SSC (T-II) 2013, MTP - 16 (SOLUTION)

1. (A) Unit digits in $(7)^4 = 1$, therefore unit digit in $(7^4)^8$ i.e. 7^{32} will be 1.
Hence, unit digits in $(7)^{35}$
$= 1 \times 7 \times 7 \times 7 = 3$
Again, unit digit in $(3)^4 = 1$
Therefore, unit digit in the expansion of $(3^4)^{17}$
$= (3)^{68} = 1$
$\therefore$ Unit digit in the expansion of $(3)^{71}$
$= 1 \times 3 \times 3 \times 3 = 7$
and unit digit in the expansion of $(11)^{35}$
$= 1$
$\therefore$ Unit digit in the product of
$7^{35} \times 3^{71} \times 11^{55} = 1$

2. (C) $a = \frac{1}{100}$, $b = \frac{1}{5}$, $c = \frac{1}{10}$
or $a = 0.01$, $b = 0.2$, $c = 0.1$
$\therefore$ $b > c > a$

3. (A) Product of the numbers
$= HCF \times LCM$
$= 21 \times 4641$
$= 21 \times 3 \times 7 \times 13 \times 17$
$= 3 \times 7 \times 3 \times 7 \times 13 \times 17.$
i.e. 273 and 357.

4. (A) Let the number be x.
$\therefore$ $x = 765k + 42$
$\Rightarrow$ $17 \times 45K + 17 \times 2 + 8$
$\Rightarrow$ $17(45K + 2) + 8$
$\Rightarrow$ Remainder = 8

5. (B) Distance traversed by the extremity of the minute-hand in one hour $= 2 \times \frac{22}{7} \times 10$
Distance traversed by the extremity of the minute-hand in 3 days and 5 hour, i.e. in 77 hours
$= 2 \times \frac{22}{7} \times 10 \times 77$
$= 22 \times 220 = 4840$ cm
Distance traversed by the hour-hand in 12 hour
$= 2 \times \frac{22}{7} \times 7 = 44$ cm
Distance traversed by the hour-hand in 77 hour
$= \frac{44}{12} \times 7 = \frac{11 \times 77}{3} = \frac{847}{3} = 282.33$ cm
Reqd. difference $= 4840 - 282.33$
$= 4557.67$ cm

6. (D) The series obtained
$= 4 \times 2 + 3, 4 \times 5 + 3, 4 \times 8 + 3, 4 \times 11 + 3 \ldots$
$= 11, 23, 35, \ldots$

7. (A) $\frac{\frac{1}{2} \div \frac{1}{2} \times \frac{1}{2}}{\frac{1}{2} + \frac{1}{2} \times \frac{1}{2}} = \frac{\frac{1}{2} \times 2 \times \frac{1}{2}}{\frac{3}{4}} = \frac{1}{2} \times \frac{4}{3} = \frac{2}{3}$

8. (C) Let a_1, d_2 represent the Ist term and common difference of AP_1.
and a_2, d_2 represent the Ist term and common difference of AP_2.
ATQ,

$$\frac{S_n}{S_n'} = \frac{\frac{n}{2}[2a_1 + (n-1)d_1]}{\frac{n}{2}[2a_2 + (n-1)d_2]}$$

$$\frac{7n+1}{4n+27} = \frac{2a_1 + (n-1)d_1}{2a_2 + (n-1)d_2} \quad \ldots\ldots \text{(i)}$$

Now, $\frac{a_{11}}{b_{11}} = \frac{a_1 + 100d_1}{a_2 + 10d_2} = \frac{2a_1 + 30d_1}{2a_2 + 30d_2}$

$$= \frac{2a_1 + (21-1)d_1}{2a_2 + (21-1)d_2}$$

$$= \frac{S_{21}}{S_{21}'}$$

$$= \frac{7 \times 21 + 1}{4 \times 21 + 27}$$

$$= \frac{148}{111} \text{ Ans.}$$

9.(B) $S_n = 0.4 + 0.44 + 0.444 + \ldots +$ to n terms
$= 4[0.1 + 0.11 + 0.111 + \ldots +$ to n terms

$$= \frac{4}{9}[0.9 + 0.99 + 0.999 + \ldots + \text{to n terms}$$

$$= \frac{4}{9}\left[\frac{9}{10} + \frac{99}{100} + \frac{999}{1000} + \ldots + \text{to n term}\right]$$

$$= \frac{4}{9}\left(1 - \frac{1}{10}\right) + \left(1 - \frac{1}{100}\right) + \left(1 - \frac{1}{1000}\right) + \ldots + \left(1 - \frac{1}{10^n}\right)$$

$$= \frac{4}{9}\left[(1 + 1 \ldots + \text{n times}) - \left(\frac{1}{10} + \frac{1}{100} + \frac{1}{1000} + \ldots + \frac{1}{10^n}\right)\right]$$

$$= \frac{4}{9}\left[n - \frac{\frac{1}{10}\left\{1 - \left(\frac{1}{10}\right)^n\right\}}{1 - \frac{1}{10}}\right] \quad \therefore S_n = \frac{a(1-r^n)}{(1-r)}$$

$$= \frac{4}{9}\left[n - \frac{\frac{1}{10}\left(1-\frac{1}{10^n}\right)}{\frac{9}{10}}\right]$$

$$= \frac{4}{9}\left[n - \frac{1}{9}\left(1-\frac{1}{10^n}\right)\right]$$

$$= \frac{4}{9}\left[9n - 1 + \frac{1}{10^n}\right] \text{ Ans.}$$

10. (C) Number of women who have either nose studs or ear right = (15 – 3) = 12
∴ Number of those who have both nose studs and ear rings = (8 + 7) – 12 = 3

11. (C) Ashok's present age = 26 – 6 = 20 yrs
∴ Pradeep's present age = $20 \times \frac{3}{4} = 15$ yrs]

12. (A) Let the number of girls = x
∴ boys = $x - 2$
According to question:-
$x + x - 2 = 52$
∴ $x = 27$
∴ No. of bags = 25
Again:-
Let average no. of girls = y kg
$42 \times 25 + 27xy = 52 \times 52$

$$\therefore \quad y = \frac{52\times52 - 42\times25}{27}$$

$$= 61.25 \sim 61 \text{ kg (Approx.)}$$

13. (D) Wrong calculated marks
$= 35 \times 75$

$$= \frac{2520 - 36 + 86}{35} = \frac{2570}{35} = 73.42$$

14. (C) If a container contains y units of liquid and x units of liquids is taken out. If this operation is repeated n times. The final quantity of the liquid in the container is

$$y\left(1-\frac{x}{y}\right)^n$$

$$\therefore \quad 24 = 54\left(1-\frac{x}{54}\right)^2$$

$$\Rightarrow \quad \left(1-\frac{x}{54}\right)^2 = \frac{24}{54} = \frac{4}{9}$$

$$\Rightarrow \quad \left(1-\frac{x}{54}\right) = \frac{2}{3}$$

$$\Rightarrow \quad \frac{x}{54} = \frac{1}{3}$$

$$\Rightarrow \quad x = 18\ l$$

15. (C) Let the quantity of pure milk be x l.
If 5 l of water is added to it,
then,
Cost of $(5 + x)$ l = Rs. $(3x + 5)$
∴ Profit = Rs. 15
Given, 20% of $3x$ = 15

$$\Rightarrow \quad \frac{3x}{5} = 15$$

$$\Rightarrow \quad x = 25\ l$$

16. (D) Let the amount be Rs. x and rate is r%.
Then, Simple interest

$$\frac{x\times r}{100} = 25$$

$$\Rightarrow \quad x \times r = 2500$$

For true discount

$$\frac{(x-20)\times r}{100} = 20$$

$$\Rightarrow \quad \frac{x\times r - 20r}{100} = 20$$

$$\Rightarrow \quad xr - 20r = 2000$$

From Eqs. (i) and (ii), we get
$2500 - 20r = 2000$
$\Rightarrow \quad r = 25\%$
From Eq. (i)
$x \times 25 = 2500$
$\Rightarrow \quad x = 100$

