SSC MAINS - 03 (SOLUTION)

1. (C) OA = OB $\Rightarrow \angle OBA = \angle OAB = 50°$
In ΔOAB,
$\angle OAB + \angle OBA + \angle AOB = 180°$
$50° + 50° + \angle AOB = 180°$
$\angle AOB = 80°$
$\angle BOD = (180° - 80°)$
$= 100°$

2. (A) $\dfrac{\sin\theta - (\cos\theta - 1)}{\sin\theta + (\cos\theta - 1)}$

$= \dfrac{\sin\theta - (\cos\theta - 1)}{\sin\theta + (\cos\theta - 1)} \times \dfrac{\sin\theta - (\cos\theta - 1)}{\sin\theta - (\cos\theta - 1)}$

$= \dfrac{\sin^2\theta + \cos^2\theta - 2\cos\theta + 1 - 2\sin\theta(\cos\theta - 1)}{\sin^2\theta - (\cos\theta - 1)^2}$

$= \dfrac{2 - 2\cos\theta - 2\sin\theta\cos\theta + 2\sin\theta}{\sin^2\theta - \cos^2\theta + 2\cos\theta - 1}$

$= \dfrac{2(1 - \cos\theta) - 2\sin\theta(1 - \cos\theta)}{1 - \cos^2\theta - \cos^2\theta + 2\cos\theta - 1} = \dfrac{2(1 + \sin\theta)}{2\cos\theta}$

$= \dfrac{1 + \sin\theta}{\cos\theta} = \dfrac{1}{\cos\theta} + \tan\theta = \sec\theta + \tan\theta$

3. (A) $\cos x + \cos y = 2$
$\because \cos x \le 1 \Rightarrow \cos x = 1, \cos y = 1$
$\Rightarrow x = y = 0$

4. (B) Since the side opposite to a greater angle is larger.
$\angle C > \angle B \Rightarrow AB > AC$

5. (C)

6. (A) When A runs 800 m, B runs 760 m
When A runs 200 m, B runs
$= \dfrac{760}{800} \times 200 = 190$ m
Again, When B runs 500 m, C runs 495 m
$\therefore$ When B runs 190 m, C runs
$= \dfrac{495}{500} \times 190 = 188.1$ m
Hence, A will beat C by 200 – 188.1
=11.9 m in a race of 200 m.

7. (B) $x - \dfrac{1}{x} = 4$

$\left(x + \dfrac{1}{x}\right)^2 = \left(x - \dfrac{1}{x}\right)^2 + 4 = (4)^2 + 4 = 20$

$x + \dfrac{1}{x} = \sqrt{20} = 2\sqrt{5}$

8. (B) $\angle BAD = 70°$
$\angle BDA = 180° - (70° + 50°) = 60°$

9. (B) $\dfrac{AB}{AC} = \dfrac{BD}{CD} \Rightarrow \dfrac{5}{AC} = \dfrac{2}{3} \Rightarrow AC = 7.5$ cm

10. (C) CD || AB, BD is transversal
$\therefore \angle CDB = \angle DBA = 45°$
AD ||BC
$\angle DAB + \angle ABC = 180°$
$\angle ABC = 180° - 75° = 105°$
$\angle CBD = 105° - 45° = 60°$

11. (C) $\angle ACB = \angle ADB = 32°$
$\angle ACD = \angle ABD = 50°$
$x = \angle BCD = \angle ACB + \angle ACD = 82°$

12. (B) Time taken $= \dfrac{\text{Distance}}{\text{Speed}} = \dfrac{\frac{4}{5}}{45}$ hours
$= \dfrac{4 \times 60 \times 60}{5 \times 45} = 64$ seconds

13. (A) Total time $= \dfrac{600}{80} + \dfrac{800}{40} + \dfrac{500}{400} + \dfrac{100}{50}$
$= \dfrac{123}{4}$ hours
Average speed $= \dfrac{600 + 800 + 500 + 100}{\frac{123}{4}}$
$= \dfrac{2000 \times 4}{123} = 65\dfrac{5}{123}$ kms./hr

14. (C) Required time $= \dfrac{100}{30 \times 1000}$ hours
$= \dfrac{100 \times 60 \times 60}{30 \times 1000} = 12$ sec.

15. (B) Required time $= \dfrac{1200 \text{ mt}}{(5 + 10) \text{ mt/ min}} = 80$ min.

