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SSC MAINS (MATHS) MOCK TEST-17 (SOLUTION)

1.(B) Let the three fraction be p, q and r where p < q < r

$$\frac{r}{p} = \frac{7}{6} \Rightarrow r = \frac{7}{6}p$$

Now middle fraction

$$q = \frac{7}{6} - \frac{1}{3} \Rightarrow \frac{7-2}{6} = \frac{5}{6}$$

$\because$ $p + q + r = 2\frac{11}{24}$

$$p + \frac{5}{6} + \frac{7}{6}p = \frac{59}{24}$$

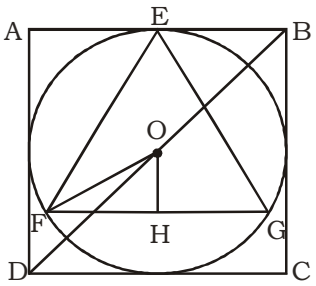
$$\frac{6p+7p}{6} = \frac{39}{24}$$

$$13p = \frac{39}{24} \times 6 = \frac{39}{4}$$

$$p = \frac{39}{4 \times 13}$$

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

2.(A) Side of square = $\frac{1}{\sqrt{2}} \times 6\sqrt{2} = 6$ cm



$\because$ Radius of circle = $\frac{6}{2} = 3$ cm

AB = $2x$ cm

$\because$ FH = x cm

$\because$ From $\triangle$OFH

$$\cos 30° = \frac{FH}{OF}$$

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

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

$\because$ Length of side = $3\sqrt{3}$ cm

3.(B) Area of the base of pyramid = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$$= \frac{\sqrt{3}}{4} \times 4 \times 4 = 4\sqrt{3} \text{ sq.cm}$$

Length of meidan on the base AD

$$= \sqrt{(4)^2 - (2)^2} = 2\sqrt{3} \text{ cm}$$

$\because$ OD = $\frac{1}{3} \times 2\sqrt{3}$

$$= \frac{2}{\sqrt{3}} \text{ cm}$$

Height of pyramid = $\sqrt{(5)^2 - \left(\frac{2}{\sqrt{3}}\right)^2}$

$$= \frac{\sqrt{71}}{\sqrt{3}} \text{ cm}$$

$\because$ Volume of pyramid = $\frac{1}{3} \times$ Area of base $\times$ h

$$= \frac{1}{3} \times 4\sqrt{3} \times \frac{\sqrt{71}}{\sqrt{3}} \text{ cm.}$$

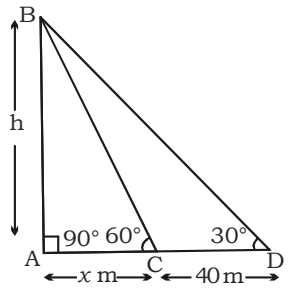
4.(C) 19 × 26 – 18 × 25 = 44 years

5.(C) $7777 + 7777 \times 7777 \times \frac{5}{77} \times \frac{11}{35}$

7777 + 1111 × 1111

7777 + 1234321 = 1242098

6. (A)



In A triangle ABC

$$\tan 60° = \frac{h}{x}$$

$$\Rightarrow \sqrt{3} = \frac{h}{x}$$

$$\Rightarrow h = x\sqrt{3}$$

in $\triangle$ABD = $\frac{AB}{AD} = \tan 30°$

$$\frac{h}{(x+40)} = \frac{1}{\sqrt{3}}$$

$$\frac{x\sqrt{3}}{(x+40)} = \frac{1}{\sqrt{3}}$$

$x = 20$ m

Then, h = $20\sqrt{3}$ m

7.(D) Let the normal speed be x km/h.