17. (*) Let the CP price of pen = Rs. 1
CP of 40 pen = 36×1 = Rs. 36
∴ Selling price of 40 pen = 40 – 3% of 40

$$= 40 - \frac{3}{100} \times 40$$

$$= \frac{400 - 12}{10}$$

= Rs. 38.80

$$\therefore \% \text{ profit} = \left[\frac{38.80 - 36}{36}\right] \times 100$$

$$= \frac{280}{36} = \frac{70}{9} = 7\frac{7}{9}\%$$

18.(C) Length of bridge = 1000 m
Length of train = 500 m
Total length = 1000 + 500 = 1500 m

$$\text{Speed of train} = \frac{1500}{1000} \times \frac{60}{2} = 45 \text{ km/h}$$

19. (B) Distance (D) = Speed (S) × Time (T)

$$\therefore \quad D = 4 \times \left(T \times \frac{15}{60}\right)$$

$$\Rightarrow \quad D = 4T + 1$$

and $D = 6\left(T - \frac{10}{60}\right)$

$D = 6T - 1$

Solving eqns. (i) and (ii),

$T = 1$ h

$D = 4 \times 1 + 1 = 5$ km

20. (D) It is clear from the question that when A covers 500m, B covers 400 m i.e., A takes a lead of 100 m in every 500 m of distance. Therefore, a lead of 400 m will be taken in travelling a distance of 2000 m or in other words A passes B after every 2000m. Hence, total number of such pass

$$= \frac{5000}{2000} = \frac{5}{2} = 2\frac{1}{2} \text{ times}$$

21. (C) Let three numbers A, B and C are Rs. $12x$, $15x$ and $25x$ respectively.

$\therefore \quad 12x + 15x + 25x = 312$

$$\Rightarrow \quad x = \frac{312}{52} = 6$$

$$\therefore \text{ Required ratio} = \frac{15\times6 - 12\times6}{25\times6 - 15\times6}$$

$$= \frac{3\times6}{10\times6}$$

$$= \frac{3}{10} = 3 : 10$$

SHORTCUT METHOD:-

There is no need to calculate the value of x.

$$\text{Required ratio} = \frac{15x - 12x}{25x - 15x}$$

$$= \frac{3x}{10x} = \frac{3}{10} = 3 : 10$$

22. (B) Ratio of investment of Sita, Gita and Rita is $(5000 \times 3 + 7000 \times 9) : (4000 \times 1 + 3000 \times 11) : (7000 \times 11)$

$= 78000 : 37000 : 77000$

$= 78 : 37 : 77$

$\therefore$ Share of Rita in profit

$$= \frac{77}{78 + 37 + 77} \times 1218 = \text{Rs. } 488.47$$

23. (A) Let the speed of man and current be x km/h and y km/h respectively.

Then,

$$\frac{30}{x - y} + \frac{44}{x + y} = 10 \quad \ldots \text{(i)}$$

and $$\frac{40}{x - y} + \frac{55}{x + y} = 13 \quad \ldots \text{(ii)}$$

Solving eqns.(i) and (ii),

$y = 3$ km/h

24. (C) Let the tap can fill the cistern in x h.

$$\therefore \quad \frac{x \times 8}{x - 8} = 12$$

$$\Rightarrow \quad 8x = 12x - 96$$

$$\Rightarrow \quad x = 24 \text{ h}$$

$\therefore$ Capacity of cistern

$= 24 \times 60 \times 6 = 8640l$

25. (A) Part of the cistern filled in 3 min

$$= \frac{3}{12} + \frac{3}{16} = \frac{21}{48} = \frac{7}{16}$$

Let remaining $\frac{9}{16}$ part was filled in x min

Then, $$\frac{x}{12} \times \frac{7}{8} + \frac{x}{16} \times \frac{5}{6} = \frac{9}{16}$$

$$\Rightarrow \quad x\left(\frac{7+5}{96}\right) = \frac{9}{16}$$

$$\Rightarrow \quad x = \frac{9}{16} \times \frac{96}{12} = 4.5 \text{ min}$$

26. (A) Ratio of efficiencies of the three persons

$$= \frac{24}{6} : \frac{24}{8} : \frac{24}{3} - \left(\frac{24}{6} + \frac{24}{8}\right)$$

$= 4 : 3 : 1$

$$\therefore \text{Boy's share} = \frac{1}{(4+3+1)} \times 600 = \text{Rs. } 75$$

27. (A) Let the cost price of geyser be Rs.x, then, $x \times 1.1 \times 1.15 \times 1.25 = 1265$

$$x = \frac{1265}{1.58125}$$

$= \text{Rs. } 800$

28. (B) Let his increased income be x.

Then,

$$(x - 1200) \times \frac{80}{100} \times \frac{12}{100} = x \times \frac{80}{100} \times \frac{10}{100}$$

$$\Rightarrow \quad 12x - 14400 = 10\%$$

$$x = \text{Rs. } 7200$$

29. (D) Let the present value of what A owes to B be Rs. x.

Then,

$$x + \frac{x \times 14 \times 3}{2 \times 100} = 1573$$

$$\Rightarrow \quad x + \frac{21}{100}x = 1573$$

$$\Rightarrow \quad \frac{121x}{100} = 1573$$

$$\therefore \quad x = \text{Rs. } 1300$$

Let y be the present value of what B owes A.

Then, $$y + y \times \frac{1}{2} \times \frac{14}{100} = \text{Rs. } 1444.50$$

$\Rightarrow \quad y + \frac{7}{100}y = \text{Rs. } 1444.50$

$\Rightarrow \quad y = \frac{1444.50 \times 100}{107} = \text{Rs. } 1350$

Hence, B pay Rs. 50 to A.

30. (A) Let the amount given at 4% per annum be Rs. x.

$\therefore$ Amount given at 5% per annum $= (1200 - x)$

$$\frac{x \times 4 \times 2}{100} + \frac{(1200 - x) \times 5 \times 2}{100} = 110$$

$$\Rightarrow \quad \frac{-2x + 12000}{100} = 110$$

$\Rightarrow \quad x = \text{Rs. } 500$

Also, $(1200 - x) = 1200 - 500 = \text{Rs. } 700$

31.(A) Let money invested at 5% be Rs. x.

$$\therefore \quad \frac{x \times 1 \times 5}{100} + \frac{(10000 - x) \times 1 \times 8}{100} = 688.25$$

$\Rightarrow 5x - 8x + 80000 = 68825$

$\Rightarrow 3x = 11175$

$\Rightarrow x = \text{Rs. } 3725$

32. (C) Let principal amount be Rs. 100.