16. (A) $(1)^2 + 1 = 2$
$(2)^2 + 1 = 5$
$(5)^2 + 1 = 26$
$(26)^2 + 1 = 677$
Therefore the next number of the series will be 677.

17. (D) ? = 125 + 216 + 343 + 512 + 729 + 1000
= 2925

18. (B) ? = 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100
= 380

19. (B) Let the speed of stream = x km/hr
Rate upstream $= \dfrac{9}{2} - x$
Rate downstream $= \dfrac{9}{2} + x$
Then,
$\dfrac{2}{\frac{9}{2} + x} = \dfrac{1}{\frac{9}{2} - x}$

$$9 - 2x = \frac{9}{2} + x$$

$$3x = 9 - \frac{9}{2} = \frac{9}{2}$$

$$x = \frac{9}{2\times 3} = \frac{3}{2} = 1.5 \text{ km/hr}$$

20. (D) Area of shaded part $= \pi(4)^2 - \frac{1}{2}(8)^2$

$= (16\pi - 32)$ cm^2

21. (C) $2(20 + 20) \times h = 2 \times 20 \times 20$

$$h = \frac{2\times 20\times 20}{2\times 40} = 10 \text{ m}$$

22. (C) Area of space in between the circles

$= \pi(5)^2 - \pi(4)^2 = \pi(25 - 16)$

$$= \frac{198}{7} \text{ cm}^2$$

23. (B) $\frac{\text{First volume of cylinder}}{\text{Second volume of cylinder}}$

$$= \frac{\text{First radius}}{\text{Second radius}} \times \frac{\text{First height}}{\text{Second height}}$$

$$\frac{3850}{\text{Second volume}} = \left(\frac{1}{2}\right)^2 \times \frac{2}{1}$$

Hence second volume $= \frac{1}{2} \times 3850$

$= 1925$ cube mm

24. (D) Let number of balls $= n$

Volume of n balls = Volume of cone

$$n \times \frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^3 h$$

$$n \times \frac{4}{3}(2)^3 = \frac{1}{3} \times (20)^2 \times 10$$

$$n = 125$$

25. (B) Suman's share $= \frac{2}{5} \times 150 = ₹ 60$

26. (C) Part filled by A and B in 1 hr

$$= \frac{1}{12} + \frac{1}{15} = \frac{5+4}{60} = \frac{3}{20}$$

Part filled by A and C in the next 1 hr

$$= \frac{1}{12} + \frac{1}{20} = \frac{5+3}{60} = \frac{2}{15}$$

Part filled in 2 hr $= \frac{3}{20} + \frac{2}{15} = \frac{9+8}{60}$

$$= \frac{17}{60}$$

Part filled in 6 hr $= \frac{51}{60}$

Remaining part $= 1 - \frac{51}{60} = \frac{9}{60} = \frac{3}{20}$

This will be filled by (A + B) in 1 hour.

27. (D) (A + B)'s 2 day work $= 2\frac{1}{12} + \frac{1}{18} = \frac{10}{36}$

Time taken by B to complete $\frac{26}{36}$ part of work $= \frac{26}{36} \times 18 = 13$ days

28. (D) Let principal $= ₹ x$

Then amount $= \frac{8x}{5}$

Then simple interest $= \left(\frac{8x}{5} - x\right) = \frac{3x}{5}$

time = 5 years

Then,

$$\text{Rate} = \left(100 \times \frac{3x}{5} - \frac{1}{x} \times \frac{1}{5}\right)\%$$

$= 12\%$ annual

29. (D) $$\text{Rate } \% = \left[\left(\frac{y}{x}\right)^{\frac{1}{n}} - 1\right] \times 100$$

Here, $n = 3 - 2 = 1$, $x = 578.40$ and $y = 614.55$

$$\left[\left(\frac{614.55}{578.40}\right)^{\frac{1}{3-2}} - 1\right] \times 100$$

$$= \frac{(61455 - 57840)}{57840} \times 100 = 6\frac{1}{4}\%$$

30. (B) Cost price of watch $= ₹ 198$

Profit = 10%, cost price = ?

$$\text{Cost price} = \frac{\text{S.P.} \times 100}{100 + \text{Profit}}$$

$$\text{Hence, C.P.} = \frac{198\times 100}{100+10} = ₹ 180$$

31. (A) In these type of question always loss is obtained.

