ACE OF PACE OBJECTIVE SECTION (SOLUTION)

1. **(C)**

$a + b = 2c$

$$\frac{a}{a-c}+\frac{c}{b-c}=\frac{a}{a-\frac{a+b}{2}}+\frac{\frac{a+b}{2}}{b-\frac{a+b}{2}}$$

$$=\frac{2a}{a-b}+\frac{a+b}{b-a}=\frac{2a-a-b}{a-b}$$

$= 1$

2. **(A)**

Chairman came at 12 : 20 pm

Other members came at 12 : 40 pm

$\therefore$ scheduled time 12 : 10 pm

3. **(C)**

7 girls $\longrightarrow$ 49 bags $\longrightarrow 7^3$ adult cats $\longrightarrow$ 7^4 little cats.

$\therefore$ Number of legs $= 7^4 \times 4 + 7^3 \times 4 + (7+1) \times 2$

$= 10992$

4. **(C)**

6, 2, 8 $\Rightarrow$ Three numbers

5. **(D)**

$$\alpha+\beta=-\frac{5}{2}$$

$$\alpha\beta=\frac{K}{2}$$

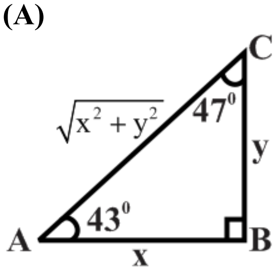
$$\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$$

$$\Rightarrow(\alpha+\beta)^2-\alpha\beta=\frac{21}{4}$$

$$\Rightarrow\frac{25}{4}-\frac{K}{2}=\frac{21}{4}\Rightarrow\frac{K}{2}=1$$

$\Rightarrow K = 2$

6. **(A)**



$\cos 43^0 = \frac{x}{\sqrt{x^2 + y^2}}$

$\tan 47^0 = \frac{x}{y}$

7. **(B)**

$\frac{x}{3} = \frac{y}{4} = \frac{z}{7} \quad \Rightarrow y = \frac{4}{3}x \quad \& \quad z = \frac{7}{3}x$

$\therefore \frac{x+y+z}{x} = 1 + \frac{4}{3} + \frac{7}{3} = \frac{14}{3}$

8. **(A)**

x + y = 8, xy = 7

$x^3 + y^3 = (x+y)^3 - 3xy(x+y)$

$= 8^3 - 3 \times 7 \times 8$

= 344

9. **(B)**

Apply TFF, FFT, FTF logic.

10. **(C)**

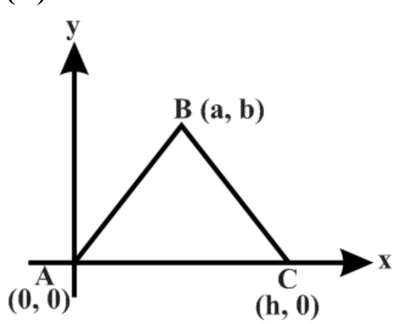
Similar triangle

$\therefore \frac{3x-19}{x-3} = \frac{x-4}{4}$

$\Rightarrow x^2 - 19x + 88 = 0$

$\Rightarrow x = 8, 11$

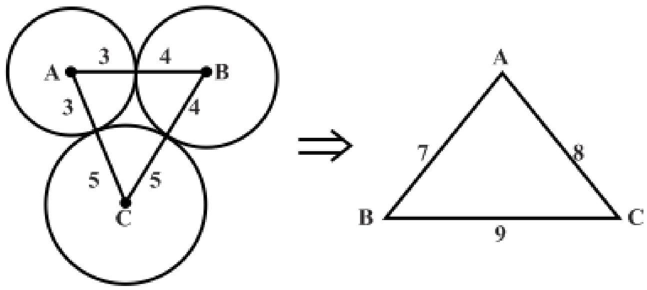
11. **(D)**



$\text{Area} = \frac{1}{2} \times h \times b = 20$

$\Rightarrow h = \frac{40}{b}$

12. **(A)**



$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$

Where $s = \dfrac{7+8+9}{2} = 12$

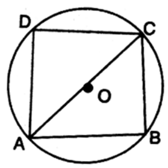
$\therefore$ Area $= \sqrt{12(5)(4)(3)}$

$= 12\sqrt{5}$

13. **(B)**

Let *r* be the radius of the circle.

