KD Campus
KD Campus Pvt. Ltd
2007, OUTRAM LINES, 1ST FLOOR, OPPOSITE MUKHERJEE NAGAR POLICE STATION, DELHI-110009

SSC MAINS (MATHS) MOCK TEST-12 (SOLUTION)

1. (B) Required ratio = $(\sqrt{2})^2 : (1)^2 = 2 : 1$

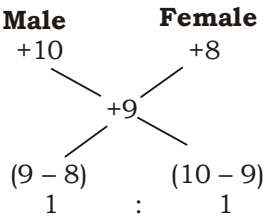
2. (A) $(64)^2 - (36)^2 = 20K$
$(64 + 36)(64 - 36) = 20\ K$
$20K = 28 \times 100$
$K = 140$

3. (D) $\angle ACB = 88°$ ($\because$ exterier angle)
$\angle BAC = 180° - (88°+54°) = 38°$
$\angle BOC = 2 \times 38° = 76°$

4. (A) Total profit earned = ₹ 60000
Profit remain after reinvesting 40% profit
$= ₹ \left(60000 \times \frac{60}{100}\right)$
$= ₹\ 36000$
ATQ,
Amount spent on advertisement
$= ₹\ 36000 \times \left(1 - \frac{30}{100} - \frac{20}{100}\right)$
$= ₹\ 18000$

5. (B) $NP = 208 \times \frac{1}{4} \times \frac{1}{4} \times 4$
$= ₹\ 52/kg$

6. (D) Total population of town = 8000



Ratio of male and female = 1 : 1

Population of females = $\frac{1}{2} \times 8000$
$= 4000$

Population of males = $\frac{1}{2} \times 8000$
$= 4000$

If 75% of population is females then

Number of females = $\frac{75}{100} \times 8000$
$= 6000$

Number of males to be added to females
$= 4000 - (6000 - 4000)$
$= 2000$

7. (B) 100 SP — $133\frac{1}{2}$ SP — $\frac{400}{3\times80}\times100 = \frac{500}{3}$ MP
20

$SP = \frac{500}{3} \times \frac{90}{100} = 150$
Profit % = 50%

8. (C) Selling price of merchant = ₹ 56100
Loss = 15%
Cost price of merchant
$= ₹ \left(56100 \times \frac{100}{85}\right)$
$= ₹\ 66000$
Selling price of wholesale dealer
= cost price of merchant = ₹ 66000
Cost price of wholesale dealer
= selling price of manufacturer
$= ₹ \left(66000 \times \frac{100}{120}\right)$
$= ₹\ 55000$
Cost price of manufacturer
$= ₹ \left(55000 \times \frac{100}{110}\right)$
$= ₹\ 50{,}000$

9. (C) $\frac{1}{x} + \frac{1}{x+5} = \frac{1}{x-4}$
$\frac{x+5+x}{x(x+5)} = \frac{1}{(x-4)}$
$(2x + 5)(x - 4) = x^2 + 5x$
$2x^2 - 8x + 5x - 20 = x^2 + 5x$
$x^2 - 8x - 20 = 0$
$x^2 - 10x + 2x - 20 = 0$
$x(x - 10) + 2(x - 10) = 0$
$(x - 10)(x + 2) = 0$
$x = 10$
Time taken by Ist pipe = (x + 5) hrs.
= 10 + 5 = 15 hrs.

10. (A) Sum after 2 years if compounded annually
= ₹ 4624
Sum after 3 years if compounded annually
= ₹ 4913
So, initiall sum= $₹ \left[4624 \times \left(\frac{4624}{4913}\right)^2\right]$
= ₹ 4096

11. (C) It must be multiple of 3.

12. (A) α and β are roots of equation $ax^2 + bx + c = 0$

So, $\alpha + \beta = -\frac{b}{a}$

$\alpha\beta = \frac{c}{a}$

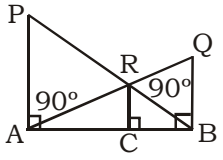
$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$

$= \left(-\frac{b}{a}\right)^2 - 2 \times \frac{c}{a}$

$= \frac{b^2}{a^2} - \frac{2ac}{a^2}$

$= \frac{b^2 - 2ac}{a^2}$

13. (D)



$\Delta BRC \sim \Delta BPA$

$\frac{x}{y} = \frac{BC}{AB}$ .....(i)