$$\text{Loss } \% = \left(\frac{b}{10}\right)^2$$

Here, $b = 10$

Hence loss percentage $= \left(\frac{10}{10}\right)^2 = 1$

32. (C) Equivalent discount

$$= 100 - \frac{(100-35)(100-10)}{100}$$

$$= 100 - \frac{65\times 90}{100} = 41.5\%$$

S.P. = M.P. × (100 – discount)%

Hence

$1170 =$ M.P. × (100 – 41.5)%

$=$ M.P. × 58.5%

$$\text{M.P.} = \frac{1170\times 100}{58.5} = ₹ 2000$$

33. (A) C.P. of article

$$= \frac{x}{\frac{(100+A)}{100}\times\frac{(100+B)}{100}-\frac{(100+C)}{100}}$$

Here $x = -780$, A = – 15, b = 20, C = 15
Hence C.P. of article

$$= \frac{-7.80}{\frac{(100-15)}{100}\times\frac{(100+20)}{100}-\frac{(100+15)}{100}}$$

= ₹ 60

34. (C) Let the amount be divided in three parts A, B and C. Now, according to question,

$$\frac{1}{2}A = \frac{1}{2}B = \frac{1}{2}C = K$$

Then, A = 2K, B = 3K, C = 6K
Then, A : B : C = 2K : 3K : 6K
= 2 : 3 : 6

$$\text{Hence share of A} = ₹\left(3740\times\frac{2}{11}\right)$$

= ₹ 680

$$\text{Share of B} = ₹\left(3740\times\frac{3}{11}\right)$$

= ₹ 1020
Share of C = [3740 – (680 + 1020)]
= ₹ 2040

35. (B) Let initially capital of A and B is ₹ $9x$ and ₹ $8x$ respectively and B's capital is for y months in the business.
Then ratio of A and B's capital
= $(9x \times 8 : 8x \times y) : 9 : y$

$$\frac{9}{y} = \frac{3}{4}$$

y = 12 months

36. (D) Let total profit = ₹ 100
A's share after given to charity

$$= ₹\left(91\times\frac{4}{7}\right) = ₹\ 52$$

$$\text{Hence, } \frac{\text{A's share}}{\text{Total profit}} = ₹\ \frac{52}{100}$$

$$\text{Hence, total profit} = ₹\left(1196\times\frac{100}{62}\right)$$

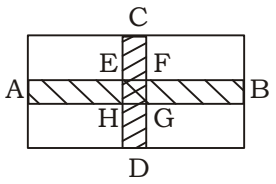
= ₹ 2300

37. (D) 3 women = 2 men
Similarly 21 women = 14 men

$$\left.\begin{matrix}\text{Men} & 14:15\\ \text{Working hour} & 6:8\end{matrix}\right\} :: 21\times x$$

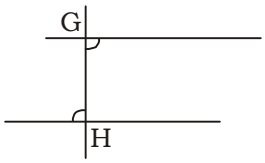
$$x = \frac{15\times8\times21}{14\times6} = 30$$

38. (C)



Area of road AB = 500 × 10 = 5000 m²
Area of road CD = 400 × 10 = 4000 m²
Area of EFGH = 10 × 10 = 100 m²
Hence area of both roads
= 5000 + 4000 – 100
= 8900 m²

39. (A)



Pair of alternate angles.

40. (B) ∠ABP = 100° (given in figure)
∠ABP = ∠AER = 100°
∠AER = ∠CDR
Thus,
y = 80° (∵ ∠CDR + ∠CDS = 180°)

41. (A) ∠CEF = ∠ABF = 70°
∠FED = 180° – 70° = 110°
∠EDF + ∠DFE + ∠FED = 180°
∠FDE = 180° – (110° + 20°) = 50°

42. (B)
Let BC = x then CA = $9x$
∴ AB = $10x$
ATQ,
∠ADC = ∠CDB = θ
and BD = 15 m
In ΔBDC,

$$\tan\theta = \frac{BC}{BD} = \frac{x}{15}$$

In ΔADB,

$$\tan2\theta = \frac{AB}{BD} = \frac{10x}{15}$$

$$\text{or, } \frac{2\tan\theta}{1-\tan^2\theta} = \frac{10x}{15} = \frac{2x}{3}$$

$$\frac{\frac{2x}{3}}{\frac{1-x^2}{225}} = \frac{2x}{3}$$

∴ $x = 6\sqrt{5}$ m
The height of the pole is $6\sqrt{5}$ m.