Then diagonal of the square inscribed within this side = 2*r*



$\therefore \quad AB^2 + BC^2 = 4r^2$

$\Rightarrow \quad 2AB^2 = 4r^2$

$AB^2 = 2r^2$

$AB = \sqrt{2}r$

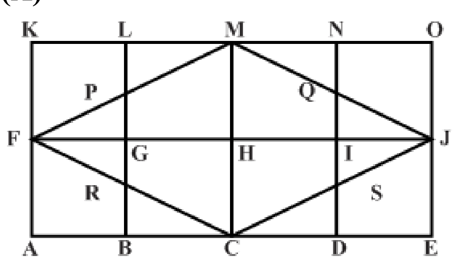
$\therefore$ Area of the square $= \left(\sqrt{2}r\right)^2 = 2r^2$

Here $r = 8\,\text{cm}$

$\therefore$ Required area $= 2(8)^2 = 128\,\text{cm}^2$

Hence, the option (B) is the correct option.

14. **(A)**



$\Delta MFJ, \Delta FJC, \Delta MFC, \Delta MJC \Rightarrow 4$

Triangle like $\Delta PFG \Rightarrow 4$

Triangle like $\Delta MFH \Rightarrow 4$

Triangle like $\Delta FKM \Rightarrow 4$

Triangle like $\Delta PLM \Rightarrow 4$

Triangle like $\Delta FPR \Rightarrow 2$

Total = 22

15. (B)

Volume of one marble $= \frac{4}{3}\pi r^3$

Volume of one marble $= \frac{4}{3}\pi \times \left(\frac{7}{10}\right)^3 cm^3$

Volume of the water raised in the beaker due to dropping of marbles

$$= \pi r^2 h = \frac{22}{7} \times \left(\frac{7}{2}\right)^2 \times 5.6\, cm^3$$

Let x be the number of marbles dropped in the beaker

$$x \times \left(\frac{4}{3}\right) \times \left(\frac{7}{10}\right)^3 \pi = \frac{22}{7} \times \frac{49}{4} \times 5.6$$

$$x = \frac{\frac{22}{7} \times \frac{49}{4} \times 5.6}{\frac{4}{3} \times \frac{7 \times 7 \times 7}{10 \times 10 \times 10} \times \frac{22}{7}}$$

$$x = \frac{49 \times 5.6 \times 3 \times 1000}{4 \times 4 \times 7 \times 7 \times 7} = 150$$

Hence, the option (B) is the correct option.

16. (C)

$2 = \frac{1 - 3 + h}{3} \Rightarrow h = 8 = \alpha$

$-6 = \frac{-2 + 4 + k}{3} \Rightarrow k = -20 = \beta$

$\therefore \alpha - \beta = 8 - (-20) = 28$

17. (D)

$x + x \times \frac{8}{100} = 23220$

$\frac{108}{100} x = 23220$

$x = 21500$

18. (C)

Clearly, n(s) = 52

There are 26 red cards (including 2 kings) and there are 2 more kings.

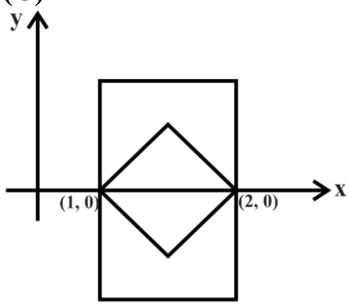
Let E be the event of getting either a red card or a king.

