PARAMOUNT
Coaching Centre Pvt. Ltd.
An ISO 9001: 2008 Certified Company
Centres at: ★ MUKHERJEE NAGAR ★ MUNIRKA ★ UTTAM NAGAR ★ DILSHAD GARDEN ★ ROHINI ★ BADARPUR ★ JAIPUR ★ GURGAON ★ NOIDA ★ MEERUT ★ VARANASI ★ ROHTAK ★ PANIPAT ★ SONEPAT ★ BAHADURGARH ★ AGRA

SSC MAINS - 26 (SOLUTION)

1. (B) $S = \frac{a}{1-r}$

$a \rightarrow$ first term of G.P.

$r \rightarrow$ common ratio between consequtive terms of G.P.

ATQ,

$$S = \frac{28}{1-\frac{1}{7}} = \frac{28}{6} \times 7 = \frac{98}{3}$$

2. (A) $8B + 5M = 92)_{\times 5}$

$5B + 8M = 77)_{\times 8}$

Solving both equations

$39M = 156 \Rightarrow M = 4$

$8B + 5(4) = 92$

$8B = 92 - 20 = 72$

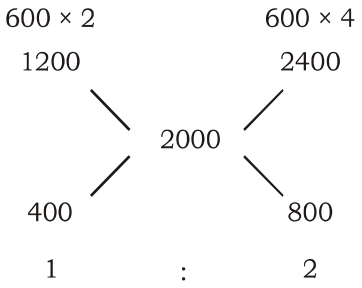
$B = 9$

So, Cost of 2 Mug and 3 Buckets

$= 2(4) + 3(9) = 8 + 27$

$= 35$

3. (D) **Two wheeler** **Four wheeler**



So, number of two wheelers $= \frac{1}{3} \times 600$

$= 200$

4. (C) $(4 + 7 + 6 + x + y + 0) = 17 + (x + y)$

or, $(x + 7) - (y + 6 + 4) = x - y - 3$

Now, $[17 + (x + y)]$ must be divisible by 3 and $(x - y - 3)$ is either 0 or divisible by 11. Clearly $x = 8$, $y = 5$ satisfy both the conditions.

5. (C) $\frac{\text{Decrease in 2nd year}}{\text{Decrease in 3rd year}} = \frac{100}{100-r} = \frac{10}{9}$

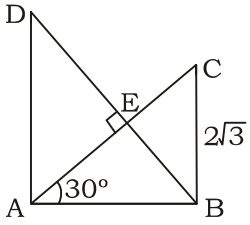
$r = 10\%$

Let the population of vultures 3 years ago be P, then

$$P\left(1-\frac{10}{100}\right)^3 = 29160$$

$P = 40{,}000$

6. (D)



$\frac{AB}{BC} = \cot 30°$

$AB = 2\sqrt{3} \times \sqrt{3} = 6$ cm

$AE = AB \cos 30° = 6 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$ cm

$\angle DAC = 90° - \angle CAB = 90° - 30° = 60°$

$AD = AE \sec 60° = 3\sqrt{3} \times 2$

$= 6\sqrt{3}$ cm

7. (B)

8. (C) $x = 2 - 2^{\frac{1}{3}} + 2^{\frac{2}{3}} \Rightarrow x - 2 = 2^{\frac{2}{3}} - 2^{\frac{1}{3}}$

Cubing both sides,

$$x^3 - 6x^2 + 12x - 8 = 2^2 - 2^1 - 3 \times 2 \times (2^{\frac{2}{3}} - 2^{\frac{1}{3}})$$

$= 4 - 2 - 6(x - 2)$

$= 2 - 6x + 12$

$x^3 - 6x^2 + 18x + 18 = 2 + 12 + 8 + 18$

$= 40$

9. (C) $\sin\theta + \sin^2\theta = 1$

$\sin\theta = 1 - \sin^2\theta = \cos^2\theta$

or, $\sin^2\theta = \cos^4\theta$

$\therefore \cos^2\theta + \cos^4\theta = \sin\theta + \sin^2\theta = 1$

10. (C) Let a man can do one unit work in a day.