43. (A) $\sqrt[3]{4x-7} - 5 = 0$
Cube on both sides
$4x - 7 = 125$
$4x = 132$
$x = 33$

44. (B) $\left(\frac{1}{4}\right)^{-2} - 3 \times (8)^{\frac{2}{3}} \times (4)^0 + \left(\frac{9}{16}\right)^{\frac{1}{2}}$

$= \left[\left(\frac{1}{2}\right)^2\right]^{-2} - 3\left[\left((2)^3\right)^{\frac{2}{3}} \times 1\right] + \left[\left(\frac{3}{4}\right)^2\right]^{\frac{-1}{2}}$

$= \left(\frac{1}{2}\right)^{-4} - 3 \times 2^2 + \left(\frac{3}{4}\right)^{-1}$

$= 2^4 - 3 \times 2^2 + \frac{4}{3} = 16 - 12 + \frac{4}{3}$

$= \frac{48 - 36 + 4}{3} = \frac{16}{3} = 5\frac{1}{3}$

45. (A) $x = \sqrt{7\sqrt{7\sqrt{7.....\infty}}}$

Squaring both sides

$x^2 = 7\sqrt{7\sqrt{7\sqrt{7.....\infty}}}$

$x^2 = 7x \Rightarrow x^2 - 7x = 0$

$x(x - 7) = 0$

$x = 0$ or 7 but $x \neq 0$

46. (C) Let $x = 2^a$ and $y = 3^b$

Then,

$x + y = 17$ ...(i)

$4x - 3y = 5$ ...(ii)

From equation (i) × 3 + eq. (ii)

$3x + 3y = 51$

$4x - 3y = 5$

$7x = 56$

$\therefore \quad x = \frac{56}{7} = 8$

From eq. (i)

$y = 17 - x = 17 - 8 = 9$

$x = 8$ and $y = 9$

$x = 2^a = 8$

$2^a = 3 \Rightarrow a = 3$

And $y = 3^b = 9$

$3^b = 3^2 \Rightarrow b = 2$

47. (A) $\frac{1}{1 - a + a^2} - \frac{1}{1 + a^2 + a} - \frac{2a}{1 + a^2 + a^4}$

$= \frac{1 + a^2 + a - (1 + a^2 - a)}{(1 + a^2 - a)(1 + a^2 + a)} - \frac{2a}{(1 + a^4 + a^2)}$

$= \frac{2a}{1 + a^4 + 2a^2 - a^2} - \frac{2a}{1 + a^4 + a^2}$

$= \frac{2a}{1 + a^4 + a^2} - \frac{2a}{1 + a^4 + a^2} = 0$

48. (D) $x + \frac{1}{x} = 1$

$\frac{1}{x} = \frac{y}{y - 1}$, $y + \frac{1}{z} = 1$ and $z = \frac{1}{1 - y}$

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

49. (B) $2x - \frac{1}{2x} = 6$

$x - \frac{1}{4x} = 3$ (on divided by 2)

$x^2 + \frac{1}{16x^2} - 2 \times x \times \frac{1}{4x} = 9$

On squaring

$x^2 + \frac{1}{16x^2} = 9 + \frac{1}{2} = \frac{19}{2}$

50. (B) $a + \frac{1}{a} + 2 = 0$

$a^2 + 1 + 2a = 0$

$(a + 1)^2 = 0$

$a = -1$

$a^{37} = (-1)^{37} = -1 - 1 = -2$

51. (B) Let $0.03 = x$

$0.003 = \frac{x}{10}$

$0.21 = y \Rightarrow 0.021 = \frac{y}{10}$

and $0.065 = z = 0.0065 = \frac{z}{10}$

$\sqrt{\frac{x^2 + y^2 + z^2}{\left(\frac{x}{10}\right)^2 + \left(\frac{y}{10}\right)^2 + \left(\frac{z}{10}\right)^2}}$

$= \sqrt{100\frac{x^2 + y^2 + z^2}{x^2 + y^2 + z^2}}$

$= \sqrt{100}$

$= 10$

52. (B) HCF of two number = 27

$27x + 27y = 216$

$x + y = \frac{216}{27} = 8$

Possible pair = (1, 7)(3, 5)