Then, n(E) = (26 + 2) = 28

$\therefore \quad P(E) = \frac{n(E)}{n(S)} = \frac{28}{52} = \frac{7}{13}$

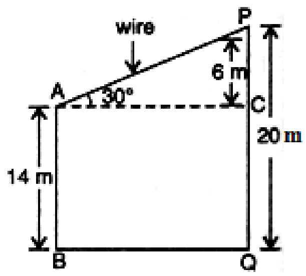
$\therefore \quad P(E) = \frac{7}{13}$

19. **(C)**



20. **(A)**

In ΔAPC, we have



$$\sin 30^o = \frac{PC}{AP}$$

$\Rightarrow$ $\frac{1}{2} = \frac{6}{AP}$

$\Rightarrow$ AP = 12 m

$\Rightarrow$ Length of wire AP = 12 metres.

Hence, option (A) is the correct option.

21. **(B)**

$x^{12} + 1 = Q(x-1) + R$

Put x = 1

R = 2

22. **(A)**

5m + 7n = 46

n = 3 $\Rightarrow$ 5m + 21 = 46

$\Rightarrow$ 5m = 25

$\Rightarrow$ m = 5

$\therefore$ mn = 15

23. **(B)**

$\frac{a^2}{b^2} = \frac{16}{25}$

$\Rightarrow \frac{a}{b} = \frac{4}{5}$

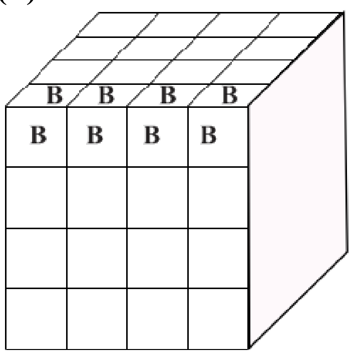
24. **(A)**

$$\frac{10^{2000}+10^{2002}}{10^{2001}+10^{2001}}=\frac{10^{2000}+10^{2002}}{2.10^{2001}}=\frac{1}{20}+\frac{10}{2}=5.05$$

25. **(B)**

Multiply divide the expression by $\left(1-\frac{1}{2}\right)$

26. **(B)**



$\therefore$ number of cubes which have exactly 2 faces black $=12\times 4=48$

27. **(A)**

$x=\sqrt{7+4\sqrt{3}}$

$=\sqrt{4+3+4\sqrt{3}}$

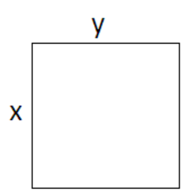
$x=2+\sqrt{3}$

$\therefore x+\frac{1}{x}=2+\sqrt{3}+\frac{1}{2+\sqrt{3}}$

$=2+\sqrt{3}+2-\sqrt{3}=4$

28. **(D)**

$\frac{(y+x)}{y}=\frac{y}{x}$



$\frac{y}{y}+\frac{x}{y}=\frac{y}{x}$

$1+\frac{x}{y}=\frac{y}{x}$

Let $\frac{y}{x}=t$

$1+\frac{1}{t}=t\Rightarrow t^2=t+1$

$\Rightarrow t^2 - t - 1 = 0$

$\Rightarrow t = \dfrac{1 \pm \sqrt{1+4}}{2}$

$\Rightarrow t = \dfrac{1+\sqrt{5}}{2} \quad (t > 0, \because x, y > 0)$

29. **(C)**

Let $\angle ACB = \theta$

In $\Delta ABC = \theta$

$\angle B = 90^\circ$

$\tan\theta = \dfrac{a}{c+x}$ ___i

In ΔEDC

$\angle D = 90^\circ$

$\tan\theta = \dfrac{b}{c}$ ___ii

$i = ii$

$\dfrac{a}{c+x} = \dfrac{b}{c}$

$\Rightarrow ac = bc + bx$

$\Rightarrow bx = c(-b+a)$

$x = \dfrac{c}{b}(-b+a)$

30. **(B)**

$P(x) = x^{1000} + ax + 9$

since $(x+1)$ is a factor of $P(x)$

$P(-1) = 0$

$\Rightarrow (-1)^{1000} + a(-1) + 9 = 0$

$\Rightarrow 1 - a + 9 = 0$

$a = 10$

31. **(C)**

$A_0 = \dfrac{2}{5} \times \pi \times r_A^2$ ....(I)