Then, $SI = \frac{100 \times 20 \times 3}{100} = \text{Rs. } 60$

and $CI = 100\left(1 + \frac{20}{100}\right)^3 - 100$

$$= 100 \times \left(\frac{6}{5}\right)^3 - 100 = \frac{364}{5}$$

$\therefore CI - SI = \frac{364}{5} - 60 = \frac{64}{5}$

If difference is Rs. $\frac{64}{5}$, Principal = Rs. 100

If difference is Rs. 48,

Principal $= \frac{100 \times 5}{64} \times 48 = \text{Rs. } 375$

33. (C) $$\frac{P\left(1 + \frac{r}{100}\right)^2}{\left(P + \frac{Pr}{100}\right)} = \frac{6}{5}$$

$$\Rightarrow \quad \left(1 + \frac{r}{100}\right) = \frac{6}{5}$$

$\Rightarrow \quad r = 20\%$

34. (D) Train with a speed of 54km/h passes the man in 20s.

$\therefore$ Length of the train $= 54 \times \frac{5}{18} \times 20$

$= 300$ m

Let the length of platform be x m.

Then, $(300 + x) = 54 \times \frac{5}{18} \times 36$

$x = 540 - 300 = 240$ m

35. (A) Length of train $= 12 \times 15 = 180$ m

Time $= 18$ s

$$\text{Speed} = \frac{180}{18} = 10 \text{ m/s}$$

New distance $= 15 \times 10 = 150$ m

$\therefore$ Required time $= \frac{150}{10} = 15\text{s}$

36. (B) Let the CP of the pen and book be Rs. x and Rs. y respectively.

$\therefore \quad 0.95x + 1.15y = (x + y) + 7$

$\Rightarrow \quad 0.15y - 0.05x = 7 \quad \ldots$ (i)

and $1.05x + 1.1y = (x + y) + 13$

$\Rightarrow \quad 0.05x + 0.1y = 13 \quad \ldots$ (ii)

Solving Eqs. (i) and (ii), we get

y = Rs. 80

37. (D) Let the cost price of articles be Rs.x.

Then, selling price of article = $0.88x$.

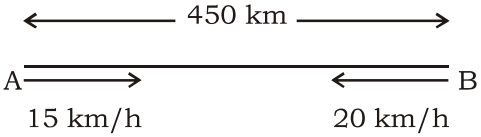
Marked price of article

$$= \frac{0.88}{80} \times 100 \times x = 1.1x$$

New selling price of article = $1.045x$

$\therefore$ Profit per cent $= \frac{1.045x - x}{x} \times 100 = 4.5\%$

38. (A) Let the time of meet = t h



Now,

$$15\left(t - \frac{20}{60}\right) + 20t = 450$$

$\Rightarrow \quad t = 13\text{h}$

Distance from A $= 15\left(13 + \frac{1}{3}\right) = 190$ km

39. (A) Speed of Ramesh $= 3x$ km/hr

Speed of Suresh $= 4x$ km/hr

Let the distance $= D$

ATQ,

$$\frac{D}{3x} - \frac{D}{4x} = \frac{1}{2}$$

$$\Rightarrow \quad \frac{D}{x}\left(\frac{1}{12}\right) = \frac{1}{2}$$

$\Rightarrow \quad D = 6x$

Time of Ramesh $= \frac{D}{3x} = \frac{6x}{3x} = 2$ h

Time of Suresh $= \frac{D}{4x} = \frac{6x}{4x} = 1.5$ h

40.(*) Work done by A & B in 16 days = $\frac{16}{30} = \frac{8}{15}$

Remaining work = $1 - \frac{8}{15} = \frac{7}{15}$

$\because$ $\frac{7}{15}$ work is done by B alone in 44 days.

$\therefore$ 1 work is done by B alone in

$= \frac{44}{\frac{7}{15}} = \frac{44\times15}{7} = 94.29$ days

41. (C) SP = $\frac{70}{700}$ MP

SP For Tarun = Rs. 8750

Labelled price = $\frac{125}{100} \times \frac{70}{100}$ MP = 8750

$\Rightarrow$ MP = Rs. 10000

42. (A) Let the CP of the article be Rs. x.

Then,

SP = $x \times 1.12 \times 1.1$

Given, $x \times 1.12 \times 1.1 = 616$

$\Rightarrow$ $x = \frac{616}{1.232}$ = Rs. 500

43. (B) Let CP = Rs. x and SP = Rs. y.

$\Rightarrow$ $y \times 7\% = x \times 8\%$

and $y \times 9\% = x \times 10\% + 1$

and $\frac{9}{100} \times y = \frac{10}{100} \times x + 1$

$\Rightarrow$ $7y = 8x$

and $9y = 10x + 100$

$\Rightarrow$ $9 \times \frac{8x}{7} = 10x + 100$

$\Rightarrow$ x = Rs. 350

44. (B) Let the numbers be $3x$ and $4x$.

Then,

$16x^2 = 8 \times (9x)^2 - 224$

$\Rightarrow$ $16x^2 = 72x^2 - 224$

$\Rightarrow$ $56x^2 = 224$

$\Rightarrow$ $x^2 = 4$

$\Rightarrow$ $x = 2$

Hence, numbers are 6, 8.

45. (A) P = $\frac{x^2-36}{x^2-49} = \frac{(x-6)(x+6)}{(x-7)(x+7)}$

Q = $\frac{x+6}{x+7}$

$\therefore \frac{P}{Q} = \frac{\frac{(x-6)(x+6)}{(x-7)(x+7)}}{\frac{(x+6)}{(x+7)}} = \frac{x-6}{x-7}$

46. (B) $S_n = pn + qn^2$

$S_{n-1} = p(n-1) + q(n-1)^2$

$= pn - p + qn^2 - 2qn + q$

$a_n = S_n - S_{n-1}$

$= pn + qn^2 - (pn - p + qn^2 - 2qn + q)$

$= p + 2qn - q$

Common difference

$= a_2 - a_1$

$= (p + 4q - q) - (p + 2q - q)$

$= 2q$ Ans.

47.(C) a, b and c are in GP and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$.

Let, $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}} = k$

$\therefore$ $a = k^x$

$b = k^y$

$c = k^z$

Now:-

$b^2 = ac$ [a, b and c are in G.P.]

or, $(k^y)^2 = k^{x+z}$

$\therefore$ $2y = x + z$

48. (C)

	Spirit		Water
Vessel 1	0.5		0.5
	1	:	1
Vessel 2	0.75	:	0.25
	3	:	1

$\frac{\text{Spirit}}{\text{Water}} = \frac{\frac{1}{2}\times2 + \frac{3}{4}\times3}{\frac{1}{2}\times2 + \frac{1}{4}\times3} = \frac{13}{7}$

49. (C) $\frac{y}{x-z} = \frac{y+x}{z}$

$\Rightarrow$ $yz = xy + x^2 - yz - xz$ ... (i)

Also, $\frac{x}{y} = \frac{y}{x-z}$

$\Rightarrow x^2 - xz = y^2$ ... (ii)

Using Eqs. (i) and (ii), we get

$yz = xy - yz + y^2$

$\Rightarrow 2yz = xy + y^2$

$\therefore$ $2z = x + y$ ... (iii)

Only option (C) satisfies the Eq. (iii).

50. (A) CP = x (say)

34% of CP = 26% of SP

$\frac{34}{26}x = \frac{17}{13}x$ = SP

% profit = $\frac{\frac{17x-13x}{13}}{x}\times100$

= 30.77%

51. (B) Given roots are real and equal.