Then work in 12 days = 12 × 20 = 240 units

Total work units

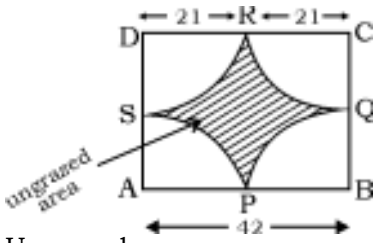
$= 240 + (30 - 12 - 2) \times (20 + 5)$

$= 240 + 400 = 640$ units

If 5 men were not employed,

Then, required days $= \frac{640}{20} = 32$ days.

11. (A)



Ungrazed area

= Area of square – 4 (area of quadrants)

$= 42^2 - 4 \times \frac{1}{4} \times \pi (21)^2 = 378$

12. (A)

13. (C) ***Note :*** length of the train in which passenger is sitting is not considered since we are concerned with the passenger instead of train. So, the length of the bridge will be directly proportional to the time taken by the passenger respectively.

$$\therefore \frac{t_1}{t_2} = \frac{l_1}{l_2} \Rightarrow \frac{7}{4} = \frac{280}{x}$$

x = 160 m

14. (C) Men × Time = Work
100 × 1 = 100 unit
150 × 1 = 150 unit
Extra man power required = 50
but since new workers are 25% times as efficient as existing workers.

$$\therefore \text{Actual number of workers} = \frac{50}{\frac{5}{4}} = 40 \text{ men}$$

$$\text{Hence, required percentage} = \frac{40}{100} \times 100 = 40\%$$

15. (C) SP – CP = ₹ 175 = 14% of CP
CP = ₹ 1250
SP = ₹ 1250 + ₹ 175 = ₹ 1425

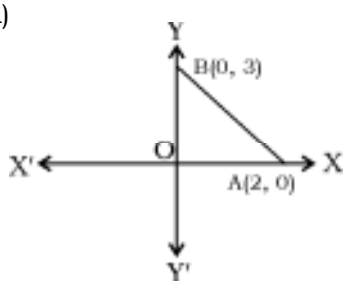
16. (A) $\left(x + \frac{1}{x}\right)^2 = 3 \Rightarrow x + \frac{1}{x} = \sqrt{3}$
on cubing both side

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

$$x^3 + \frac{1}{x^3} = 3\sqrt{3} - 3\sqrt{3} = 0$$

$x^6 + 1 = 0$
$x^{200}(x^6 + 1) + x^{84}(x^6 + 1) + x^{12}(x^6 + 1) + (x^6 + 1) = 0$

17. (A)



Putting $y = 0$ in the equation $3x + 2y = 6$
$x = 2$
Point of intersection on x-axis = (2, 0)
Putting $x = 0$, $y = 3$
OA = 2, OB = 3

$$\Delta OAB = \frac{1}{2} \times OA \times OB = \frac{1}{2} \times 2 \times 3$$

= 3 sq. unit.

18. (B) $Z = \sin\theta + \cos\theta$
$Z^2 = \sin^2\theta + \cos^2\theta + 2\sin\theta.\cos\theta$
$0° < \theta < 90°$
$2\sin\theta.\cos\theta = \sin 2\theta$ $[0 < \sin 2\theta < 1]$
Z^2 = greater than 1
So, Z = greater than 1

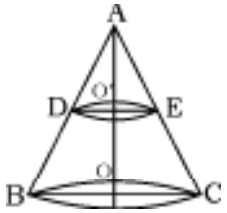
19. (A) ATQ,

$$\frac{91}{10 + x} + \frac{91}{10 - x} = 20$$

$[91 = 13 \times 7]$

$x = 13 - 10 = 3$ km/hr.

20. (B) let DO′ = r cm and OO′ = h cm.



From similar angles property ADO and ABO

$$\frac{AO'}{AO} = \frac{DO'}{BO} \Rightarrow \frac{9 - h}{9} = \frac{r}{3}$$

$\Rightarrow 9 - h = 3r \therefore h = 9 - 3r$
$\Rightarrow h = 9 - 3r$

$$\text{Vol. of frustum} = \frac{1}{3}\pi h\,(r_1^2 + r_2^2 + r_1 r_2)$$

$$\Rightarrow 44 = \frac{1}{3} \times \frac{22}{7}(9 - 3r)(9 + r^2 + 3r)$$

$$\Rightarrow 44 = \frac{22}{7}(3 - r)(3^2 + 3r + r^2)$$

$$\Rightarrow \frac{44 \times 7}{22} = 3^3 - r^3$$

$\Rightarrow r = \sqrt[3]{13}$

21. (D)

Speed		Time
200		12
400		6
600	2400	4
800		3
		25

$$\text{So, average speed} = \frac{2400 \times 4}{25}$$

= 384 km/hr.