$\Delta ARC \sim \Delta AQB$

$\frac{y}{z} = \frac{AC}{AB}$ ..... (ii)

$\frac{y}{x} + \frac{y}{z} = \frac{BC}{AB} + \frac{AC}{AB}$

$y\left(\frac{z+x}{xz}\right) = \frac{BC + AC}{AB} = \frac{AB}{AB}$

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

$yx + yz = xz$

14. (D) $\angle ACB = \angle PAB = 80°$
$\angle ACQ = 180° - 80° = 100°$
$\angle CAQ = \angle ABC = 30°$
$\angle AQC = 180°(\angle ACQ + \angle CAQ)$
$= 180° - (100° + 30°) = 50°$

15. (B) Let the obstruction remained for A minutes only.
$\therefore$ Part of cistern filled in A minutes + Part of cistern filled in 3 minutes = cistern filled.

$\left[\left(\frac{7}{8} \times \frac{A}{12}\right) + \left(\frac{5}{6} \times \frac{A}{16}\right) + \left(\frac{3}{12} + \frac{3}{16}\right)\right] = 1$

$\frac{12A}{96} + \frac{7}{16} = 1$

$A = 4.5$ minutes

16. (B) $\sin^6A + \cos^6A + 3\sin^2A\cos^2A$
$= (\sin^2A)^3 + (\cos^2A)^3 + 3\sin^2A\cos^2A$
$(\sin^2A + \cos^2A)$
$= (\sin^2A + \cos^2A)^3$
$= (1)^3 = 1$

17. (A)

$$\begin{array}{cc} 100 & 100 + x\% \\ 100 & 100 - x \\ \hline 10{,}000 & 10000 - x^2 \longrightarrow 1 \\ \downarrow \times 1 & \times 1 \\ 10{,}000 - x^2 & 10{,}000 - x^2 \\ \hline 10{,}000 & \\ \hline 10{,}000 - x^2 & \end{array}$$

18. (D) Let the mixture of two containers be added together in the ratio of $x : y$

$\left(\frac{\frac{2}{3}x + \frac{4}{5}y}{x+y}\right) \times 100 = 70$

$\frac{10x + 12y}{15(x+y)} \times 10 = 7$

$100x + 120y = 105x + 105y$
$5x = 15y$
$x : y = 3 : 1$

19. (B) Arithmetic = $10 \times \frac{70}{100} = 7$

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

Geometry = $35 \times \frac{60}{100} = 21$

Total = 40

Required no = $75 \times \frac{60}{100} = 45 - 40 = 5$

20.(D)

	Spirit		Water		
Jar A	2	:	$3)_{\times 6 \times 3}$	=	36 : 54
Jar B	3	:	$7)_{\times 3 \times 4}$	=	36 : 84
Jar C	4	:	$11)_{\times 2 \times 5}$	=	40 : 110
					112 : 248
					14 : 31

Ratio of spirit and water in mixture = 14 : 31

21.(C) $(P + 2)^2 = P^2 + 2P + 4$

22. (A)

23. (A) $x + y = 4$ and $x - y = 3$
Square both sider
$x^2 + y^2 + 2xy = 4^2$
$x^2 + y^2 + 2xy = 16$ ....(i)
$x^2 + y^2 - 2xy = 9$ ....(ii)
Subtracting equations (ii) from (i)
then $4xy = 7$

$xy = \frac{7}{4}$

On adding (i) and (ii) we have $x^2 + y^2 = \frac{25}{2}$

ATQ, $16 \times \left(\frac{25}{2}\right) \times \frac{7}{4}$

$= 14 \times 25 = 350$

24. (B) $\sqrt{\frac{100[(0.003)^2 + (0.021)^2 + (0.0065)^2]}{(0.003)^2 + (0.021)^2 + (0.0065)^2}}$

$= \sqrt{100} = 10$

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

26. (D) Average age of A, B and C = 4 years
A + B + C = 12
By Hit and Trial method
Ratio of age =3 : 4 : 5
Ratio of square of ages = 9 : 16 : 25
Ratio of chocolates = 9 : 16 : 25
Respective chocolates of A, B and C
= 9, 16, 25