$\therefore \quad B^2 - 4AC = 0$

$\Rightarrow \quad [-2(a^2 - bc)]^2 - 4(c^2 - ab)(b^2 - ac) = 0$

$\Rightarrow \quad 4(a^4 + b^2c^2 - 2a^2bc - c^2b^2 + ac^3 + ab^3 - a^2bc = 0$

$\Rightarrow \quad 4a(a^3 + b^3 + c^3 - 3abc) = 0$

$\Rightarrow \quad a^3 + b^3 + c^3 = 3abc$

52. (B) $\dfrac{a^{1/2} + a^{-1/2}}{1-a} + \dfrac{(1 - a^{-1/2})}{1 + \sqrt{a}}$

$\Rightarrow \dfrac{2}{(1-\sqrt{a})(1+\sqrt{a})} + \dfrac{1 - a^{-1/2}}{(1+\sqrt{a})}$

$\Rightarrow \dfrac{2 + (1-\sqrt{a})(1 - a^{-1/2})}{1-a}$

$\Rightarrow \dfrac{2 + 1 - a^{-1/2} - a^{-1/2} + 1}{1-a}$

$\Rightarrow \dfrac{2 + 2 - (a^{-1/2} + a^{+1/2})}{1-a}$

$\Rightarrow \dfrac{2+2-2}{1-a} = \dfrac{2}{1-a}$

53. (A) Both the expressions are divided by $(x-2)$.
Hence $f_1(2) = f_2(2)$.
($\because$ Both remainders are same)

$\Rightarrow \quad p \times (2)^4 - 3(2)^3 + 20 = 4(2)^2 + 7(2) - p$

$\Rightarrow \quad 16p - 24 + 20 = 16 + 14 - p$

$\Rightarrow \quad 17p = 34$

$\therefore \quad p = 2$

Hence, the value of 'p' is 2.

54. (A) $x^{a^3+b^3+3ab(a+b)} = (2^5)^{25}$

$\Rightarrow x^{(a+b)^3} = 2^{125}$

$\Rightarrow x^{5^3} = 2^{5^3}$

$\Rightarrow x = 2$

55. (A) Joining point O to three vertices A, B and C.

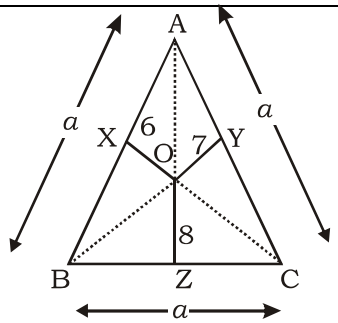
Now,

Area of (ΔOBC + ΔOCA + ΔOAB) = area of ΔABC.

$\Rightarrow \quad \dfrac{1}{2}(a \times 8 + a \times 7 + a \times 6) = \dfrac{\sqrt{3}}{4}a^2 = \dfrac{21a}{2}$

$a = \dfrac{42}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}}$

$\therefore \quad a = 14\sqrt{3}$



$\Rightarrow$ Hence, area of triangle ABC.

$= \dfrac{\sqrt{3}}{4}a^2$

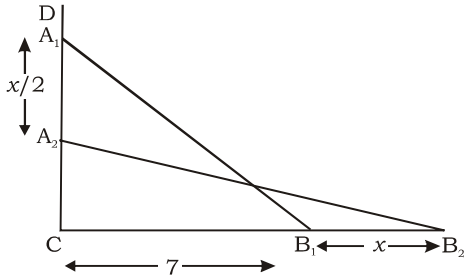
$= \dfrac{\sqrt{3}}{4}(14\sqrt{3})^2 \text{ m}^2$

$= 254.6 \text{ m}^2$

56. (D) Let A_1B_1 be the ladder placed against the wall.

A_1B_1 = length of ladder = 25 m

B_1C = 7 m



Now, ladder foot is drawn out from B_1 to B_2 such that $B_1B_2 = x$ m, then the top of the ladder comes down from A_1 to A_2 and A_1A_2

$= \dfrac{x}{2}$ m (as per question),

So, $A_1B_1 = A_2B_2 = 25$ m and $A_2C = Y$ (say)

In ΔA_1B_1C

$A_1C = \sqrt{(A_1B_1^2) - (B_1C)^2}$

$\Rightarrow \quad A_1A_2 + A_2C = \sqrt{25^2 - 7^2}$

$\Rightarrow \quad \dfrac{x}{2} + Y = 24 \qquad \ldots (i)$

In ΔA_2B_2C

$(A_2C)^2 + (B_2C)^2 = A_2B_2{}^2$

$\Rightarrow \quad Y^2 + (x+7)^2 = 25^2$

$\Rightarrow \quad \left(24 - \dfrac{x}{2}\right)^2 + (x+7)^2 = 25^2 \quad$ [from (i)]

$\Rightarrow \quad 576 + \dfrac{x^2}{2} - 24x + x^2 + 49 + 14x = 625$

$\Rightarrow \frac{5x^2}{4} = 10x$

$\Rightarrow x = 8$ m

57. (C) Let the circumference of outer circle $C_1 = 62.832$ m

circumference of inner circle $C_2 = 37.6992$ m

The area between two circles = $A_1 - A_2 = ?$

Here, using the correlation formula for circumference and area.

$$A = \frac{C^2}{4\pi}$$

$$\Rightarrow A_1 - A_2 = \frac{C_1^2}{4\pi} - \frac{C_2^2}{4\pi}$$

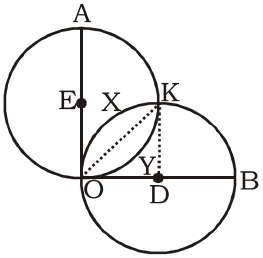
$$\Rightarrow A_1 - A_2 = \frac{C_1^2 - C_2^2}{4\pi}$$

$$\Rightarrow A_1 - A_2 = \frac{(C_1 - C_2)(C_1 - C_2)}{4\pi}$$

$$\Rightarrow A_1 - A_2 = \frac{(62.832 + 37.6992)(62.832 - 37.6992)}{4 \times 3.1416}$$

$\Rightarrow A_1 - A_2 = 201$ m^2

58. (A)



Let AOB be one quadrant of a circle radius.

OA = OB = 10 m

Two circles OKB and OKA are made on the above radiii as diameter. So, if E and D are centres.

OD = BD = OE = EA = 5 m

Since two circles are equal, k will be midpoint of arc AKO and OKB.

$\Rightarrow \angle KDO = 90°$

$\Rightarrow OK = 5\sqrt{2}$

Area common to both circle = 2 × area of segment OXK (or OYK)

Using the formula, for central angle = 90°

Area of segment OXK $= 0.285 \times r^2$

$= 0.285 \times 5^2$

$= 7.13$ m^2

Area common to both circle

$= 2 \times 7.13$

$= 14.26$ m^2

59. (B) Let A = 2 pens are red.

B = 2 pens are blue.

than $P(A) = \frac{5}{9} \times \frac{4}{8} = \frac{20}{72} = \frac{5}{18}$

$P(B) = \frac{4}{9} \times \frac{3}{8} = \frac{12}{72} = \frac{1}{6}$

Now, A and B are mutually exclusive events.

Hence,

P(selecting either 2 red pens or blue pens) = P(A + B) = P(A) + P(B)

$= \frac{5}{18} + \frac{1}{6} = \frac{4}{9}$

Hence, the required probability is $\frac{4}{9}$.