22. (B) Let inlet pipes = n, outlet pipes = $8 - n$
Therefore,

$$(8 - n)\frac{1}{6} - n \times \frac{1}{8} = \frac{1}{6} \Rightarrow n = 4$$

23. (C)

24. (B) $\angle BOC = 90° + \frac{1}{2}A$

25. (A) $x - y = \frac{x+y}{7} = \frac{xy}{4} = k$

$\Rightarrow x - y = k$

$x + y = 7k$

$\therefore (x+y)^2 - (x-y)^2 = 49k^2 - k^2$

$4xy = 48k^2 \Rightarrow 16k = 48k^2 \Rightarrow k = \frac{1}{3}$

$\therefore xy = 4k = 4 \times \frac{1}{3} = \frac{4}{3}$

26. (B) S.P. for a profit of 12% $= \frac{8000 \times 112}{100}$

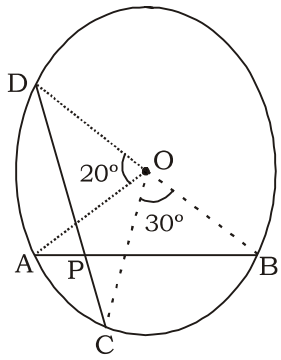
$= ₹\ 8960$

$\therefore$ Discount = ₹11200 – ₹ 8960 = ₹ 2240

Discount percent $= \frac{2240 \times 100}{11200}$

$= 20\%$

27. (C)



$\angle BOC = \angle BAC$

$\angle AOD = 2\angle DCA$

$\therefore \angle BOC + \angle AOD = 2(\angle BAC + \angle DCA)$

$= 2\angle BPC$

$\therefore 2\angle BPC = 20° + 30° = 50°$

$\angle BPC = 25°$

28. (A) $x + \frac{1}{x} = 2$ (given)

then, $x = 1$

So, $x^{100} + \frac{1}{x^{100}} = 2$

29. (B) $\frac{(0.75)^3}{1-0.75} + [(0.75)^2 + 0.75 \times 1 + 1]$

$= \frac{(0.75)^3 + (1 - 0.75)[(0.75)^2 + 0.75 \times 1 + 1^2]}{(1 - 0.75)}$

$= \frac{(0.75)^3 + 1^3 - (0.75)^3}{0.25}$

$[\because (a-b)(a^2 + ab + b^2 = a^3 - b^3)]$

$= \frac{1}{0.25} = \frac{100}{25} = 4 = 2^2$

So, square root of $\frac{(0.75)^3}{1-0.75)} + [0.75 + (10.75)^3 + 1]$

i.e. 2.

30. (D)

4	$x - 2$
5	$y - 3$
6	$z - 4$
	1 ← minimum

$z = 6 \times 1 + 4 = 10$

$y = 5 \times 10 + 3 = 53$

$x = 4 \times 53 + 2 = 214$

31. (C) Volume of new ball $= \frac{3}{4} \times \frac{4}{3}\pi(r_1^3 + r_2^3 + r_3^3)$

$= \pi(1^3 + 2^3 + 3^3)$

$= 36\pi\ cm^3$

ATQ, $\frac{4}{3}\pi r^3 = 36\pi$

$r^3 = 27$

$r = \sqrt[3]{27} = 3$ cm.

32. (A) Average of the batsman after 12th innings

$= 63 - 11 \times 2$

$= 41$

33. (C) $\angle BDE = 115°, \angle ADF = 65°$ and $\angle AED = 75°$

$\Delta AED \sim \Delta ABC$

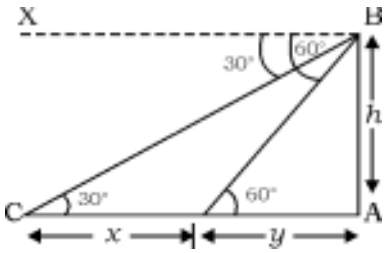
$\therefore \frac{DE}{BC} = \frac{AE}{AB} = \frac{AD}{AC}$

$\frac{2}{3} = \frac{10}{AB} \Rightarrow AB = 15$ cm.

