either one of them is lying

$$= \frac{90}{100}\times\frac{20}{100}+\frac{10}{100}\times\frac{80}{100}$$

Chances that he is first one $= \dfrac{\frac{10}{100}\times\frac{80}{100}}{\frac{90}{100}\times\frac{20}{100}+\frac{10}{100}\times\frac{80}{100}}\times 100$

$$= 30.77\,\%$$

28. **(d)**

Let B can do the work in x days. A can do the work in $x - 6$ days.

$$\frac{1}{x}+\frac{1}{x-6} = \frac{1}{x-8}$$

$$\frac{x-6+x}{x^2-6x} = \frac{1}{x-8}$$

$$(2x - 6)(x - 8) = (x^2 - 6x)$$

$$2x^2 - 22x + 48 - x^2 + 6x = 0$$

$$x^2 - 16x + 48 = 0$$

$$x = 12, 4$$

$x \neq 4$ because for $x = 4$, $x - 6$ will be negative which is not possible. So, $x = 12$.

29. **(c)**

The number of boys in 6th class

$$= \frac{20}{100}\times\frac{3}{5}\times 1000 = 120$$

The number of boys in 9th class

$$= \frac{18}{100}\times\frac{3}{5}\times 1000 = 108$$

Total boys in 6th & 9th class $= 120 + 108 = 228$

30. **(c)**

Let their present ages are $4x$, $5x$. Eighteen years ago, their ages were $= 4x - 18$, $5x - 18$

$$\frac{4x-18}{5x-18} = \frac{11}{16}$$

$$64x - 288 = 55x - 198$$

$$9x = 90$$

$$x = 10$$

Sum of their present ages $= 4x + 5x = 9x = 9 \times 10 = 90$ years

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