60. (B) $\sec^2\theta \operatorname{cosec}^2\theta - [\tan^2\theta + \cot^2\theta]$

$= (1 + \tan^2\theta)(1 + \cot^2\theta) - [\tan^2\theta + \cot^2\theta]$

[since $\sec^2\theta = 1 + \tan^2\theta$]

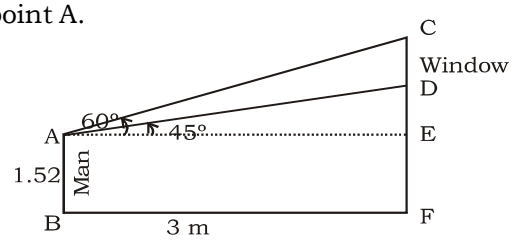
$= 1 + \tan^2\theta + \cot^2\theta + \tan^2\theta \cot^2\theta - \tan^2\theta - \cot^2\theta$

$= 1 + 1$

$= 2$

Hence, the required value is 2.

61. (B) Let AB be the man standing out side a house which has a window CD. C (top point) and D (bottom point) of window are viewed from point A.



$\left.\begin{matrix}\angle CAE = 60° \\ \angle DAE = 45°\end{matrix}\right\}$ Given

In right Δ DAE,

$\tan 45° = \frac{DE}{AE} = \frac{DE}{3}$

$\Rightarrow$ DE = 3tan 45° = 3 m

In right Δ CAE,

$\tan 60° = \frac{DE}{AE} = \frac{CD + DE}{AE} = \frac{CD + 3}{AE}$

$\Rightarrow \sqrt{3} = \left(\frac{CD}{3} + 1\right)$

Therefore, the length of the window is 2.2 m.

62. (C) $(1 - \sin^2 A) = \frac{0.8}{\sec A}$

$\Rightarrow \cos^2 A \cdot \sec A = 0.8$

$\Rightarrow \cos A = 0.8 = \frac{4}{5}$

$\Rightarrow \quad \sin A = \frac{3}{5}$

$\Rightarrow \quad \tan A = \frac{3}{4}$

So, $\tan A + \frac{1}{\cos A} = \frac{3}{4} + \frac{5}{4} = \frac{8}{4} = 2$

63. (A) $\tan\theta = 3\cot\theta$

$\Rightarrow \tan\theta = \frac{3}{\tan\theta}$

$\Rightarrow \tan^2\theta = 3$

$\Rightarrow \tan\theta = \pm\sqrt{3}$

Since θ is an acute angle $\Rightarrow \theta = 60°$

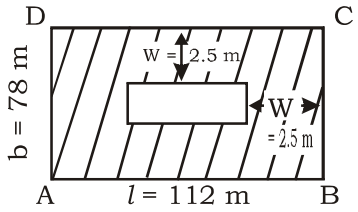
Now, $\sin^2\theta + \text{cosec}^2\theta - \frac{1}{2}\cot^2\theta$

$= \sin^2 60° + \text{cosec}^2 60° - \frac{1}{2}\cot^2 60°$

$= \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{2}{\sqrt{3}}\right)^2 - \frac{1}{2}\times\left(\frac{1}{\sqrt{3}}\right)^2$

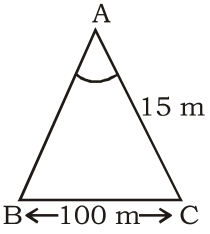
$= \frac{3}{4} + \frac{4}{3} - \frac{1}{6} = \frac{23}{12}$

64. (C)



Let ABCD be a rectangular grass plot which has a gravel path of width = W = 2.5 m (shaded portion)
length of plot = l = 112 m
breadth of plot = b = 78 m
Here, the path is inside the rectangular plot.
Using the formula:-
$= 2W(l + b - 2W)$
$= 2 \times 2.5\ (112 + 78 - 2 \times 2.5)$
$= 925\ m^2$
Now, cost of construction the path
$= 925 \times 3.40 =$ Rs. 3145

65. (A)



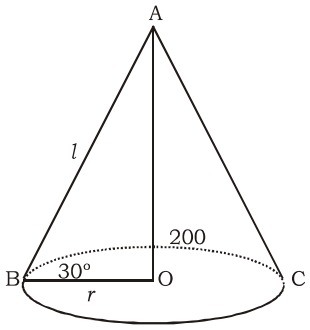
Since the triangle is an equilateral, so each angle = 60° = θ, r = 15

$\therefore$ area of sector $= \frac{\theta}{360°}\times\pi r^2$

$= \frac{60°}{360}\times\frac{22}{7}\times 225$

$= 117.85\ m^2$.

66. (D)



Let ABCO be the right cone whose slant height = l = AB = AC
height = h = 200 m
In ΔABO, $\angle$ABO = 30°

$\sin 30° = \frac{200}{l}$

$\Rightarrow \quad l = 200 \times 2 = 400$ m

$\left[\sin 30° = \frac{1}{2}\right]$

$\cos 30° = \frac{r}{l}$

$\Rightarrow \quad r = l\cos 30° = 400 \times \frac{\sqrt{3}}{2} = 200\sqrt{3}$ m

$\left[\cos 30° = \frac{\sqrt{3}}{2}\right]$

Now,
Area of curved surface = πrl

$= \frac{22}{7}\times 200 \times \sqrt{3} \times 400$

$= 435312\ m^2$.

67. (A) Let, the side of equilateral triangle is 'a' m.

Area (A) $= \frac{\sqrt{3}}{4}a^2\ m^2$

$\Rightarrow$ Cost of paving $= 10 \times \frac{\sqrt{3}}{4}a^2$ rupees

Similarly, perimeter (P) = $3a$ m
$\Rightarrow$ Cost of fencing = $25 \times a$ rupees
According to the question,

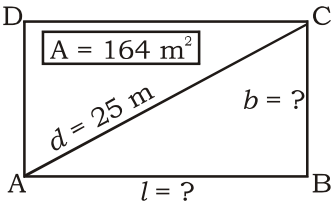
$10 \times \frac{\sqrt{3}}{4}a^2 = 25 \times 3a$

$\Rightarrow \quad a = 10\sqrt{3}$

$\Rightarrow$ $a = 17.32$ m

Hence, the side of the equilateral triangle is 17.32 m.

68. (C)



Let ABCD is a rectangle whose

diagonal = d = 25 m

area = A = 168 m2

length = l = ?

breadth = b = ?

Using the correlation formula

$(l + b)^2 = d^2 + 2A$ [Refer 12.4]

and $(l + b)^2 = d^2 - 2A$

$\Rightarrow$ $(l + b)^2 = (25)^2 - 2 + 168$

$l + b = 31$ (i)

Similarly,

$\Rightarrow$ $(l + b)^2 = (25)^2 - 2 \times 168$

$l - b = 17$ (ii)

From (i) and (ii)

l = 24 m = length of the rectangle

b = 7 m = breadth of the rectangle

69. (A) The given points A, B and C are collinear. So, these area of the triangle formed by these points will be zero.

$\Rightarrow$ $(m + 1)(3 - 2m) + (2m + 1)(2m - 1) + (2m + 2)(1 - 3) = 0$

$\Rightarrow$ $2m^2 - 3m - 2 = 0$

$\Rightarrow$ $2m^2 - 4m + m - 2 = 0$

$\Rightarrow$ $2m(m - 2) + 1(m - 2) = 0$

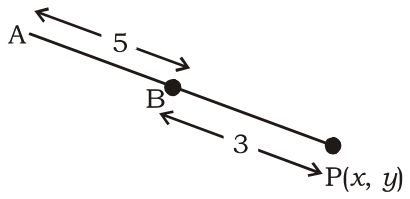
$\Rightarrow$ $(2m + 1)(m - 2) = 0$

$m = -\frac{1}{2}$ or $m = 2$

70. (B) Let P(x, y) be the required point dividing the line AB externally in the ratio 5 : 3.