$A_0 = \dfrac{5}{8} \times \pi r_B^2$ ....(II)

$\dfrac{2}{5}\pi r_A^2 = \dfrac{5}{8}\pi r_B^2$

$\Rightarrow \left(\dfrac{r_A}{r_B}\right)^2 = \dfrac{25}{16} = \left(\dfrac{5}{4}\right)^2$

$\Rightarrow \dfrac{r_A}{r_B} = \dfrac{5}{4}$

32. **(A)**

$2^{\pi}x + 2^{\pi}y + \cancel{5y} = 3^{\sqrt{2}}x + 3^{\sqrt{2}}y + \cancel{5y}$

$\left(2^{\pi} - 3^{\sqrt{2}}\right)x = \left(3^{\sqrt{2}} - 2^{\pi}\right)y$

$\frac{x}{y} = \frac{-\left(2^{\pi} - 3^{\sqrt{2}}\right)}{\left(2^{\pi} - 3^{\sqrt{2}}\right)}$

$= -1$

33. **(C)**

$\left[\frac{32^{1/5} + 81^{1/4}}{256^{1/2} - 121^{1/2}}\right] = \frac{2+3}{16-11} = 1$

34. **(A)**

The total distance covered $= \frac{1}{2}16 + \frac{3}{2}4 = 14$

The average speed = $\frac{14}{2} = 7$

35. **(C)**

The product, through experimentation, has to be (1) (−1) (3) (−3) (5)
Therefore, we can easily find a, b, c, d, and e.

a = 5; b = 7; c = 3; d = 9; e = 1

a + b + c + d + e = 1 + 3 + 5 + 7 + 9 = 25

36. **(A)**

$\frac{x_1}{x_2} = \frac{6}{5} \Rightarrow x_1 = 6k$ and $x_2 = 5k$

Also, $x_1 + x_2 = 66$

$k = 6$

$\Rightarrow$ current age $= 36$ & 30

$\Rightarrow \frac{36+x}{30+x} = \frac{8}{7} \Rightarrow x = 12$ years

37. **(C)**

Numbers are $2x, 3x, 4x \Rightarrow Lcm = 12x = 240$

$x = 20$

$\Rightarrow$ 40, 60, 80, HCF = 20

38. **(B)**

They will charge again together after an integral multiple of LCM of their individual tune period
$=$ LCM of (36, 42, 72)
$= 504$ sec.
$= 8$ min and 24 sec.

39. **(A)**

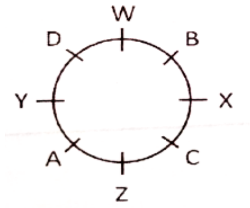
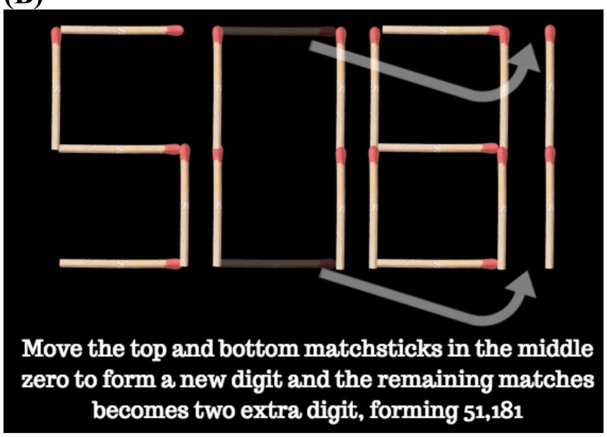


Figure above represents the exact position of all the eight persons. The sitting arrangement fulfills all the conditions given in the question. We observe that D is sitting between W and Y. Hence, the correct answer is (A).