27. (C) $\angle PQR + \angle PSR = 180°$
$\angle PQR + 95° = 180°$
$\angle PQR = 85°$
Now, RY|| PQ and RQ is the transversal.
$\angle QRY = \angle PQR = 85°$
[Alternate Interior Angles]
$\angle QRX = 85° + 20° = 105°$
$\angle SRQ = 180 - 105° = 75°$
Now, $\angle QPS + \angle QRS = 180°$
$\angle QPS + 75° = 180°$
$\angle QPS = 105°$

28. (C) Age of mother when Deepak was born
= 36 years
Age of Priya when Deepak was born = 4 years
Age of father when Priya was born = 38 years
Age of father when Deepak was born
= (38 + 4) = 42 years
Difference of ages of the parents
= (42 – 36) years
= 6 years

29. (B) If $x = y = z = 1$ then
Put value :
$= (3)^3 - (1)^3 - (1)^3 - (1)^3$
$= 27 - 3 = 24 = 24xyz$

30. (C) Let number of candidates who applied = x

Eligible candidates = $\frac{80}{100}x$

Candidates of other category = $\frac{20}{100} \times \frac{80}{100}x$

$= \frac{16}{100}x$

ATQ,

$\frac{16}{100}x = 8000$
$x = 50000$
Total number of candidates who applied for the exam = 50000

31. (C) Distance covered in 1 Litre petrol with 50 km/h speed = 19.5 km
Hence, this distance will cover with 70 km/h speed in 1·3 litres.
then distance covered in 1 litre with 70 km/h Speed

$= \frac{19.5}{1.3} = 15$ km

then distance covered in 10 litres diesel with 70 km/h. Speed = 10 × 15
= 150 km

32. (D) Monthly savings of the person = ₹ 3645
ATQ,
Monthly savings of the person

$= 100 \times \frac{(100-40)}{100} \times \frac{(100-20)}{100} \times \frac{\left(100 - 37\frac{1}{2}\right)}{100}$

$\times \frac{(100-10)}{100} \times \frac{(100-10)}{100} \times \frac{(100-40)}{100}$

= 14.58%

Monthly salary = ₹ $\left(3645 \times \frac{100}{14.58}\right)$

= ₹ 25000

33. (A) Let marked price = 100
ATQ,

$100 \times \frac{70}{100} \times \frac{85}{100} = 476$

59.5 = 476

$MP = 476 \times \frac{100}{59.5}$

= ₹ 800

34. (B) $\frac{x-a^2}{b^2+c^2} + \frac{x-b^2}{c^2+a^2} + \frac{x-c^2}{a^2+b^2} = 3$

$\frac{x-a^2}{b^2+c^2} - 1 + \frac{x-b^2}{c^2+a^2} - 1 + \frac{x-c^2}{a^2+b^2} - 1 = 0$

$\frac{x^2-a^2-b^2-c^2}{b^2+c^2} + \frac{x^2-a^2-b^2-c^2}{c^2+a^2} + \frac{x^2-a^2-b^2-c^2}{a^2+b^2} = 0$

$(x - a^2 - b^2 - c^2)\left[\frac{1}{b^2+c^2} + \frac{1}{c^2+a^2} + \frac{1}{a^2+b^2}\right] = 0$

So, $x - a^2 - b^2 - c^2 = 0$
$x = a^2 + b^2 + c^2$

35. (B) The weight of the boxes are Ist box → 200 Kg
Weight of IIIrd box → 250 Kg
2nd box → 300 Kg
4th box → 350 Kg

5^{th} box $\rightarrow$ 500 Kg
Hence difference between the havier 4 and the lighter 4 is 300.
So difference in the averages is 75 kg.

36. (A) Given $\left(x+\frac{1}{x}\right)^2 = 3 \Rightarrow x+\frac{1}{x} = \sqrt{3}$

So, $x^6 + 1 = 0$

Now,

$x^{206} + x^{200} + x^{90} + x^{84} + x^{18} + x^{12} + x^6 + 1$

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

$= 0$ [$\because x^6 + 1 = 0$]