$$\frac{80}{x} - \frac{80}{x+4} = 1$$

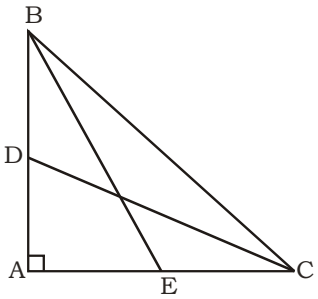
$x^2 + 4x - 320 = 0$

$x(x + 20) - 16(x + 20) = 0$

$x = 16$ km/h

16 + 4 = 20 km/h

8.(B) Using pythagoras theoram



$BE^2 = AE^2 + AB^2$

$CD^2 = AC^2 + AD^2$

$\because$ $BE^2 + CD^2 = AE^2 + AD^2 + AB^2 + AC^2$

$$\left(\frac{AC}{2}\right)^2 + \left(\frac{AB}{2}\right)^2 + AB^2 + AC^2$$

$$\frac{AC^2}{4} + \frac{AB^2}{4} + AB^2 + AC^2$$

$4(BE^2 + CD^2) = 5(AB^2 + AC^2)$

$4(BE^2 + CD^2) = 5BC^2$

9.(D) $$= \frac{9^n \cdot 3^2 \cdot \left(3^{-\frac{n}{2}}\right)^{-2} - (27)^n}{3^{3m} \cdot 2^3} = \frac{1}{27}$$

$$= \frac{3^{2n} \cdot 3^2 \cdot 3^n - 3^{3n}}{3^{3m} \cdot 2^3} = \frac{1}{(3)^3}$$

$$= \frac{3^{2n+2+n} - 3^{3n}}{8 \cdot 3^{3m}} = \frac{1}{(3)^3}$$

$$= \frac{3^{3n+2} - 3^{3n}}{3^{3m} \cdot 8} = 3^{-3}$$

$= 3^{3n-3m} = 3^{-3}$

$3n - 3m = -3$

$m - n = 1$

10.(C) Speed of car = $x\left(\frac{t_1 - t_2}{t_2}\right)$ km/h

(speed of sound) = $330 \times \frac{18}{5}$ km/hr

= 1188 km/hr

$$= 1188\left(\frac{t_1 - t_2}{t_2}\right)$$

$$= 1188 \times \frac{8\,\text{sec}}{5\,\text{min}\,52\,\text{sec}}$$

$$= 1188 \times \frac{8}{352} = 27 \text{ km/h}$$

11.(B) Let = $7x$ and $5x$

A in the bucket = $\left(7x - 9 \cdot \frac{7}{12}\right)$

$$= 7x - \frac{63}{12}$$

In B, after replacing 9 litres mixture by 9 litres of liquid B

$$12x - \left(7x - \frac{63}{12}\right) = 5x + \frac{63}{12}$$

Then, $$\frac{7x - \frac{63}{12}}{5x + \frac{63}{12}} = \frac{7}{9}$$

$(84x - 63) \times 9 = (60x + 63) \times 7$

$84x \times 9 - 60x \times 7 = 63 \times 7 + 63 \times 9$

$= 336x = 63 \times 16$

$= x = 3$

Liquid in Bucket = $7 \times 3 = 21$

12.(A) $$x + \frac{1}{y + \frac{1}{y + \frac{1}{z}}} = \frac{37}{13} = 2 + \frac{11}{13}$$

$$x + \frac{1}{y + \frac{1}{y + \frac{1}{z}}} = 2 + \frac{1}{\frac{13}{11}}$$

$$x + \frac{1}{y + \frac{1}{y + \frac{1}{z}}} = 2 + \frac{1}{1 + \frac{2}{11}}$$

$$x + \frac{1}{y + \frac{1}{y + \frac{1}{z}}} = 2 + \frac{1}{1 + \frac{1}{\frac{11}{2}}}$$

Therefore

$$x = 2, y = 1, z = \frac{11}{2}$$

$$x + y + z = 2 + 1 + \frac{11}{2} = \frac{17}{2}$$

13.(C) LCM of 32, 36, 40 = 1440

Therefore

The required number 1440 – 8 = 1432

14.(D) Payal present age = $\frac{4}{3}$ of her marriage is age

$= \frac{4}{3} \times$ marriage age

$\therefore$ marriage age $9 \times 3 = 27$ years

present age = 27 + 9 = 36 years

age of daughter = $\frac{1}{6} \times 36 = 6$ years

her daughter age 2 year ago = 6 – 2 = 4 years

15.(B) $= 210 \times \frac{120}{100} \times \frac{8}{7} = ₹ 288$

16.(A) $(250 + x) \times \frac{3}{4} = 270$

$750 + 3x = 1080$

$3x = 330$

$x = 110$

17.(B)