$\Rightarrow$ $\frac{AB}{BP} = \frac{5}{3} = \frac{1}{m}$ (say)

Using the formula (section)



$x = \frac{lx_2 - mx_1}{l - m}$

where $x_1 = 2$, $x_2 = -3$

$\Rightarrow$ $x = \frac{5 \times -3 - 3 \times 2}{5 - 3} = -\frac{21}{2} = -10.5$

and $y = \frac{ly_2 - my_1}{l - m}$

where, $y_1 = -3$, $y_2 = 7$

$y = \frac{5 \times 7 - 3 \times (-3)}{5 - 3} = 22$

Hence, the required point P is (– 10.5, 22).

71. (D) Using :-

$d_1^2 + d_2^2 = 2(a^2 + b^2)$

$\Rightarrow$ $a^2 + b^2 = \frac{1}{2}[(10)^2 + (17.78)^2] = 208$... (i)

and $2(a + b) = 40$ (given)

$\Rightarrow$ $a + b = 20$ ..... (ii)

From (i) and (ii), we have

$a = 12$, $b = 8$

72. (B) Let ABCD be a rhombus whose

perimeter = p = 36 m

area = A = 72 m^2

perimeter $p = 4 \times a$

$\Rightarrow$ $36 = 4a$

$\Rightarrow$ $a = 9$ m

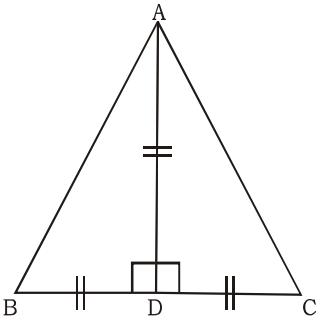
Area, $A = a \times h$

$\Rightarrow$ $72 = 9 \times h$

$\Rightarrow$ $h = \frac{72}{9}$ m

h = 8 m

73. (C)



Given that:-

$\frac{BD}{DA} = \frac{DA}{DC}$ .... (i)

= $DA^2 = BD \times DC$ .... (ii)

In right triangle AOB and AOC:-

$AB^2 = AD^2 + BD^2$ .... (i)

and, $AC^2 = AD^2 + DC^2$ .... (ii)

Adding (A) and (B):-

$AB^2 + AC^2 = 2AD^2 + DC^2$

$= 2 \times BD \times DC + BD^2 + DC^2$ [from (ii)]

Thus in Δ ABC;

$AB^2 + AC^2 = BC^2$

Hence, Δ ABC is a right angled at A.

74. (D) Use length of the rope

$$= \frac{\pi dn}{2}(2n+1)$$

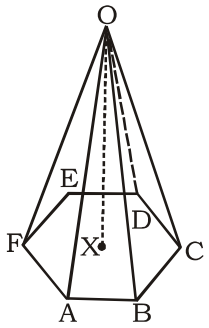
Where $d = 2$ cm

$n = 140$

$$\text{length} = \frac{3.14\times 2\times 140[281]}{2}$$

$$= 1236.40 \text{ m}$$

75. (C) Let ABCDEF be a regular hexagonal pyramid whose base



ABCDEF is a regular hexagon.

If a = each side of regular hexagon,

then, $6a = 30$

$\Rightarrow a = 5$ m

height of pyramid = OX = $h = 20$ m

$$\text{Volume (V)} = \frac{1}{3}Ah$$

$$= \frac{1}{3}\times 6\times\left(\frac{\sqrt{3}}{4}a^2\right)\times 20$$

$$= 10\sqrt{3}a^2$$

$$= 10\sqrt{3}\times 5^2$$

$$= 250 \times 1.732 \text{ m}^3$$

$$= 433 \text{ m}^3$$

76. (B) It is given that

$S = 2.5\,k$, where k stands for curved surface area.

$$\Rightarrow 2\pi r(h+r) = 2.5(2\pi rh)$$

$$\Rightarrow \frac{h+r}{h} = 2.5$$

$$\Rightarrow 7 + r = 2.5 \times 7 \quad [\text{since } h = 7 \text{ cm}]$$

$$\Rightarrow r = 10.5 \text{ cm}$$

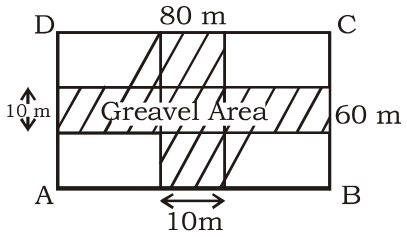
Now,

$$\text{Volume} \quad V = \pi r^2 h$$

$$= \frac{22}{7}\times (10.5)^2 \times 7$$

$$= 2425.5 \text{ cm}^3$$

77.(A)



Let ABCD be a rectangular grass plot

whose length $= l = 80$ m

breadth $= b = 60$ m

Two roads of width W = 10 m (shaded part) are crossing each other at the middle of plot.

Area of roads $= W(l + b - W)$

$= 10(80 + 60 - 10)\text{m}^2$

$= 1300 \text{ m}^2$

Cost of gravelling the roads

= rate of gravelling / m^2 × area of roads

= Rs. 2 × 1300

= Rs. 2600

78. (C) Let r = radius of hemisphere bowl

$\Rightarrow 2\pi r = 176$

$\Rightarrow r = 28$ cm

Volume of the quantity in hemispherical

$$\text{punch bowl} = \frac{1}{2}\times\frac{2}{3}\pi^3$$

$$= \frac{1}{3}\pi\times 28^3 \text{ cm}^3$$

Volume of the bowl in which food is to be

$$\text{served} = \frac{2}{3}\pi\times 2^3 \text{ cm}^3.$$

No. of persons served

$$= \frac{\frac{1}{3}\pi\times 28^3}{\frac{2}{3}\pi\times 2^3}$$

$$= 1372$$

79. (D) $3^{x^2-xy+y^2} = 81 = 3^4$

$\Rightarrow x^2 - xy + y^2 = 4$ … (i)

and $2^{x^3+y^3} = 256 = 2^8$

$\Rightarrow x^3 + y^3 = 8$ … (ii)

Dividing (ii) by (i) $x + y = 2$

80. (B) The given equation is

$$c + \frac{d-y}{y} = e - 1 + \frac{f}{y}$$

$$\Rightarrow c + \frac{d}{y} - \frac{y}{y} = e - 1 + \frac{f}{y}$$

$$\Rightarrow c + \frac{d}{y} - 1 = e - 1 + \frac{f}{y}$$

$\Rightarrow \quad \frac{d}{y} - \frac{f}{y} = e - c$

$\Rightarrow \quad \frac{d-f}{y} = e - c$

$\Rightarrow \quad y = \frac{d-f}{e-c}$

81. (B) The given equation is

$bx^2 - ax + \log_2 m^y = 0$

Now,

Sum of the roots = $x_1 + x_2$

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

$= \frac{a}{b}$ ... (i)