37. (B) H = Height of pyramid
h = Slant height

Height of pyromid = $\sqrt{h^2 - \left(\frac{10\sqrt{3}}{2\sqrt{3}}\right)^2}$

H = $\sqrt{(13)^2 - \left(\frac{10\sqrt{3}}{2\sqrt{3}}\right)^2}$

H = 12 cm

Volume of Pyramid = $\frac{1}{3}$ × Area of base × Height

$= \frac{1}{3} \times \frac{\sqrt{3}}{4} \times (10\sqrt{3})^2 \times 12$

$= 300\sqrt{3}$ cm³

38. (C) Marked price = $6580 \times \frac{100}{(100-30)} = ₹\,9400$

39. (B) $x + \frac{1}{x} = 1$

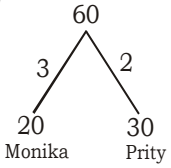
$x^3 = -1$

$x^{17} + \frac{1}{x^{17}} \Rightarrow \frac{x^{18}}{x} + \frac{x}{x^{18}}$

$\Rightarrow \frac{(-1)^6}{x} + \frac{x}{(-1)^6}$

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

40. (A)



10 days work of Monika = 3 × 10 = 30 units

Required days = $\frac{60-30}{3+2}$ days

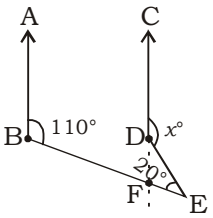
$= \frac{30}{5}$ days

= 6 days

41. (B) ATQ, $\frac{M}{3} - \frac{M}{4} = 7$

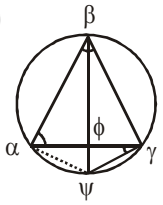
M = 84 feet
= 84 × 30 cm
= 2520 cm

42. (D)



AB || CF
∠DFE = 110°
∠CDE = 110° + 20°
(sum of two interior angles equal to exterior angle)
x = 130°

43. (B)



$\Delta\alpha\beta\phi \cong \Delta\psi\beta\gamma$

$\frac{\alpha\beta}{\beta\phi} = \frac{\beta\psi}{\beta\gamma} = \frac{\alpha\beta}{\gamma\psi}$

$\beta\phi \times \phi\psi = \psi\phi \times \phi\gamma$ ....(i)
$\alpha\beta \times \beta\gamma = \psi\phi \times \beta\psi$ ...(ii)
$\beta\alpha \times \beta\gamma = \beta\phi \times \beta\psi$ ....(iii)
put value of $\beta\phi \times \beta\psi + \psi\phi \times \phi\psi = \beta\psi$
$(\beta\phi + \psi\phi)$
$= (\beta\psi)^2$

44. (C) ∠CAD = $\frac{180°}{\text{Number of sides}} = \frac{180°}{5} = 36°$

45. (B) SI = $\frac{12000 \times 3 \times r}{100} = 360r$

Remaining principal 12000 – 6500
= 5500

Again SI = $\frac{5500 \times r \times 2}{100} = 110r$

$5500 + 110r + 360r = 9260$
$470r = 9260 - 5500$
$r = 8\%$

46. (A) $\frac{1}{1-x} - \frac{1}{1+x} - \frac{2x}{1+x^2} - \frac{4x^3}{1+x^4} - \frac{8x^7}{1+x^8} - \frac{16x^{15}}{1-x^{16}}$

$= \frac{1+x-1+x}{1-x^2} - \frac{2x}{1+x^2} - \frac{4x^3}{1+x^4} - \frac{8x^7}{1+x^8} - \frac{16x^{15}}{1-x^{16}}$

$$= \frac{2x}{1-x^2} - \frac{2x}{1+x^2} - \frac{4x^3}{1+x^4} - \frac{8x^7}{1+x^8} - \frac{16x^{15}}{1-x^{16}}$$

$$= \frac{4x^3}{1-x^4} - \frac{4x^3}{1+x^4} - \frac{8x^7}{1+x^8} - \frac{16x^{15}}{1-x^{16}}$$

Similarly it becomes

$$= \frac{16x^{15}}{1-x^{16}} - \frac{16x^{15}}{1-x^{16}} = 0$$

47. (D) $\left[\frac{1}{1^2}-\frac{1}{2^2}\right] + \left[\frac{1}{2^2}-\frac{1}{3^2}\right] + ...+ \left[\frac{1}{9^2}-\frac{1}{10^2}\right]$

$$= \frac{1}{1} - \frac{1}{10^2} = \frac{99}{100}$$

48. (D) $x + \frac{4}{x} = 4$

$x^2 + 4 = 4x$

$x^2 - 4x + 4 = 0$

$(x-2)^2 = 0$

$x = 2$

$$x^2 + \frac{1}{x^3} = (2)^2 + \frac{1}{(2)^3} = 4\frac{1}{8}$$

49. (A) Diagonal of inner most square is 2 cm.
After that diagonal will increase by 2,
So, diagonal of seventh square will be 14,
Area of seventh square will be 14,