	Black	Blue
No of Jeans	6	x
Price of Jeans	3	1
Expenditure →	18	x

Initial expenditure $\frac{23}{11}$ $(18 + x)$

But now expenditure $\frac{23}{11}$ $6 \times 1 + 3 \times x$

$(6 + 3x)$

$= \frac{120}{100}(18 + x)$

$30 + 15x = 108 + 6x$

$9x = 78$

$x = \frac{26}{3}$

Ratio $\frac{23}{11}$ $6 : \frac{26}{3}$

$18 : 26$

$9 : 13$

18.(C) Let days = x

$$\frac{(3m + 4b)}{756} \times 7 = \frac{(11m + 13b)}{3008} \times 8$$

$282\,m + 376\,b = 297\,m + 351b$

$$\frac{M}{B} = \frac{5}{3}$$

Then,

$$\left(\frac{3 \times 5 + 4 \times 3}{756}\right) \times 7 = \left(\frac{7 \times 5 + 9 \times 3}{2480}\right) \times x$$

$x = 10$ days

19.(C) $2x + 3x + 5x = 180 - 45 = 135°$

$$x = \left(\frac{27}{2}\right)$$

$\because$ largest angle $= 5x + 15°$

$$= \left(5 \times \frac{27}{2}\right) + 15 = \left(\frac{165}{2}\right)$$

$\because$ $180 = \sqrt[4]{12}$ radin

$$\frac{165}{2} = \frac{p}{180} \times \frac{165}{2} = \frac{11p}{24}$$

20.(A) Factories $(x^8 + x^4 y^4 + y^8)$

$x^8 + 2x^4 y^4 + y^8 - x^4 y^4$

$(x^4 + y^4)^2 - (x^2 y^2)^2$

$(x^4 + y^4 + x^2 y^2)(x^4 + y^4 - x^2 y^2)$

$$\left[(x^2 + y^2) - (xy)^2\right](x^4 - x^2 y^2 + y^4)$$

21.(B) $2y - \sqrt{12}x - 9 = 0$

$$y = \frac{\sqrt{12}}{2}x + \frac{9}{2}$$

$\therefore$ $m_1 = \frac{\sqrt{12}}{2} = \sqrt{3}$

$\sqrt{3}y - x + 7 = 0$ $\therefore$ $y = \left(\frac{1}{\sqrt{3}}\right)x - \frac{7}{\sqrt{3}}$

$$m_2 = \left(\frac{1}{\sqrt{3}}\right)$$

$\because$ $\tan\sqrt[6]{39} = \frac{m_1 - m_2}{1 + m_1 \times m_2}$

$$= \frac{\sqrt{3} - \frac{1}{\sqrt{3}}}{1 + \sqrt{3} \times \frac{1}{\sqrt{3}}} = \frac{1}{\sqrt{3}}$$

Then $\sqrt[6]{39} = 30°$

22.(C) $\therefore$ A : B = $\frac{1}{2} : \frac{1}{3}$ $\therefore$ 3 : 2

B : C = $\frac{1}{5} : \frac{1}{3}$ $\therefore$ 3 : 5

A : B = 3 : 2 × 3
B : C = 3 : 5 × 2
A : B : C = 9 : 6 : 10
Then (A + B) : (B + C)
15 : 16

23.(B) $\frac{142857}{999999} \div \frac{285714}{999999}$

$\frac{142857}{285714} = \frac{1}{2}$

24.(B) $P_1 + P_2 = A$

$\because \quad \frac{25}{26}x + \frac{625}{676}x = 2550$

$\frac{25}{26}x\left[1+\frac{25}{26}\right] = 2550$

$x = 2550 \times \frac{676}{1275}$

$x = 1352$

25.(C) $\frac{3a+4b}{2} > 50$

3a+ 4b > 100

$3a + \frac{4a}{2} > 100$

3a+ 2a > 100
5a > 100
a > 20
minimum value of a = 21

26.(B)