The given relation is

$x_1^2 - x_2^2 = a^2$

$\Rightarrow (x_1 + x_2)(x_1 - x_2) = a^2$

$\Rightarrow \frac{a}{b}(x_1 - x_2) = a^2$

[From equation (i)]

$\Rightarrow x_1 - x_2 = ab$ ... (ii)

From equation (i) and equation (ii)

$x_1 = \frac{1}{2}\left[\frac{a}{b} + ab\right] = \frac{a(b^2+1)}{2b}$

$x_2 = \frac{1}{2}\left[\frac{a}{b} - ab\right] = \frac{a(1-b^2)}{2b}$

Hence, the roots are

$= \frac{a}{2b}(b^2 + 1), \frac{a}{2b}(1 - b^2)$

82.(*) The given expression is

$= (\sqrt{k+l})^2 + (\sqrt{m})^2 + (\sqrt{n})^2 + 2\sqrt{m}\sqrt{k+l} - 2\sqrt{n}\sqrt{m} - 2\sqrt{n}\sqrt{k+l}$

$= \left[\sqrt{k+l} + \sqrt{m} - \sqrt{n}\right]^2$

So, the square root of the given expressions

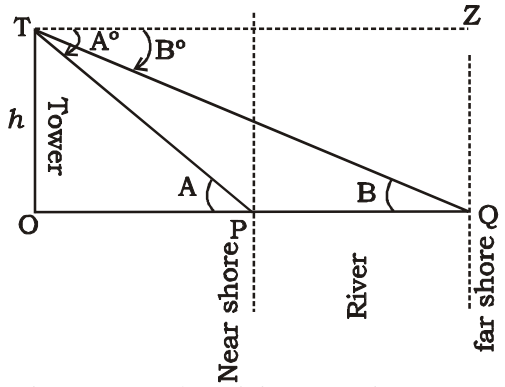
$= \pm\left[\sqrt{k+l} + \sqrt{m} - \sqrt{n}\right]$

83. (C) $\frac{\cos(180°+75)° + \tan(360°-75°)}{2\cot(90°+75°) - 2\sin(360°+90°-75°)}$

$= \frac{-\cos 75° - \tan 75°}{-2\tan 75° - 2\cos 75°} = \frac{1}{2}$

84. (D) Let OT = height of tower = h metres

PQ = width of the river



Where P = point of the near shore to tower.

Q = point of the far shore to the tower.

$\angle ZTA$ = A° (angle of depression)

$\angle ZTQ$ = B° (angle of drepression)

Then, $\angle ZTA = \angle TPO$ = A°

$\angle ZTQ = \angle TQO$ = B°

Now,

In ΔTOP, $\tan A = \frac{h}{OP}$

$\Rightarrow$ OP = $h \cot A$ .... (i)

In ΔTQO, $\tan B = \frac{h}{OQ}$

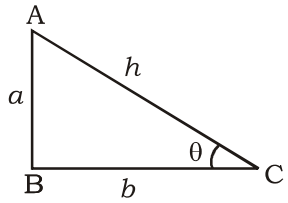
$= \frac{h}{OP + OQ}$

$\Rightarrow$ OP + PQ = $h \cot B$ .... (ii)

From (i) and (ii),

PQ = $h(\cot B - \cot A)$

85. (C)



$h^2 = a^2 + b^2$

since, a and h are consecutive integers,

$h = a + 1$

$\Rightarrow (a+1)^2 = a^2 + b^2$

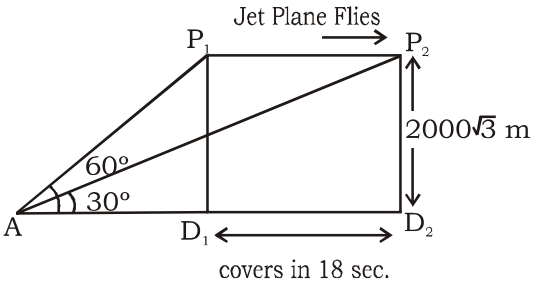
$\Rightarrow b^2 = 2a + 1$

$\Rightarrow a = \frac{b^2-1}{2}$

$\Rightarrow h = \frac{b^2+1}{2}$

So, $\sin\theta = \frac{a}{h} = \frac{b^2-1}{b^2+1}$

86. (A)



In ΔAP_1D_1,

$$\tan 60^\circ = \frac{P_1D_1}{AD_1} = \frac{2000\sqrt{3}}{AD_1}$$

$$\sqrt{3} = \frac{2000\sqrt{3}}{AD_1}$$

$\Rightarrow AD_1 = 2000$ m

In ΔAP_2D_2,

$$\tan 30^\circ = \frac{P_2D_2}{AD_2} = \frac{2000\sqrt{3}}{AD_2}$$

$$\frac{1}{\sqrt{3}} = \frac{2000\sqrt{3}}{AD_2}$$

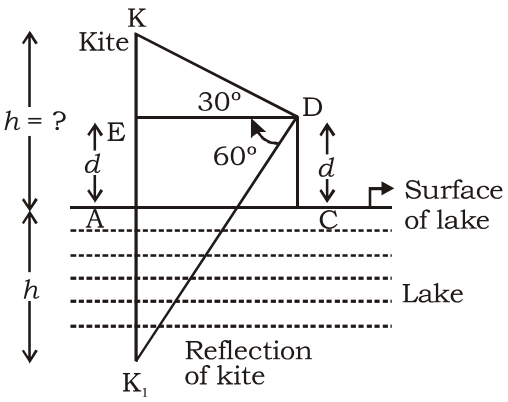
$\Rightarrow AD_2 = 6000$ m

$\therefore D_1D_2 = 6000 - 2000 = 4000$ m

Speed of the Jet $= \frac{4000}{18} \times \frac{18}{5}$

$= 800$ km/h

87. (C)



Let K_1 be the reflection of kite K.

Then AK = h (say) = AK_1

D is a point above the surface AC of the lake such that CD = d = AE

Then, In ΔKED,

$$\tan 30^\circ = \frac{KE}{ED} = \frac{h-d}{ED} \quad \ldots (i)$$

In ΔK_1ED,

$$\tan 60^\circ = \frac{K_1E}{ED} = \frac{h+d}{ED} \quad \ldots (ii)$$

Dividing (i) by (ii), (ED get cancelled)

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

88. (B) Let the no. of sides of the polygon = n

So, there are n interior angles which are in A.P.

Now,

Sum of n interior angles

$$= S_n = \frac{n}{2}[2a + (n-1)d]$$

Where,

$a = 120^\circ$

$d = 5$

$$\therefore S_n = \frac{n}{2}[2 \times 120^\circ + (n-1)5^\circ] \quad \ldots (i)$$

But, also, using the formula,

Sum of interior angles for n – sided ploygon $= (2n-4) \times 90^\circ$

From (1) and (2)

$$(2n-4) \times 90^\circ = \frac{n}{2}[2 \times 120^\circ + (n-1)5^\circ]$$

$\Rightarrow n^2 - 25n + 144 = 0$

$\Rightarrow (n-16)(n-9) = 0$

$n = 16$ or 9

16^{th} interior angle

$= a + (n-1)d$, where a = 120°, $n = 16$

$= 120 + (16-1) \times 5$

$= 195^\circ$, which is greater than 180°.

Since no interior angle of a regular polygon can exceed 180°.

So, $n = 16$ is not valid.

Hence, no.of sides of the polygon is 9.