Area of seventh square = $\frac{14^2}{2}$ = 98 cm²

Area of eight square = $\frac{16^2}{2}$ = 128 cm²

Difference = 30 square unit

50. (C) $$\frac{\frac{1}{3}\times 3\times\frac{5}{7}+\frac{1}{2}\times 2\times\frac{4}{5}+\frac{1}{7}\times 1\times\frac{4}{5}}{\frac{1}{3}\times 3\times\frac{2}{7}+\frac{1}{2}\times 2\times\frac{1}{5}+\frac{1}{7}\times 1\times\frac{1}{5}}$$

$$= \frac{\frac{5}{7}+\frac{4}{5}+\frac{4}{35}}{\frac{2}{7}+\frac{1}{5}+\frac{1}{35}}$$

$$= \frac{25+28+4}{10+7+1}$$

$$= \frac{57}{18}$$

$$\% = \frac{18}{75}\times 100\% = 24\%$$

51. (D) $\tan\alpha = 1$, $\tan\beta = \sqrt{3}$

$$\sin\alpha = \frac{\tan\alpha}{\sqrt{1+\tan^2\alpha}} = \frac{1}{\sqrt{2}}$$

$$\cos\alpha = \frac{1}{1+\tan^2\alpha} = \frac{1}{\sqrt{2}}$$

$$\tan\beta = \sqrt{3}\ ,\ \sin\beta = \frac{\sqrt{3}}{\sqrt{1+3}} = \frac{\sqrt{3}}{2}$$

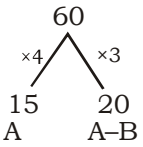
$$\cos\beta = \frac{1}{\sqrt{1+3}} = \frac{1}{2}$$

$\therefore \cos\alpha \cdot \cos\beta - \sin\alpha \cdot \sin\beta$

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

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

52. (C)



$$B = \frac{60}{4-3} = 60 \text{ hrs}$$

53. (A) $$\frac{\frac{m}{m-n}-\frac{m}{m+n}}{\frac{n}{m-n}-\frac{n}{m+n}} + \frac{\frac{m+n}{m-n}-\frac{m-n}{m+n}}{\frac{m+n}{m-n}-\frac{m-n}{m+n}} \times \frac{m^2}{m^2+n^2}$$

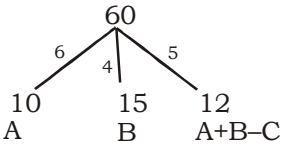
$$= \frac{m(m+n)-m(m-n)}{n(m+n)-n(m-n)} +$$

$$\frac{(m+n)^2+(m-n)^2}{(m+n)^2-(m-n)^2} \times \frac{m^2}{m^2+n^2}$$

$$\frac{2mn}{2n^2} + \frac{2(m^2+n^2)}{4mn} \times \frac{m^2}{(m^2+n^2)}$$

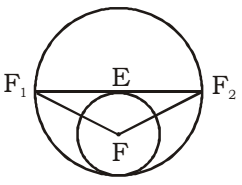
$$= \frac{m}{n} + \frac{m}{2n} = \frac{2m+m}{2n} = \frac{3m}{2n}$$

54. (C)



$$C = \frac{60}{6+4-5} = 12 \text{ hrs}$$

55. (C)



$\tan \angle EFF_1 = \frac{F_1E}{FE}$

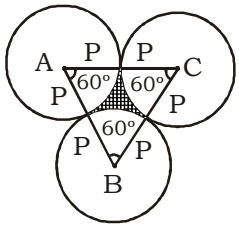
$\tan \angle EFF_1 = \frac{2}{1} = \tan \angle EFF_2$

$\tan \angle F_1FF_2 = \frac{2 \times 2}{1 - 2 \times 2} = -\frac{4}{3}$

56. (C) $\frac{40}{S_B} = \sqrt{\frac{\frac{1}{2}}{2}} = \frac{1}{2}$

S_B = 80 km/hrs

57. (A)



Let AB = BC = CA = 2P cm
$\angle BAC = \angle ACB = \angle ABC = 60^\circ$

Area of $\Delta ABC = \frac{\sqrt{3}}{4} \times (\text{side})^2 = \frac{\sqrt{3}}{4}(2P)^2$