34. (D) Go through options considering option (D)

No. of sides	=	5	: 10
Ext. angle	=	72°	: 36°
Int. angle	=	180° – 72°	: 180° – 36°
	=	108°	: 144°
	=	3	: 4

35. (A)



Now, in Δ ABD,

$\tan 60° = \frac{h}{y} \Rightarrow \sqrt{3} = \frac{h}{y}$ ...(i)

In Δ ABC,

$\tan 30° = \frac{h}{x+y} = \frac{1}{\sqrt{3}}$ ...(ii)

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

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

Required time $= \frac{10}{2} = 5$ minutes

36. (D) $\frac{1}{\sqrt{2}+\sqrt{1}} = \frac{1}{\sqrt{2}+\sqrt{1}} \times \frac{\sqrt{2}-\sqrt{1}}{\sqrt{2}-\sqrt{1}} = \sqrt{2}-\sqrt{1}$

$\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} ..... \frac{1}{\sqrt{99}+\sqrt{100}}$

$= \sqrt{2}-\sqrt{1} + \sqrt{3}-\sqrt{2} + ... + \sqrt{100} - \sqrt{99}$

$= \sqrt{100} - \sqrt{1} = 10 - 1 = 9$

37. (B) SI $= ₹ \left(\frac{1200 \times 10 \times 1}{100}\right) = ₹ 120$

CI $= ₹ \left[1200 \times \left(1+\frac{5}{100}\right)^2 - 1200\right]$

$= ₹ 123$

Required difference = ₹ 3

38. (C) $x^3 + 3x^2 + 3x = 7$

Adding one both side

$x^3 + 3x^2 + 3x + 1 = 7 + 1 = 8$

$(x+1)^3 = 2^3 \Rightarrow (x+1) = 2$

$x = 1$

39. (D) $1\frac{1}{2}$ hour = 90 minutes,

1 hour 45 minutes = 105 minutes

1 hour = 60 minutes

LCM of 90, 60, 105 = 1260 minutes

$\frac{1260}{60} = 21$ hours

$\therefore$ Bell will ring simultaneously after 21 hours.

i.e. = 9 a.m.

40. (C) Let $x = \sqrt{7\sqrt{7\sqrt{7\sqrt{7.....}}}}$

$\therefore x = \sqrt{7x}$

On sq. both sides

$x^2 = 7x$

$\Rightarrow x(x-7) = 0 \Rightarrow x = 7$

$\therefore 7 = (7^3)^{y-1} = 7^{3y-3}$

$\Rightarrow 3y - 3 = 1 \Rightarrow 3y = 4$

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

41. (C) Let original price of tea be ₹ x/kg

New Price $= ₹ \frac{9x}{10}$/kg

$\therefore \frac{22500}{\frac{9x}{10}} - \frac{22500}{x} = 25$

On solving we get, $x = 100$

New Price $= \frac{9}{10} \times 100 =$ ₹ 90/kg.

42. (B) A ⟶ 60 km ⟵ B

Speed of A = x, Speed of B = y km/hr

Acc. to QS

$x \times 6 + y \times 6 = 60$

$\Rightarrow x + y = 10$ ...(i)

$\frac{2}{3}x \times 5 + 2y \times 5 = 60$

$x + 3y = 18$ ...(ii)

From (i) and (ii)

x = 6 km/hr

43. (A) ATQ,

Work done by (A + B) = 2 × work done by C

Work done by A = 2 × work done by B

Let

Work done by B in a hour = 2 units

Work done by A in a hour = 2 × 2 = 4 units

Work done by C in a hour = $\frac{2+4}{2} = 3$ units

So, total work = $(2+4+3) \times \frac{20}{3} = 60$ units

Time taken by A done to complete work

$= \frac{60}{4} = 15$ hours

44. (A) Required sum = $20^2 + 21^2 + ... + 29^2$

$= (1^2 + 2^2 + ...29^2) - (1^2 + 2^2 + ...19^2)$

$= \frac{29(29+1)(2\times29+1)}{6} - \frac{19(19+1)(2\times19+1)}{6}$

$\left[\because 1^2 + 2^2 + ...n^2 = \frac{n(n+1)(2n+1)}{6}\right]$

= 8555 – 2470 = 6085 sq. cm

45. (A) $x = 3 + 2\sqrt{2}$, $xy = 1$

$y = \frac{1}{3+2\sqrt{2}} = 3 - 2\sqrt{2}$

$\therefore x + y = 3 + 2\sqrt{2} + 3 - 2\sqrt{2} = 6$

$\therefore \frac{x^2+3xy+y^2}{x^2-3xy+y^2} = \frac{(x+y)^2+xy}{(x+y)^2-5xy}$

$= \frac{36+1}{36-5} = \frac{37}{31}$

46. (A) $\frac{9.5 \times 0.0085 \times 18.9}{0.0017 \times 1.9 \times 2.1} = 225$