40. **(B)**



41. **(C)**

We know that Mr. Yellow was not wearing a yellow tie because of his statements. He also was not wearing the green tie because the one wearing the green tie agreed to his statement.
Therefore, Mr Yellow was wearing a brown tie. Mr. Green was wearing a yellow tie. and Mr. Brown was wearing the green tie.

42. **(B)**

The possibilities are that makes the product 36 are
a) 1, 4 ,9, Sum = 14
b) 1, 2, 18, Sum = 21
c) 1, 1, 36,Sum = 38
d) 1, 6, 6,Sum = 13
e) 2, 2, 9,Sum = 13
f) 2, 3, 6, Sum = 11
g) 3, 3, 4, Sum = 10
h) 1, 12, 3 Sum = 16

The investigator could not get the answer even after checking the street number of next door neighbor. This gives us the clue that there are more than one case where the sum of their ages is the street number of next door neighbor. From above possibilities, only sum 13 has two cases. The case 2, 2, 9 will be more likely the case because the oldest daughter(age 9) goes to school.

43. **(B)**

Jack's wife shook 4 hands.
Because, obviously, no person shook hands with his or her partner, nobody shook hands with more than eight other people. And since nine people shook hands with different numbers of people, these

numbers must be 0, 1, 2, 3, 4, 5, 6, 7, and 8. The person who shook 8 hands only did not shake hands with his or her partner, and must therefore be married to the person who shook 0 hands. The person who shook 7 hands, shook hands with all people who also shook hands with the person who shook 8 hands (so in total at least 2 handshakes per person), except for his or her partner. So this person must be married to the person who shook 1 hand. The person who shook 6 hands, shook hands with all people who also shook hands with the persons who shook 8 and 7 hands (so in total at least 3 handshakes per person), except for his or her partner. So this person must be married to the person who shook 2 hands. The person who shook 5 hands, shook hands with all people who also shook hands with the persons who shook 8, 7, and 6 hands (so in total at least 4 handshakes per person), except for his or her partner. So this person must be married to the person who shook 3 hands. The only person left, is the one who shook 4 hands, and which must be Jack's wife. The answer is: Jack's wife shook 4 hands.

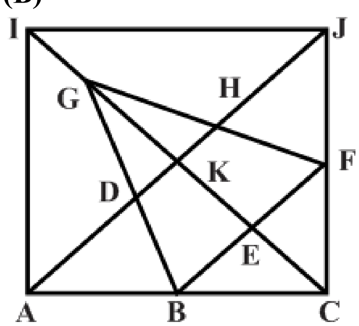
44. **(D)**

$$\sqrt{\sin^2 x+\operatorname{cosec}^2 x+\cos^2 x+\sec^2 x-\tan^2 x-\cot^2 x}$$

$$=\sqrt{\left(\sin^2 x+\cos^2 x\right)+c\left(os\,ec^2 x-\cot^2 x\right)+\left(\sec^2 x-\tan^2 x\right)}$$

$$=\sqrt{1+1+1}=\sqrt{3}$$

45. **(B)**

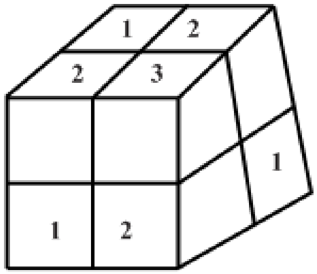


Triangle like $\Delta AKC = 4$
Triangle like $\Delta AIC = 4$
Triangle like $\Delta GDK = 2$
Triangle like $\Delta GBE = 2$
Triangle like $\Delta BCE = 2$
Triangle like $\Delta BGC = 2$
Triangle like $\Delta HJF = 2$
Triangle like $\Delta GHD = 1$
Triangle like $\Delta GFB = 1$
Triangle like $\Delta CFB = 1$
Total = 21

46. **(D)**

47. **(D)**

48 – 50 :



48. **(D)**
Exactly two sides red = 3

49. **(C)**
Exactly one side red = 3

50. **(B)**
No side painted red = 1