53. (B) $5^{\sqrt{x}} + 12^{\sqrt{x}} = 13^{\sqrt{x}}$

We know that

$5^2 + 12^2 = 13^2$

$\therefore \quad \sqrt{x} = 2 \Rightarrow x = 2^2 = 4$

54. (D)

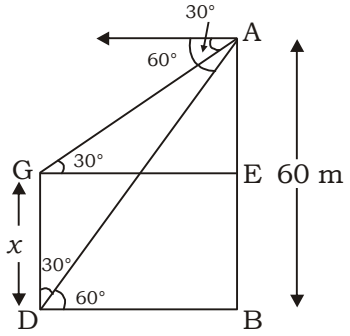
55. (D) Required percentage = $\frac{20 \times 100}{100 + 20}$

$= 16\frac{2}{3}\%$

56. (D) A : D = $\frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}$

$= \frac{3}{4} \times \frac{5}{7} \times \frac{8}{9} = 10 : 21$

57. (A) Let x be the height of the tower
AB = 60 m, BD = y m



In ΔABD,

$$\frac{AB}{BD} = \tan 60° \Rightarrow \frac{60}{y} = \sqrt{3}$$

$$y = \frac{60}{\sqrt{3}} \quad ...(i)$$

In ΔAEC,

$$\frac{AE}{EC} = \tan 30°$$

$$\frac{AE}{EC} = \frac{1}{\sqrt{3}} \Rightarrow \frac{AE}{y} = \frac{1}{\sqrt{3}}$$

$$\frac{AE}{\frac{60}{\sqrt{3}}} = \frac{1}{\sqrt{3}}$$

$$AE = \frac{1}{\sqrt{3}} \times \frac{60}{\sqrt{3}} = 20 \text{ m}$$

$\therefore$ x = AB – AE
= 60 – 20 = 40 m

58. (D) Let the breadth of rectangle hall = x
length = $(x + 5)$
Area of hall = Length × Breadth
$750 = (x + 5)x$
$x^2 + 5x - 750 = 0$
$(x - 25)(x + 30) = 0$
$x = 25$
Length of hall = $x - 5 = 25 + 5 = 30$ m

59. (C) $\frac{115 \times (115+1)}{2} - \frac{44 \times (44+1)}{2}$

$= \frac{115 \times 116}{2} - \frac{44 \times 45}{2} = 6670 - 990 = 5680$

60. (C) (100 – 9)% =105

$(100 + 30)\% = \frac{105}{91} \times 130 = 150$

61. (C) Cost price of 6 pencils = ₹ 4
Selling price of 4 pencils= ₹ 6

$\therefore$ Selling price of 6 pencils= $\frac{6}{4} \times 6 =$ ₹ 9

Gain percentage = $\frac{9-4}{4} \times 100 = 125$

62. (B)

63. (C) $\frac{2a - 5b}{3a + 6b} = \frac{4}{7}$

$14a - 35b = 12a + 14b$

$2a = 59b$

$\frac{a}{b} = \frac{59}{2}$

$a : b = 59 : 2$

64. (D) Let the radius of new ball = R cm

$\therefore$ $\frac{4}{3}\pi R^3 = \frac{4}{3}\pi(3^3 + 4^3 + 5^3)$

$R^3 = 24 + 64 + 125$
$= 216$

$R = \sqrt[3]{6 \times 6 \times 6}$
$= 6$ cm

65. (B) Let the third number be 100
$\therefore$ First number = 120
Second number = 120

Required ratio = $\frac{120}{150} = \frac{4}{5}$
$= 4 : 5$

66. (B) Let the incomes of A and B be ₹ $4x$ and ₹ $3x$ respectively and their expense be ₹ $3y$ and ₹ $2y$ respectively.
Saving of A = $4x - 3y$
Saving of B = $3x - 2y$
The saving is each is same
$4x - 3y = 3x - 2y$
$x = y$
But $4x - 3y = 600$
$x = 600$
Income of A = 600 × 4 = 2400

67. (C) Total mark obtained by 5 student
= 50 × 5 = 250
Correct total mark = 250 – 84 + 48
= 214

Average = $\frac{214}{5} = 42.8$

68. (C) Population = $5000\left(1 + \frac{4}{100}\right)^2$

$= 5000 \times \frac{26}{25} \times \frac{26}{25}$

$= 54080$

69. (B) Let the present age of A and B be $4x$ and $5x$ year respectively.