$\therefore$ Required answer = $\sqrt{225} = 15$

47. (C) $ax^2 + bx + c = a(x-p)^2$

$ax^2 + bx + c = a(x^2 - 2px + p^2)$

$ax^2 + bx + c = ax^2 - 2apx + ap^2$

comparing coefficients :

$b = -2ap$; $c = ap^2$

$b^2 = 4a^2p^2$; $\Rightarrow p^2 = \frac{c}{a}$

$b^2 = 4a^2 \times \frac{c}{a}$

$b^2 = 4ac$

48. (C) $x = \dfrac{2\sqrt{24}}{\sqrt{3}+\sqrt{2}}$

$\dfrac{x}{\sqrt{8}} = \dfrac{2\sqrt{3}}{\sqrt{3}+\sqrt{2}}$

Applying componendo and dividendo

$\dfrac{x+\sqrt{8}}{x-\sqrt{8}} = \dfrac{2\sqrt{3}+\sqrt{3}+\sqrt{2}}{2\sqrt{3}-\sqrt{3}-\sqrt{2}} = \dfrac{3\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$

Similarly,

$\dfrac{x+\sqrt{12}}{x-\sqrt{12}} = \dfrac{\sqrt{3}+3\sqrt{2}}{\sqrt{2}-\sqrt{3}}$

$\therefore \dfrac{x+\sqrt{8}}{x-\sqrt{8}} + \dfrac{x+\sqrt{12}}{x-\sqrt{12}} = \dfrac{3\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \dfrac{\sqrt{3}+3\sqrt{2}}{\sqrt{2}-\sqrt{3}}$

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

$= \dfrac{2(\sqrt{3}-\sqrt{2})}{\sqrt{3}-\sqrt{2}}$

$= 2$

49. (D) $\sqrt[3]{4}$ $\sqrt{2}$ $\sqrt[6]{3}$ $\sqrt[4]{5}$

LCM of 3, 2, 6 and 4 = 12

(4) $4^{\frac{1}{3}\times 12}$ (2) $2^{\frac{1}{2}\times 12}$ (3) $3^{\frac{1}{6}\times 12}$ (5) $5^{\frac{1}{4}\times 12}$

256 64 9 125

50. (B) 8, 13, 21, 32, **46**, 63, 83

5 8 11 14 17 20

3 3 3 3 3

51. (B) Quantity of fresh fruits= 100 kg

So, Quantity of fruit $= 100 \times \dfrac{100-68}{100}$

$= 32$ kg

So, quantity of dry fruit $= 32 \times \dfrac{100}{100-20}$

$= 40$ kg

52. (B) % of families having either a cow or a buffalo or both = 60 + 30 –15 = 75%

If means 25% of families do not have a cow or a buffalo.

$\therefore$ 25% of 960 = 240

53. (D) Price for10 chairs = 10 × 200 = ₹ 2000

Price of 12 chairs (without discount)

= 12 × 200 = ₹ 2400

Price of 12 chairs with discount

= 10 × 200 + 2 × 80

= ₹ 2160

$\therefore$ Discount = ₹ 2400 – ₹ 2160

= ₹ 240

Discount % $= \dfrac{24}{2400} \times 100$

= 10%

54. (A) If CP of an article = ₹ x.