$= \sqrt{3}\,P^2$ cm^2

Area of three sectors $= 3 \times \frac{60}{360} \times \pi P^2$

$= \frac{\pi P^2}{2}$ cm^2

$\therefore$ Area of shaded portion $= \sqrt{3}\,P^2 - \frac{\pi}{2}P^2$

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

58. (C) Speed $= \frac{45 \times 40}{30}$ = 60 km/hr

59. (B) $CP_1 \times \frac{119}{100} = CP_2 \times \frac{85}{100}$

$CP_1 : CP_2 = 5 : 7$

$C.P_1 = \frac{5}{12} \times 4800 = 2000$

$C.P_2 = 2800$

then selling price of second Article SP_2

$= \frac{85}{100} \times 2800 = 2380$

60. (C)

4 km/hr	+15 $\Rightarrow$	+60
6 km/hr	–10 $\Rightarrow$	–60
2	$\Rightarrow$	120

$T = \frac{120}{2}$ = 60 min

$D = 4\left(1 + \frac{15}{60}\right)$ km

$= 4 \times \frac{5}{4} = 5$ km

61. (C) Area of circle = 9π
$\therefore \pi r^2 = 9\pi \therefore r = 3$
So, d = height = 6
Now in triangle ADB,
$AB^2 = AD^2 + DB^2 \therefore (2x)^2 = 6^2 + x^2$
$\therefore 4x^2 = 36 + x^2 \therefore 3x^2 = 36$
$\therefore x^2 = 12 \therefore x = \sqrt{12} \therefore x = 2\sqrt{3}$ units
$\therefore$ DB = $2\sqrt{3} \therefore$ CD = 2DB = $4\sqrt{3}$
So, the base of equilateral triangle = $4\sqrt{3}$

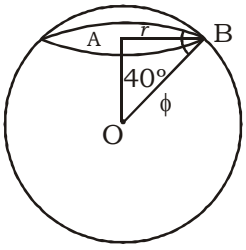
$\therefore$ Area of equilateral $\Delta ABC = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 4\sqrt{3} \times 6 = 12\sqrt{3}$ sq. units

62. (B) Required time $= \frac{60 \times \frac{1}{2}}{15}$ = 2 hr

Distance = 75 × 2 = 150 km

63. (A)



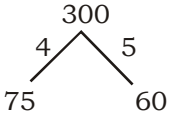
In ΔOAB

$\cos 40^\circ = \frac{AB}{OB}$

$\cos 40^\circ = \frac{r}{\phi}$

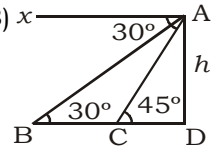
$\therefore r = \phi \cos 40^\circ$
$\because 40^\circ\beta = \phi \cos 40^\circ$

64. (B)



Required time $= \frac{1}{5} \times 60$ = 12 min

65. (B)



AD = h
Let CD = x
BC = 1
$\angle XAB = 30° = \angle ABD$ asnd
$\angle XAC = 45° = \angle ACD$

In DAB, $\tan 30° = \frac{AD}{BD} = \frac{h}{x+1}$

$\frac{1}{\sqrt{3}} = \frac{h}{x+1}$

$x = \sqrt{3}\,h - 1$ .....(i)

Again ΔACD

$\tan 45° = \frac{AD}{CD} = \frac{h}{x}$

$\Rightarrow 1 = \frac{h}{x}$

$\Rightarrow h = x$

$\therefore$ From (i)

$(\sqrt{3}-1)h = 1$

$\frac{1}{\sqrt{3}-1} = \frac{1}{0.732} = 1.366$ Km

66. (A)

67. (C) PQ = (PS – SQ) = (PS – PT) and ST = (PS – PT) $\Rightarrow$ PQ = ST
In ΔPQR and ΔSTU, we know
PQ = ST (proved)
RQ = TU (given)
$\angle PQR = \angle UTS$
$\therefore \Delta PQR \cong \Delta STU$

68. (D) B : A = 1 : 2
A : C = 1 : 3
B : A : C = 1 : 2 : 6
A : B : C = 2 : 1 : 6

69. (D) $\because$ 5a7 + 815 = 13b2
$\therefore$ 815 = 13b2 – 5a7
We get $a = 1$, $b = 3$
then $(a + b)^3 = (3 + 1)^3 = 64$