$\frac{4x + 5}{5x + 5} = \frac{5}{6}$

$25x + 25 = 24x + 30$
$x = 30 - 25 = 5$
A's present age = $4x = 4 \times 5 = 20$ years

70. (C) In 40 litre mixture,

$$\text{Quantity of milk} = \frac{7}{8} \times 40 = 35 \text{ litre}$$

Quantity of water = 5 litre

Let x litres of water be mixed

$$\frac{35}{5+x} = \frac{3}{1}$$

$$3x + 15 = 35$$

$$3x = 20$$

$$x = \frac{20}{3} = 6\frac{2}{3}$$

71. (B) Let the radius of the circle be r cm

Then,

$$2\pi r - 2r = 30$$

$$2r \times \frac{22-7}{7} = 30$$

$$r = 7 \text{ cm}$$

72. (B) 2(A + B + C)'s 1 day's work

$$= \frac{1}{12} + \frac{1}{20} + \frac{1}{15}$$

$$= \frac{12}{60} = \frac{1}{5}$$

(A + B + C)'s 1 day's work = $\frac{1}{10}$

(A + B + C)'s together can complete the work in 10 days.

73. (C) Diagonal of the cube = $4\sqrt{3}$

Let the edge of cube be x cm

$$\sqrt{3}\,x = 4\sqrt{3}$$

$$x = 4$$

Volume of cube = $(4)^3 = 64$

74. (A) Number of boys = $\frac{13}{13+11} \times 504 = 273$

Number of girls = 504 – 273 = 231

3 girls are admitted

∴ Required ratio = 273 : 234 = 7 : 6

75. (B) Sum of 4 new number

= 50 × 104 – 100 × 44

= 800

$$\text{Average} = \frac{800}{4} = 200$$

76. (B)

77. (A) Distance cover in one one revolution

= circumference of wheel

$$= 2\pi r = 2 \times \frac{22}{7} \times 20$$

Total distance = 176 meter = 17600 cm

$$\therefore \text{ Number of resolution} = \frac{17600}{2 \times \frac{22}{7} \times 20} = 140$$

78. (D) Let the side of square is increase by x%

it area is increased by $\left(2x + \frac{x^2}{100}\right)\%$

$$x = 25\%$$

$$\left(2 \times 25 + \frac{25 \times 25}{100}\right)\% = 56.25\%$$

79. (C) Amount

$$= P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right)$$

$$= 10000\left(1+\frac{4}{100}\right)\left(1+\frac{5}{100}\right)\left(1+\frac{6}{100}\right)$$

$$= 10000 \times \frac{26}{25} \times \frac{21}{20} \times \frac{53}{50}$$

= ₹ 11575.2

∴ Compound interest = ₹(11575.2 – 10000)

= ₹ 1575.2

80. (A) $2\pi r = 2 \times \frac{22}{7} \times 70 = 440$ cm = 4.4 m

$$\frac{66000}{60} = 1100 \text{ in one minute}$$

$$\frac{1100}{44} = 250 \text{ revolutions}$$

81. (D) Number of bullets = $\frac{\pi \times 6 \times 6 \times 28}{\frac{4}{3}\pi \times \frac{15}{2} \times \frac{15}{2} \times \frac{15}{2}}$

= 1792

82. (C) $\frac{136+144+2x}{4} = 133$

$$\frac{280+2x}{4} = 133$$

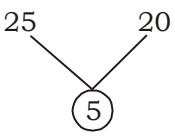
$$x = 126$$

83. (B) 84%

$$-\frac{16\%}{68\%} = 476$$

$$100\% = \frac{476}{68} \times 100 = 700$$

84. (C)



Let number of be a and b

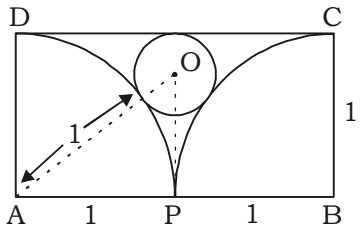
$a + b = 45$

$a - b = 5$

$a = 25$ and $b = 20$

LCM = 100

85. (B)



Let radius of the circle is 'r' units
OP = $(1 - r)$, OA = $(1 + r)$ and AP = 1
In ΔAOP,

$$OA^2 = AP^2 + OP^2$$
$$(1 + r)^2 = 1^2 + (1 - r)^2$$
$$r = \frac{1}{4} \text{ units}$$

