ACE OF PACE OBJECTIVE SECTION
(SOLUTION)

1. **(C)**
$80 = 3^4 - 1$
$255 = 4^4 - 1$
$5^4 - 1 = 624$

2. **(D)**
GERM = 7512
DUST = 3496
By comparing
S = 9, U = 4, R = 1, D = 3
9413 = SURD

3. **(B)**
Product of last and first number is the middle number.
In 383, $3 \times 3 = 9$, hence it is the odd one out.

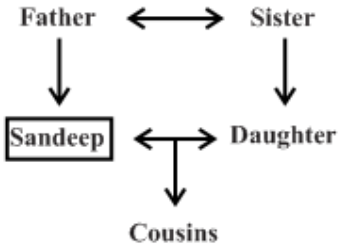
4. **(C)**
$7 + 9 - 4 = 12$
$4 + 1 - 1 = 4$
$5 + 6 - 2 = 9$

5. **(C)**
$8 \div 6 - 4 \times 3 + 4$
$= \frac{4}{3} - 12 + 4 = \frac{-20}{3}$

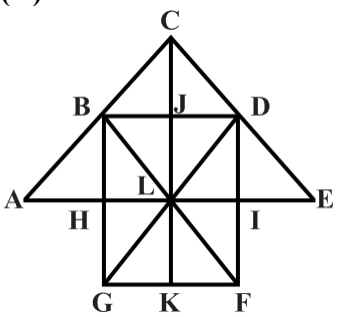
6. **(B)**
$1^3 + 1 = 2$
$2^3 + 2 = 10$
$3^3 + 3 = 30$
n^{th} term is $n^3 + n$
$9^3 + 9 = 738$

7. **(A)**
$\frac{48}{2} = 24, \qquad 24 \times 3 = 70$
$\frac{30}{2} = 15, \qquad 15 \times 3 = 45$
$\frac{20}{2} = 10, \qquad 10 \times 3 = 30$

8. **(B)**



9. **(D)**



Types of $\Delta ABH = 4$ Types of $\Delta DFE = 4$
Types of $\Delta DIE = 4$ Types of $\Delta HLG = 4$
Types of $\Delta ABL = 2$ Types of $\Delta DLE =$
Types of $\Delta ALE = 2$ Types of $\Delta BDL = 4$
Types of $\Delta ALC = 2$ Types of $\Delta BGF = 4$
Types of $\Delta ACE = 1$ Types of $\Delta BCD = 1$
BJLH type of squares – 4
BDFG = 1 BLDC = 1

10. **(B)**

1×1 square $- 4^2$
2×2 square $- 3^2$
3×3 square $- 2^2$
4×4 square $- 1^2$
$1^2 + 2^2 + 3^2 + 4^2 = 30$

11. **(B)**

$14 \times 2 = 28$ $28 - 8 = 20$
$20 \times 2 = 40$ $40 - 8 = 32$
$32 \times 2 = 64$ $64 - 8 = 56$

12. **(D)**

Slope of line 60^0 degrees from $y = \sqrt{3} \times +2$ will be at 120^0 or 0^0 degrees from x – axis as from $\tan 60 = \sqrt{3}$. So $\tan 120 = -\sqrt{3}$, $\tan 0 = 0$.

13. **(A)**

$23 \times 3 + 5 = 74$

14. **(D)**

$\sqrt{25}+\sqrt{26},\ \sqrt{25}+\sqrt{126}$

$\frac{1}{\sqrt{25}+\sqrt{126}}+\frac{1}{\sqrt{26}+\sqrt{27}}\ldots+\frac{1}{\sqrt{360}+\sqrt{361}}$

Rationalising all

$-\sqrt{25}+\cancel{\sqrt{26}}-\cancel{\sqrt{26}}+\cancel{\sqrt{27}}\ldots-\cancel{\sqrt{360}}+\sqrt{361}$

$=-\sqrt{25}+\sqrt{361}=-5+19=14$

15. **(A)**

$x=2+\sqrt{3}$

$\frac{1}{x}=2-\sqrt{3}$

$x+\frac{1}{x}=4$

$x^2+\frac{1}{x^2}=\left(x+\frac{1}{x}\right)^2-2=14$

$x^3+\frac{1}{x^3}=\left(x+\frac{1}{x}\right)^3-3\left(x+\frac{1}{x}\right)=52$

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

$52\times14=x^5+\frac{1}{x^5}+4$

$x^5+\frac{1}{x^5}=724$

16. **(C)**

$3+4y-y^2$ minimum at $y=4$.

At $y=2$, $3+4y-y^2$ is maximum.