ATQ,

$\dfrac{x-21}{x} \times 100 = x$

$x^2 - 100x + 2100 = 0$

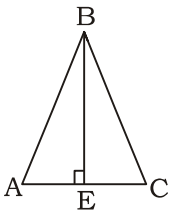
$x^2 - 70x - 30x + 2100 = 0$

$x(x-70) - 30(x-70) = 0$

$(x-70)(x-30) = 0$

x = ₹ 30 or ₹ 70

55. (C)



Let AB = a units

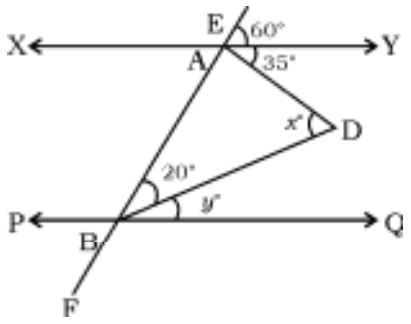
BE = $\dfrac{\sqrt{3}}{2}a$ units

$AB^2 + BC^2 + CA^2 = 3a^2 = 4 \times \dfrac{3}{4}a^2$

$= 4 \times \left(\dfrac{\sqrt{3}}{2}a\right)^2$

$= 4BE^2$

56. (A)



$\angle BAD + \angle DAY = \angle ABD + \angle ADB$

$60° + 35° = 20 + x$

$x = 95° - 20° = 75°$

$\angle EAY = \angle ABQ = 60°$ (corresponding angles)

$y = 60° - 20° = 40°$

57. (D) $\dfrac{\text{Area of parallelogram ABCD}}{\text{Area of triangle ABN}}$

$= \dfrac{BC \times AN}{\frac{1}{2} \times BN \times AN}$

$= \dfrac{4x \times AN}{\frac{1}{2} \times x \times AN}$

$= \dfrac{8}{1}$

Required ratio = 8 : 1

58. (B) Required area $= \pi(23^2 - 12^2)$

$= \frac{22}{7} \times [529144]$

$= 1210$

59. (A) Area of surface to be cemented
(*i.e* Area of four walls + Area of floor)

$= 2 \times (l + b) \times h + (l \times b)$

$= 2 \times 21 \times 4 + (106.25)$

$= 274.25 \text{ m}^2$

$\therefore$ Cost of cementing $= 24 \times 274.25$

$= ₹\ 6582$

60. (A) Volume of water which flow in 25 minutes

$= 25 \times 60 \times 0.05 \times 0.03 \times 16$

$= 36 \text{ m}^2$

$\therefore$ Rise in water level $= \frac{36}{15 \times 12} = \frac{1}{5} \text{m}$

$= 0.2\text{m}$

61. (A) $\frac{n}{1} = \frac{\sin 2x}{\sin 2y}$

Apply C & D rules

$\frac{n+1}{n-1} = \frac{\sin 2x + \sin 2y}{\sin 2x - \sin 2y}$

$= \frac{2\sin(x+y).\cos(x-y)}{2\cos(x+y).\sin(x-y)}$

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

62. (B) $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} + \sqrt{\frac{1+\sin\theta}{1-\sin\theta}}$

$= \frac{(1-\sin\theta)+(1+\sin\theta)}{\sqrt{1-\sin^2\theta}}$

$= \frac{2}{\sqrt{\cos^2\theta}} = \frac{2}{\cos^2\theta}$

$= 2 \sec\theta$

63. (B) Angle subtended at the centre by the sector $= 90°$

Area of circle $= 154$

$\pi r^2 = 154 \Rightarrow r = 7\text{cm}$

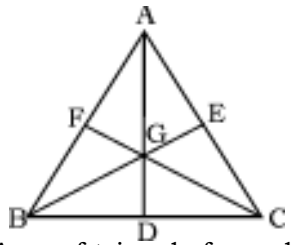
Length of arc $= \frac{\theta}{180} \times \pi r = 11$ cm

Perimeter of Sector $= 2r + l$

$= 2 \times 7 + 11$

$= 25$ cm

64. (B)



Area of triangle formed by median

$= \frac{1}{2} \times 9 \times 12 = 54 \text{ cm}^2$

Area of Δ ABC $= \frac{4}{3} \times 54 = 72 \text{ cm}^2$

65. (D) Sum of interior angles $= (2n - 4) \times 90°$

Sum of exterior angles $= 360°$

ATQ,

$(2n - 4) \times 90° = 360° \times 2$

$n = 6$

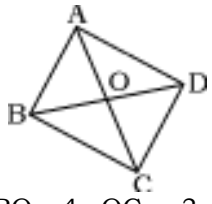
66. (B) Volume of rainwater = Base area × height

$= 1000000 \times \frac{2}{100} = 20000 \text{ m}^3$

Water stored in pool $= 10000 \text{ m}^3$

Required water level $= \frac{10000}{1000} = 10$ m

67. (A)