89. (A) Volume of earth dug out

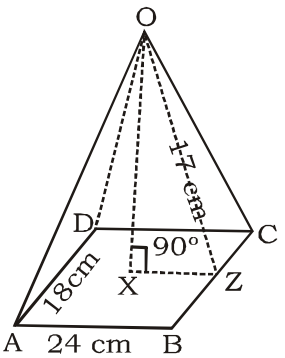
$$= \pi r^2 h = \frac{22}{7} \times \left(\frac{3.5}{2}\right)^2 \times 12 = 115.5 \text{m}^3$$

The earth dug out is exactly spread is form a platform of height h m.

$\Rightarrow 115.5 = 10.5 \times 8 \times h$

$\Rightarrow h = 1.375$ m

90. (C)



Let OABCD be the right pyramid whose

AB = DC = 24 cm

BC = AD = 18 cm

If Z is the mid point of side BC, then OZ = slant height = l = 17 cm

In ΔOXZ, $\angle X = 90^\circ$

$\Rightarrow$ OX = height = $\sqrt{OZ^2 - XZ^2}$

$\Rightarrow \quad h = \sqrt{17^2 - \left(\frac{DC}{2}\right)^2}$

$\Rightarrow \quad h = \sqrt{17^2 - 12^2}$

$\Rightarrow h = 12.04$ cm

Now,

$$\text{Volume} = \frac{1}{3}Ah$$

$$= \frac{1}{3} \times 24 \times 18 \times 12.04$$

$$= 1733.76 \text{ cm}^3$$

$$= 1733.5 \text{ cm}^3 \text{ (approx.)}$$

	September	October
	Total sales $= \frac{1560}{13} \times 100$ **= 12000**	**Total sales** $= \frac{2250}{15} \times 100$ **= 15000**
A	$12000 \times \frac{3}{100} = 360$	$15000 \times \frac{5}{100} = 750$
B	$12000 \times \frac{13}{100} = 1560$	$15000 \times \frac{15}{100} = 2250$
C	$12000 \times \frac{22}{100} = 2640$	$15000 \times \frac{25}{100} = 3750$
D	$12000 \times \frac{25}{100} = 3000$	$15000 \times \frac{20}{100} = 3000$
E	$12000 \times \frac{17}{100} = 2040$	$15000 \times \frac{10}{100} = 1500$
F	$12000 \times \frac{8}{100} = 960$	$15000 \times \frac{13}{100} = 1950$
G	$12000 \times \frac{12}{100} = 1440$	$15000 \times \frac{12}{100} = 1800$

91. (A) Required difference

$$\left(12000 \times \frac{D+C}{100}\right) - \left(15000 \times \frac{A+E}{100}\right)$$

$$\left(12000 \times \frac{25+22}{100}\right) - \left(15000 \times \frac{5+10}{100}\right)$$

$= 5640 - 2250 = 3390$

92. (B) There is only one absolute decrease i.e. E.

93. (D) A + B = 360 + 1560 = 1920 i.e. approximately equal to F type of tyres in October i.e. 1950.

94. (B) Required difference
= (750 + 2250 + 3750 + 1950 + 1800) – (360 + 1560 + 2640 + 960 + 1440)
= 10500 – 6960 = 3540
[Note : D and E decreasing in sales]

95. (D) Number of tyres D and E sold in September
= 3000 + 2040 = 5040
Number of tyres D and E sold in October
= 3000 + 1500 = 4500
Required percentage

$$= \frac{5040}{4500} \times 100 = 112\%$$

96. (C) Leather goods turnover in Tanzania

$$= 40 \times \frac{25}{100} = \$ 10 \text{ million}$$

Leather goods turnover in Africa
= 30 million
Rest of Africa turnover for leather goods
= $ 30 million – 10 million
= $ 20 million

$$\text{Required percentage} = \frac{20}{30} \times 100$$

$= 66.67\% = 67\%$

97. (C) Jewellery items turnover in Tanzania

$$= 40 \times \frac{20}{100} = \$ 8 \text{ million}$$

Jewellery items turnover in Africa
= $ 10 million
$\therefore$ Jewellery items turnover in rest of Africa
= $ 10 million – $ 8 million
= $ 2 million
Garments items turnover in Tanzania

$$= 40 \times \frac{30}{100} = \$ 12 \text{ million}$$

Garments items turnover in Africa
= $ 40 million
$\therefore$ Garments items turnover in rest of Africa
= 40 – 12 = $ 28 million
Total of Jewellery items and Garments items turnover in rest of Africa
= 2 + 28 = $ 30 million
Turnover from Tanzania from Electrical and leather goods

$$= 40 \times \frac{10}{100} + 40 \times \frac{25}{100}$$

$= 4 + 10 = \$ 14$ million

$$\text{Ratio} = \frac{30}{14} = 2.14 : 1$$

98. (B) Turnover from Tanzania for Electrical goods and Handicraft together

$$= 40 \times \frac{10}{100} \times 40 \times \frac{15}{100}$$

= 4 + 6 = $ 10 million

Turnover of Garment in Tanzania

$= 40 \times \frac{30}{100}$ = $ 12 million

Turnover of Garment in Africa

= $ 40 million

Turnover from rest of Africa for Garments

= $ 40 million – $ 12 million

= $ 28 million

According to question,

$28 \times x = 10$

$\therefore \quad x = \frac{10}{28} = 0.36$ times

99. (D) Turnover from Jewellery and Garments together from Tanzania

$= 40 \times \frac{20}{100} + 40 \times \frac{30}{100}$

= $ 20 million

Turnover from the rest of Africa for Electrical and Leather goods together

$= (15 + 30) - \left(40 \times \frac{10+25}{100}\right)$

= 45 – 14 = $ 31 million

Required percentage

$= \frac{20}{31} \times 100 = 65\%$

100. (C) Turnover from rest of Africa for Electrical goods $= 15 - 40 \times \frac{10}{100}$

= $ 11 million

Now, $11 \times \frac{120}{100}$ = $ 13.2 million

Turnover from Tanzania for handicrafts items $= 40 \times \frac{15}{100}$ = $ 6 million

$\therefore$ Required ratio $= \frac{6}{13.2}$

= 6 : 13

SSC MAINS (MATHS) MOCK TEST -16 (ANSWER SHEET)

1.	A	21.	C	41.	C	61.	B	81.	B
2.	C	22.	B	42.	A	62.	C	82.	*
3.	A	23.	A	43.	B	63.	A	83.	C
4.	A	24.	C	44.	B	64.	C	84.	D
5.	B	25.	A	45.	A	65.	A	85.	C
6.	D	26.	A	46.	B	66.	D	86.	A
7.	A	27.	A	47.	C	67.	A	87.	C
8.	C	28.	B	48.	C	68.	C	88.	B
9.	B	29.	D	49.	C	69.	A	89.	A
10.	C	30.	A	50.	A	70.	B	90.	C
11.	C	31.	A	51.	B	71.	D	91.	A
12.	A	32.	C	52.	B	72.	B	92.	B
13.	D	33.	C	53.	A	73.	C	93.	D
14.	C	34.	D	54.	A	74.	D	94.	B
15.	C	35.	A	55.	A	75.	C	95.	D
16.	D	36.	B	56.	D	76.	B	96.	C
17.	*	37.	D	57.	C	77.	A	97.	C
18.	C	38.	A	58.	A	78.	C	98.	B
19.	B	39.	A	59.	B	79.	D	99.	D
20.	D	40.	*	60.	B	80.	B	100.	C