17. **(C)**

$(2x)^2+(3y)^2+(4z)^2-2x.\ 3y-3y.\ 4z-2x.\ 4z=0$

$\left(\because a^2+b^2+c^2-ab-bc-ac=0\Rightarrow a=b=c\right)$

$2x=3y=4z$

18. **(B)**

$d=\sqrt{6^2+10^2+15^2}$

$=19$

19. **(B)**

$\left(x^2-2\right)^3+\left(8-3x\right)^3+\left(16-7x\right)^3=3\left(x^2-2\right)\left(8-3x\right)\left(16-7x\right)$

$a^3+b^3+c^3=3abc$

Case – I

$a+b+c=0$

$x^2-2+8-3\ x+16-7x=0$

$x^2 - 10x + 22 = 0$

Sum of roots = 10

Case – II

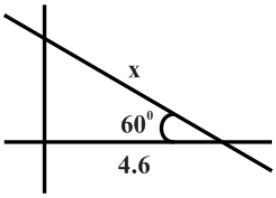
$a = b = c$

$x^2 - 2 = 8 - 3x = 16 - 7x$

$x = 2$

So, $2 + 10 = 12$

20. (C)



$\cos 60 = \frac{4.6}{x}$

$x = 9.2$ m

21. (C)

$\sqrt{25+10\sqrt{6}} = \sqrt{10+15+2.\sqrt{150}}$

$= \sqrt{\left(\sqrt{15}+\sqrt{10}\right)^2} = \sqrt{15}+\sqrt{10}$

Similarly $\sqrt{25-10\sqrt{6}} = \sqrt{15}-\sqrt{10}$

$\sqrt{15}+\sqrt{10}+\sqrt{15}-\sqrt{10} = 2\sqrt{15}$

22. (B)

Let rate of passenger coming = k

Let rate of passenger going in from one door = c

Let 't' be the time before opening of door the customers start coming in

$(t+9)k = 3c \times 9$

$(t+5)k = 5c \times 5$

Dividing

$\frac{t+9}{t+5} = \frac{27}{25} \Rightarrow t = 45\,\text{min}$

23. (C)

S.P. = 15 × 1.05 = 15.75 Rs.

24. (B)

By C n D,

$\frac{x+1}{x-1} = \frac{\sqrt{a+3b}}{\sqrt{a-3b}}$

Squaring

$\frac{x^2+2x+1}{x^2-2x+1} = \frac{a+3b}{a-3b}$

Again C n D

$$\frac{x^2+1}{2x}=\frac{a}{3b}$$

$2ax - 3bx^2 = 3b$

25. (D)

$16^{\sin^2 x} = t$

$t+\frac{16}{t}=10 \qquad \left(\cos^2 x = 1-\sin^2 x\right)$

$t^2 - 10t + 16 = 0$

$t = 2, 8 = 16^{\frac{1}{4}}, 16^{\frac{3}{4}}$

$16^{\sin^2 x} = 16^{\frac{1}{4}}, 16^{\frac{3}{4}}$

$\sin^2 x = \frac{1}{4}, \frac{3}{4}$

$\sin x = \frac{1}{2}, \frac{\sqrt{3}}{2}$

$x = \frac{\pi}{3}$ or $\frac{\pi}{6}$

$\frac{\pi}{3}+\frac{\pi}{6}=\frac{\pi}{2}$

26. (B)

Write a line from AB

$y - 2k = \frac{3}{2k-1}(x-k-1)$

Satisfy (5k – 1, 5k)

$3k = \frac{3}{2k-1}(4k-2)$

$k(2k - 1) = 2\ (2k - 1)$

$k = \frac{1}{2}$ or 2

$2+\frac{1}{2}=\frac{5}{2}$

27. (B)

Obvious

28. (A)

Every tile is sum of two tiles just below it

16 + 17 = 33

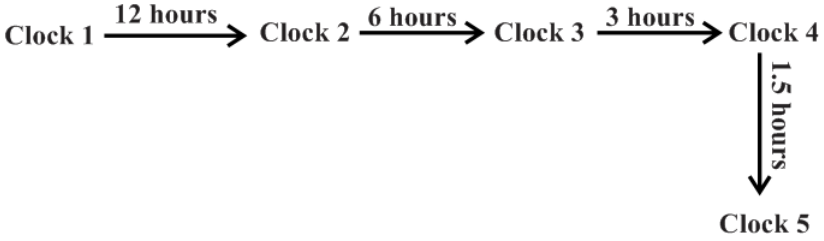
29. (C)

$$\frac{4\sin\theta-\cos\theta}{4\sin\theta+\cos\theta}$$

$$=\frac{(4\tan\theta-1)}{(4\tan\theta+1)}$$

$$= \frac{3-1}{3+1} = \frac{2}{4} = \frac{1}{2}$$

30. (B)