BO = 4, OC = 3 and $\angle$BOC = 90°

$\therefore BC^2 = 4^2 + 3^2 = 25$ units

68. (B) ATQ,

Volume of frustum $= \frac{\pi}{3} h (r^2 + Rr + R^2)$

$= 176 \text{ m}^3$

69. (B) $\frac{\text{Area of } \Delta BDF}{\text{Area of hexagon}} = \frac{1}{2}$

Actually, there is a perfect symmetry

$\therefore$ Area of hexagon $= \frac{3\sqrt{3}}{2} \times 6^2 = 54\sqrt{3} \text{ cm}^2$

$\therefore$ Area of Δ BDF $= 27\sqrt{3} \text{ cm}^2$

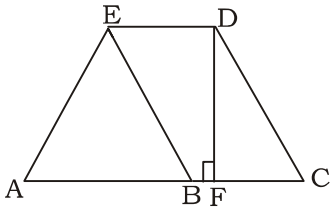
70. (A) $\sin\theta + \text{cosec}\,\theta = 2$

So, $\sin\theta = 1 \Rightarrow \theta = 90°$

$\cos^9\theta + \cot^8\theta + \sin^7\theta = (0)^9 + (0)^8 + (1)^7$

$= 1$

71. (C)



Let DL $\perp$ BC,

So, Area of ΔABE $= \frac{1}{2} \times AB \times DF$

$= \frac{1}{2} \times \left(\frac{1}{2} \times AC\right) \times DE$

Area of $\square$BCDE $= BC \times DF$

$= \left(\frac{1}{2} \times AC\right) \times DF$

$= 2 \times$ Area of ΔABE

ATQ, Area of ACDE

= Area of ΔABE + Area of $\square$BCDE

$3 \times$ Area of ΔABE $= 36 \text{ cm}^2$

Area of ΔABE $= 12 \text{ cm}^2$

72. (C)

73. (C) $\angle ABC = 180° - (65 + 75) = 40°$
$\angle ORB = \angle OQB = 90°$
$\therefore \angle ROQ = 360° - (90 + 90 - 40)$
$\therefore \angle ROQ = 140°$

74. (B) $\angle ACB = 41°$ (angles of same segment)
$\angle ADB = \angle ACB = 41°$
$\therefore \angle ABD = 180° - (\angle ADB + 90°) = 49°$
$(\angle DAB = 90°)$

75. (B) $\angle ADE = \angle AED = 80°$
$\therefore \angle BDE = \angle CED = 100°$
$\therefore \angle DBC + \angle BCE = 360° - (100° + 100°)$
$= 160°$

76. (C) $x^2 + y^2 + z^2 = xy + yz + zx$
$x^2 + y^2 + z^2 - xy + yz + zx = 0$
$2(x^2 + y^2 + z^2 - xy + yz + zx) = 0$
$(x^2 + y^2) + (y^2 + z^2) + (z^2 + x^2)$
$- 2xy - 2yz - 2zx = 0$
$(x - y)^2 + (y - z)^2 + (z - x)^2 = 0$
$x = y = z$
Thus, the given triangle is equlateral.

77. (A) Distance covered by wheel in one revolution
= circumference of wheel
$= \pi \times \text{diameter} = \frac{22}{7} \times 98$
$= 308$ cm

$$\text{Number of Revolutions} = \frac{1540 \times 100}{308} = 500$$

78. (A) $\text{Speed} \propto \frac{1}{\text{Time}}$

If a person goes with $\frac{3}{4}$ of his speed then,

original time : new time $= 1 : \frac{4}{3}$
$= 3 : 4$

ATQ,

Usual time for same distance $= \frac{3}{1} \times \frac{3}{2}$
$= 4\frac{1}{2}$ hours