CP		SP
$95\% \times \frac{110}{100}$	=	105% – 2
= 1045%	=	1050% – 20
5%	=	20
100%	=	$\frac{20}{5} \times 100 = 400$

27.(A) Discount = $24\frac{1}{2}\% = \frac{49}{2}\%$

$\because \quad \left[100 - \frac{49}{2}\right]\%$ of $x = 1510$

$x = 2000$

$\because$ CP of article = $1510 \times \frac{100}{90}$

$= \frac{100}{90}$

Gain = $2000 - \frac{15100}{9}$

$= ₹\ 322\frac{2}{9}$

28.(B) $= \frac{1}{4} - \frac{1}{16}$

$= \frac{4-1}{16} = \frac{3}{16}$

Required time = $\frac{16}{3} = 5\frac{1}{3}$ hrs

29.(A)Let the last term be n, then
$a + ar^{n-1} = 66$ ..... (i)
$ar.\ ar^{n-2} = 128$ ..... (ii)
$a^2 r^{n-1} = 128$
From equation 1st and IInd
$a(66 - a) = 128$
$a^2 - 66a + 128 = 0$
$a = 64, 2$

30.(B) $x = 1 - \sqrt{2}$

$\frac{1}{x} = \frac{1}{1-\sqrt{2}} \times \frac{1+\sqrt{2}}{1+\sqrt{2}}$

$\frac{1}{x} = -(1+\sqrt{2})$

$\because \quad x - \frac{1}{x} = 1 - \sqrt{2} + 1 + \sqrt{2} = 2$

Now, $\left[x - \frac{1}{x}\right]^3 = (2)^3 = 8$

31.(D)Let the number = x and y

Then Am = $\frac{x+y}{2} = 5$

$x + y = 10$

Gm = $\sqrt{xy} = 4$

$= xy = 16$

$(x - y)^2 = (x + y)^2 - 4xy$
$100 - 64 = 36$
$x - y = 6$
Then, $x = 8$
$y = 2$

32.(B) Let the number be $3x$ and $3y$
$3x + 3y = 36$
$x + y = 12$
and $3xy = 105$

$\frac{x}{3xy} + \frac{y}{3xy} = \frac{12}{105}$

$\frac{1}{3y} + \frac{1}{3x} = \frac{4}{35}$

33.(B) Required average

$\frac{5 \times 12 + 3 \times 16}{5+3} = \frac{60+48}{8} = 13\frac{1}{2}$ years

34. (B) $\left(\sqrt{6}+\sqrt{2}\right)^2$

$6 + 2 + 2\sqrt{12}$

$8 + 2\sqrt{12}$

$\left(\sqrt{5}+\sqrt{3}\right)^2 = 5 + 3 + 2\sqrt{15}$

$= 8 + 2\sqrt{15}$

Clearly $\sqrt{15} > \sqrt{12}$

Hence $\sqrt{6} + \sqrt{2} < \sqrt{5} + \sqrt{3}$

35.(B) $3p + 2pq = 4$

$p(3 + 2q) = 4$

$p = \frac{4}{3} + 2a$ .... (i)

Put the value of p in $5q + pq = 3$

$5q + \frac{4}{3} + 2q \times q = 3$

$\frac{15q + 10q^2 + 4q}{3 + 2q} = 3$

$10q^2 + 13q - 9 = 0$

$10q^2 + 18q - 5q - 9 = 0$

$(2q - 1)(5q + 9) = 0$

$q = \frac{1}{2}$ or $-\frac{9}{5}$

Putting $q = \frac{1}{2}$ in .... (i)

$p = \frac{4}{3} + 2 \times \frac{1}{2} = 1$

Putting $q = \frac{-9}{5}$

$p = \frac{4}{3+2\left(\frac{-9}{5}\right)} = \frac{4 \times 5}{15 - 18} = -\frac{20}{3}$

36.(B) Maximum value of $a \sin 6\overline{39} + b \cos 6\overline{39}$

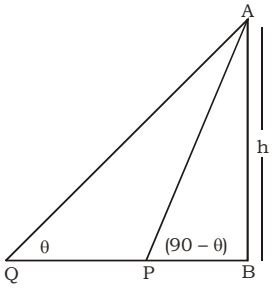
$6\overline{39} = \sqrt{a^2 + b^2}$

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

$= \sqrt{13}$

37.(C) AB = h unit

$\tan 6\overline{39} = \frac{AB}{BC}$



$\tan 6\overline{39} = \frac{h}{b}$ .... (i)