70. (A) CP = $\frac{63}{12} \times \frac{100}{105} \times 50$ = ₹ 250

Loss = $\frac{2.5}{250} \times 100\%$ = 1%

71. (A) Difference = 15
23^{rd} term $(t_{23}) = a + (n-1)d$
$= 15 + (23 - 1)\,15 = 345$
$= 27^{th}$ term $(t_{27}) = a + (n-1)d$
$= 15 + (27 - 1)15 = 405$
then $27^{th} \times 23^{th} = 139725$

72. (A) Volume = $3\sqrt{8 \times 2} \times 8$
$= 3 \times 4 \times 8 = 96$ cm³

73. (B) $\frac{18}{x+y} + \frac{12}{x-y} = 3$ ....(i)

$\frac{24}{x+y} + \frac{36}{x-y} = \frac{13}{2}$ ....(ii)

Down stream distance : 18, 24 $\rangle$ 12 { x = speed of boat
upstream distance : 12, 36 $\rangle$ 8 { y = speed of current

$\because x + y = 12$
and $x - y = 8$
satisfies above equations,

therefore $y = \frac{12-8}{2}$ = 2 km/h

$= 2 \times \frac{5}{18}$ m/s

Speed of current $\Rightarrow 2 \times \frac{5}{18} = \frac{5}{9}$ m/s

74. (B) Required area = $\frac{42 \times 14 - 3\pi \times 7 \times 7}{2}$

$= \frac{588 - 462}{2} = \frac{126}{2} = 63$ cm²

75. (B) $\tan^2\alpha = 1 - \beta^2$
$\therefore \sec\alpha + \tan^3\alpha \cdot \operatorname{cosec}\alpha$
$\Rightarrow \sec\alpha + \tan^2\alpha \cdot \tan\alpha \cdot \operatorname{cosec}\alpha$
$\Rightarrow \sec\alpha + \tan^2\alpha \cdot \sec\alpha$
$\Rightarrow \sec\alpha\,(1 + \tan^2\alpha)$

$= \sqrt{1+\tan^2\alpha}\;(1 + \tan^2\alpha)$

$\Rightarrow (1+\tan^2\alpha)^{3/2} = (1+1-\beta^2)^{\frac{3}{2}}$

$\Rightarrow (2-\beta^2)^{\frac{3}{2}}$

76. (C) AB : AC = 5 : 7

BD = $\frac{5}{12} \times 20 = \frac{25}{3}$ cm

77. (B)

Let	Camel (I)	Camel (II)
CP	$100x$	$100y$
Profit 1	$10x$	$20y$
Profit 2	$20x$	$10y$

$10x - 10y$ = ₹387
×10 ↓ ×10 ↓ ×10 ↓
$100x - 100y$ = ₹3870

78. (B) $28.49 = \frac{1}{3}\pi(28^2 + 21^2 + 28 \times 21)h$

h = 15 cm

79. (C) 36 × 8 = 288

13 × 8 = +104
392
+32
424
–56 (died)
368
+24
392
–48 (died)
Sum 344

required answer = $\frac{344}{8}$ = 43 years

80. (C) $bh = 540 \times 2 = 1080$

$(b + p)^2 = b^2 + h^2 + 2bh$

$= (51)^2 + 2 \times 1080$

$= 4761$

$b + p = 69$ cm

Perimeter = 69 + 51 = 120 cm

81. (B) $\because$ A + 2A = 3A

$\because$ cot (A + 2A) = cot 3A

or $\frac{\cot A \cot 2A - 1}{\cot 2A + \cot A} = \cot 3A$

$\Rightarrow$ cot A cot 2A – 1 = cot 3A cot 2A + (cot 3A cot A)

$\Rightarrow$ cot A cot 2A – 1 = cot 3A cot 2A + cot 3A cot cot A cot 2A – cot 3A cot 2A – cot 3A cot A = 1

82. (B) B : C = 6 : 5

C : A = 4 : 5

B : C : A = 24 : 20 : 25

A : C = 25 : 20

83. (A) $(3^{123} - 3^{122} - 3^{121})(2^{121} - 2^{120} - 2^{119})((2^3 - 3)\cdot 2)$

$\Rightarrow 3^{121}\left(3^2 - 3^1 - 1\right)_2^{119} (2^2 - 2 - 1)((2^3 - 3)\cdot 2)$