Area of smaller circle = $\pi\left(\frac{1}{4}\right)^2$

$$= \frac{\pi}{16} \text{ square units}$$

Sum of the area of the quarter circles

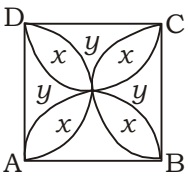
$$= \frac{\pi}{4} + \frac{\pi}{4} = \frac{\pi}{2} \text{ square units}$$

Area of shaded region = $2 - \left(\frac{\pi}{16} + \frac{\pi}{2}\right)$

$$\left(2 - \frac{9}{10}\pi\right) \cong 0.23 \text{ square units}$$

$$= \frac{13}{56} \text{ square units}$$

86. (A)



Let area of each shaded portion = x and area of each unshaded portion = y
Total area of square = $(8)^2 = 64$ cm^2

$$\therefore \quad 4(x + y) = 64$$
$$x + y = 16 \qquad \ldots(i)$$

Again in a semicircle,

$$AOB = x + y + x$$
$$= \frac{1}{2}\pi \times (4)^2$$
$$2x + y = 8\pi \qquad \ldots(ii)$$

From (i) and (ii) we get

$$x = 8\pi - 16$$
$$= 8(\pi - 2)$$

Total area of shaded region
$$= 32(\pi - 2) \text{ cm}^2$$

87. (B) ATQ,

$$M - D = 31 \qquad \ldots(i)$$
$$F - S = 30 \qquad \ldots(ii)$$
$$F - D = 34 \qquad \ldots(iii)$$

By equation (i) and (iii)

$$F - M = 3$$
$$F = 3 + M$$

Put this value in (ii)

$$3 + M - S = 30$$
$$M - S = 27$$

88. (D) CP of 24 items = SP of 18 items

$$\frac{CP}{SP} = \frac{3}{4}$$

$$\text{Profit percentage} = \frac{4-3}{3} \times 100$$
$$= 33.33\%$$

89. (B) Maximum value of $\cos\theta = 1$
90. (D)
91. (C) Income in year 2011 = ₹ 375 crore
Income in year 2012 = ₹ 475 crore

$$\text{Percentage increase} = \left(\frac{100}{375} \times 100\right)$$
$$= 26.6\%$$
$$= 26\% \text{ (approx.)}$$

92. (D) Required percentage

$$2007 = \frac{800}{450} \times 100 = 66.66\%$$
$$2008 = \frac{500}{400} \times 100 = 62.5\%$$
$$2009 = \frac{225}{350} \times 100 = 64.29\%$$
$$2010 = \frac{375}{425} \times 100 = 88.24\%$$
$$2011 = \frac{175}{375} \times 100 = 46.6\%$$
$$2012 = \frac{400}{475} \times 100 = 84.21\%$$

93. (B) Average expenditure

$$= \frac{300 + 250 + 225 + 375 + 175 + 400}{6}$$
$$= ₹ 287.5 \text{ crore}$$

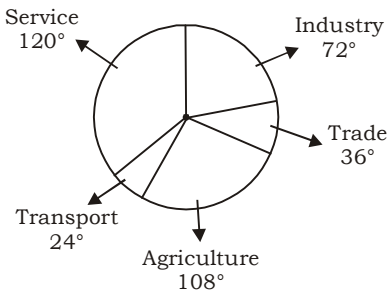
It is clear that the expenditure in year 2007, 2010 and 2012 is more than the average expenditure.

94. (D) Expenditure in 2008 = ₹ 250 crore
Hence,
Expenditure in 2009 = ₹ 200 crore
Percentage decrease in expenditure

$$= \frac{50}{250} \times 100 = 20\%$$

95. (C) Income in 2012 = ₹ 475 crore
Total expenditure in year 2008 and 2009
= 250 + 225 = ₹ 475 crore

for (96-100)



96. (D) Required Ratio = 144 : 72
= 2 : 1

97. (C) Required Ratio = 120° : 72°
= 5 : 3

98. (C)
120° + 24° = 108° + 36°

99. (D) Required percentage = $\frac{24}{360} \times 100$
= 6.6%

100. (A) Number of men required
$= \frac{120° - 108°}{360°} \times 36000$
= 1200

SSC MAINS - 03 (QUANTITATIVE ABILITIES)

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

***Note : If your opinion differs regarding any answer please message the mock test and question no to* 886030003**

***For any issues related to Result Processing, kindly contact us on* 9313111777.**