Hence, clock 4 = B

31. (B)

$$\frac{1}{k-2} = \frac{k+1}{4} = \frac{k+1}{k+6}$$

Solving these we get k = –2

32. (D)

$8 \times 1 - 2 = 6$ $\quad$ $6 \times 2 - 3 = 9$

$9 \times 3 - 4 = 23$ $\quad$ $23 \times 4 - 5 = 87$

$87 \times 5 - 6 = 429$

33. (A)

10 + 43 – 1 = 52

34. (B)

In a leap year, 366 days are there $\frac{366}{7} = 2$ remainder. That mean are in a leap year 52 total weeks and 2 odd days are there. For two days possibilities are

(1) Mon Tues

(2) Tues Wed

(3) Wed Thurs

.

.

.

(7) Sun Mon

Only 2 (Sun Mon, Sat Sun) have Sundays.

= 2/7

35. (A)

$x^2 + ax + b = 0$

Using sum of roots and product of roots

$a = -(-3 + 2) = 1$

$b = -3 \times 2 = -6$

$x^2 - 6x + 1$ at x = 6

$6^2 - 6 \times 6 + 1 = 1$

36. (D)

Only 57 is not a prime.

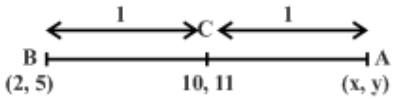
37. **(D)**
Obvious D

38. **(A)**
$2k^2 = 2k + 5(k - 1)$
$2k^2 - 7k + 5 = 0$
$(k-1)(2k-5) = 0$
$k = 1$ or $\frac{5}{2}$

39. **(A)**
$bh = 72$
$12h = 72$
$h = 6$

40. **(A)**
$\sin A = 1 - \sin^2 A$
$= \cos^2 A$
$\cos^2 A + \cos^4 A = \sin A + (\sin A)^2$
$= \sin A + \sin^2 A = 1$

41. **(B)**



As BA : AC = 2 : 1
BC : AC = 1 : 1
C is the midpoint of AB.
$x = 18, y = 17$

42. **(D)**
(2, 2) and (5, 5) lie on $x = y$
$k = -k$
$\Rightarrow k = 0$

43. **(C)**
For a sum divisible by 5, we have to get either a sum 5 or 10.
5 = {1, 4} {2, 3} {3, 2} {4, 1} = 4
10 = {6, 4} {5, 5} {4, 6} = 3
$\frac{4+3}{6\times 6} = \frac{7}{36}$

44. **(A)**
Red face cards = 6
$\frac{6}{52} = \frac{3}{26}$

45. **(A)**
External dia = 8 cm

External Rad = 4 cm
Internal rad = 4 – 1 = 3cm

$$\text{Cost} = 8 \times \text{volume} = 8 \times \frac{22}{7} \times \left(4^2 - 3^2\right) \times 21$$

$$= 3700 \text{ gm}$$

$$= 3.7 \text{ kg}$$

46. **(D)**

6 + 2 = 8, 8 + 4 = 12, 12 + 8 = 20, 20 + 16 = 36, 36 + 32 = 68

47. **(D)**

Data inadequate

48. **(B)**

$$x = \left(\cos^2\frac{\pi}{12} - \sin^2\frac{\pi}{12}\right)\left(\cos^2\frac{\pi}{12} + \sin^2\frac{\pi}{12}\right)$$

$$\cos^2\frac{\pi}{12} - \sin^2\frac{\pi}{12} = \cos\frac{\pi}{6} = \frac{1}{2}$$

$$\left(\cos 2\theta = \cos^2\theta - \sin^2\theta\right)$$

49. **(D)**

$x^2 + 6 \times -2 = 0$

Using sum of roots and product of roots

$y + z = -6$, $yz = -2$

$$y + \frac{1}{z^2} + z + \frac{1}{y^2} = -6 + \frac{\left(y+z\right)^2 - 2yz}{y^2z^2}$$

$$= -6 + \frac{36+4}{4} = 4$$

$$\left(y + \frac{1}{z^2}\right)\left(z + \frac{1}{y^2}\right) = yz + \frac{1}{y^2z^2} + \frac{1}{z} + \frac{1}{y}$$

$$= -2 + \frac{1}{4} + \frac{6}{2} = \frac{5}{4}$$

$$x^2 - 4x + \frac{5}{4} = 0 \qquad \Rightarrow 4x^2 - 16x + 5 = 0$$

50. **(A)**

$7 \times 6 = 42$ $\qquad$ $9 \times 9 = 81$

$5 \times 3 = 15$ $\qquad$ $6 \times 2 = 12$