79. (D) Mark price = ₹ 480
Discount = 10%

Selling price $= 480 \times \frac{90}{100} =$ ₹ 432

Cost price $= 432 \times \frac{100}{108} =$ ₹ 400

New profit percent $= \frac{480 - 400}{400} \times 100$
$= 20\%$

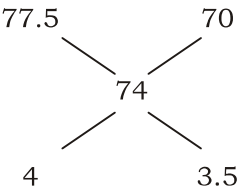
80. (D) $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = 3$
$\therefore a = 3b,\ c = 3d,\ e = 3f$

$$\therefore \frac{2a^2 + 3c^2 + 4e^2}{2b^2 + 3d^2 + 4f^2} = \frac{2(3b)^2 + 3(3d)^2 + 4(3f)^2}{2b^3 + 3d^2 + 4f^2}$$

$$= \frac{9\left(2b^2 + 3d^2 + 4f^2\right)}{\left(2b^2 + 3d^2 + 4f^2\right)}$$

$= 9$

81. (C) **Class A** **Class B**



8 : 7

Required ratio = 8 : 7

82. (B) Required percentage $= \frac{20}{100 + 20} \times 100$

$$= \frac{20}{120} \times 100$$

$$= \frac{50}{3} = 16\frac{2}{3}\%$$

83. (A) Let the CP of 1 orange = ₹ 1
$\therefore$ SP of 10 oranges = ₹13

$\therefore$ gain % $= \frac{13 - 10}{10} \times 100 = 30\%$

84. (B) Let the Principal is ₹ x

$$\therefore A = P\left(1 + \frac{R}{100}\right)^T \Rightarrow 8x = x\left(1 + \frac{R}{100}\right)^3$$

$$2^3 = \left(1 + \frac{R}{100}\right)^3 \Rightarrow 2^4 = \left(1 + \frac{R}{100}\right)^4$$

Required time = 4 years.

85. (C) Ratio $= 1 : \frac{1}{3} : \frac{1}{6} = 6 : 2 : 1$
Sum of the ratios = 6 + 2 + 1 = 9

$\therefore$ Middle part $= \frac{2}{9} \times 78 = \frac{52}{3} = 17\frac{1}{3}$

86. (A) Net effect $= 80 - 20 - \frac{80 \times 20}{100}$
$= 60 - 16 = +44\%$
Which means 44% increase in sale.

87. (B) Difference of 2 years $= P\left(\frac{r^2}{10000}\right)$

ATQ,

$$48 = P\left(\frac{400}{10000}\right) = \frac{P}{25}$$

$P = 48 \times 25 =$ ₹ 1200

88. (B) $14 + 6\sqrt{5} = 14 \times 2\ 5\ 3 \times \sqrt{5}$

$= (3)^2 + \left(\sqrt{5}\right)^2 + 2 \times 3 \times \sqrt{5}$

$= (3+\sqrt{5})^2 = 3 + \sqrt{5}$

89. (B) $2^{31} = 2 \cdot 2^{30} = 2 \cdot 4^{15}$

$= 2 \cdot (5-1)^{15}$

So, remainder will be $= 2\,(-1)^{15} + 5$

$= 3$

90. (D) Expression $= \sqrt[3]{P(P^2+3P+3)+1}$

$= \sqrt[3]{P^3+3P^2+3P+1}$

$= \sqrt[3]{(P+1)^3} = P + 1$

If P = 124, then P + 1 = 125

91. (D) Required students = 100 – 73 = 27

92. (B) 60% of 50 = 30

Required number will be 32.

93. (D) Required Difference = 27 – 21 = 6

94. (C) % age $= \left(\frac{21}{73} \times 100\right)\% = 28.77\% = 29\%$

95. (C)

96. (C) Population of town X $= 12160 \times \frac{100}{38}$

$= 32000$

Population of town S $= \frac{11}{16} \times 32000$

$= 22000$

97. (C) Required ratio $= \frac{21}{100} \times \frac{46}{100} : \frac{11}{100} \times \frac{42}{100}$

$= 23 : 11$

98. (B) Required population $= 32000 \times \frac{15}{76} \times \frac{52}{100}$

$= 15600$

99. (B) Population of town Y in 2011 = 30000

So, Population of town V in 2012

$= 30000 \times \frac{10}{15} \times \frac{110}{100}$

$= 22000$

Required population $= 22000 \times \frac{58}{100}$

$= 12760$

100. (B) Population of town R below poverty line

(in 2013) $= 16 \times \frac{110}{100} \times \frac{51}{100}$

Population of town Z below poverty line

(in 2013) $= 11 \times \frac{95}{100} \times \frac{42}{100}$

Required ratio

$= 16 \times \frac{110}{100} \times \frac{51}{100} : 11 \times \frac{95}{100} \times \frac{42}{100}$

$= 272 : 133$

SSC MAINS - 26 (ANSWER KEY)

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