$= 3^{121} \times \underline{5 \times 2^{119}} \times \underline{5 \times 2}$

= 2

$\because$ It makes 2 zero

84. (C) $x^2 + \frac{1}{x^2} = 3 + 2 = 5$

85. (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,

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

=12% annual

86. (B) It is triplet so,

Area = $\frac{4}{3} \times \frac{1}{2} \times 18 \times 7.5$ = 90 cm²

87. (C) Total prime no. between 1 to 100 = 25

Their sum = 1060

Required sum = $\frac{1060}{25} \times \frac{2}{3}$ = 28.26

88. (B) h = 9 cm = $\frac{\sqrt{3}}{2}$ a

a = $\frac{9 \times 2}{\sqrt{3}}$ cm = $6\sqrt{3}$ cm

89. (C)

90. (D) $a = \sqrt{3 + a}$

$a^2 = 3 + a$

$a^2 - a - 3 = 0$

$a = \frac{1 \pm \sqrt{1 + 12}}{2} = \frac{1 \pm \sqrt{13}}{2}$

$a = \frac{1 - \sqrt{13}}{2} < 0$ (not possible)

or

$a = \frac{1 + \sqrt{13}}{2} = \frac{1 + 3.6}{2} = \frac{4.6}{2} = 2.3$

$\therefore$ $2 < a < 3$

91. (D) Unit place of $25^{6251} + 36^{528} + 73^{50}$

= 5 + 6 + 9 = '0'

92. (D) Required number = Y in 2014 + Y in 2015

= (25 × 1000)+(15×1000)

= 40×1000

= 40000

93.(D) Required % = $\frac{(X + Y + Z)\ in\ 2013}{(X + Y + Z)\ in\ 2014} \times 100$

= $\frac{55 \times 1000}{60 \times 1000} \times 100$ = 91.67 %

94.(A) Required % = $\frac{X\ in\ 2012}{(X + Y + Z)\ in\ 2012} \times 100$

= $\frac{10 \times 1000}{55 \times 1000} \times 100$ = 18% (approx)

95.(C) Required Average

= $\frac{(5 + 10 + 25 + 20 + 25 + 15) \times 1000}{6}$

= $\frac{100000}{6} = 16666\frac{2}{3}$

96.(B) Respective Ratio = (Z in 2011): (Z in 2010)

= (15 ×1000) : (10×1000)

= 3 : 2

97. (A) Percent rise/fail in number of students who left the school to the previous year in

2011

$$= \frac{\text{Rise in no. of students left in 2011}}{\text{No. of students who left in 2010}} \times 100$$

$$= \frac{200}{250} \times 100 = 80\% \text{ increase}$$

Students left in 2012 = $\frac{50}{450} \times 100$

$$= 11\frac{1}{9}\% \text{ decrease}$$

Student left in 2013

$$= \frac{50}{400} \times 100$$

$$= \frac{1}{8} \times 100 = 12\frac{1}{2}\% \text{ decrease}$$

Student left in 2014

$$= \frac{100}{350} \times 100$$

$$= 28\frac{4}{7}\% \text{ increase}$$

$\therefore$ Maximum rise/fail was in year 2011.

98. (B) Number of students in school in 2012 = 3000
In 2013, strength of school = 3150
In 2014, 400 students join and 450 left
$\Rightarrow$ Net 50 students left in 2014
$\therefore$ Strength of students in 2014
= 3150 – 50
= 3100
In 2015, 550 students join and 450 students left $\Rightarrow$ Net 100 students join school in 2015
$\therefore$ Strength of school in 2015
= 3100 + 100
= 3200
Percent of students studying in school in 2012 to that in 2015

$$= \frac{3000}{3200} \times 100 = 93\frac{3}{4}\% = 93.75\%$$

99. (D) Least number of students who join the school = 300 (in 2011)
Maximum number of students left the school = 450 (in 2015)

$$\therefore \text{Required Ratio} = \frac{300}{450} = \frac{2}{3} = 2 : 3$$

100. (B) Strength of school in 2011 = 2950
Strength of school in 2012 = 3000
Percent increase in strength of school from (2011 to 2012)

$$= \frac{50}{2950} \times 100 \approx 1.7\%$$

SSC MAINS (MATHS) MOCK TEST-12 (ANSWER KEY)

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