Now,

$\tan (90 - 6\overline{39}) = \frac{h}{PB}$

$\cot 6\overline{39} = \frac{h}{a}$ .....(ii)

Both multiplying (i) and (ii)

$\tan 6\overline{39} \times \cot 6\overline{39} = \frac{h}{b} \times \frac{h}{a}$

$h^2 = ab$

$h = \sqrt{ab}$

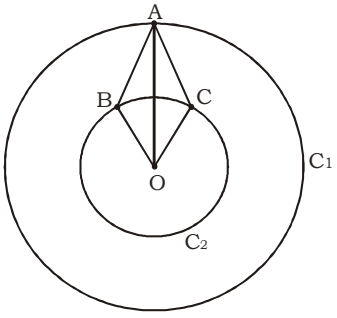
38.(D) AB = AC = Tangent

OB = OC = 3 cm

$\angle ABO = 90°$

$\because$ $AB = \sqrt{(12)^2 - (3)^2}$

$= \sqrt{15 \times 9} = 3\sqrt{15}$



$\triangle OAB = \frac{1}{2} \times OB \times AB$

$\frac{1}{2} \times 3 \times 3\sqrt{15} = \frac{9\sqrt{15}}{2}$

Area of the $\square$ ABOC $= 2 \times \frac{9\sqrt{15}}{2} = 9\sqrt{15}\ cm^2$

39. (D) January

$\square$ $\frac{2500}{1000} \times 100 = 250\%$

February $\frac{100}{1300} \times 100 = \frac{100}{13}\%$

April $\frac{700}{2200} \times 100 \approx 32\%$

May $\frac{2800}{1800} \times 100 = 155\%$

40.(A) Required percentage

$= \frac{100}{2000} \times 100 = 5\%$

41.(A) Required answer

$= \frac{2200}{1000} = 2.2$ times

42.(D) Average demand

$= \frac{8100}{5} = 1620$

Average production

$= \frac{6800}{5} = 1360$

Required difference

$= 1620 - 1360 = 260$

43.(C) Required ratio = 3 : 2

44.(C) Volume of pyramid = $\frac{1}{3} \times$ area of base $\times$ h

$1296 = \frac{1}{3} \times 324 \times h$

$h = \frac{1296}{324} \times 3 = 12$

$\because$ side of base = $\sqrt{324} = 18$ meters

$\because$ slant height = $\sqrt{(12)^2 + \left(\frac{18}{2}\right)^2}$ 3

$= \sqrt{(12)^2 + (9)^2} = 15$ meters

45.(D) $r = \frac{(n-1) \times 100}{t}$

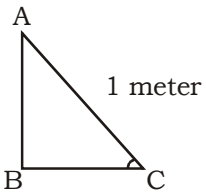
$r = \frac{(2-1) \times 100}{5} = r = 20\%$

46.(C) $\frac{15}{100} \times \frac{45}{100} \times x = 105.3$

$x = 1560$

$\frac{24}{100} \times 1560 = 374.4$

47. (B)



$\sin 15^\circ = \sin(45^\circ - 30^\circ)$

$\sin 45^\circ \times \cos 30^\circ - \cos 45^\circ \times \sin 30^\circ$

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

and $\cos 15^\circ$

$\cos(45 - 30)$

$\cos 45^\circ \times \cos 30^\circ + \sin 45^\circ \times \sin 30^\circ$

$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2}$

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

$\because$ AB = AC sin 15°

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

BC = AC cos 15° = $\frac{\sqrt{3}+1}{2\sqrt{2}}$

$= \frac{1}{8}$ square meter

$= \frac{10000}{8} = 1250$ square cm.

48. (A) (10 m + 6w) = 18 days

	M	W
Hour	3	2
Time	9 hrs	7.5 hrs
	27	15
Ratio	9	: 5

Total work = (10 × 9 + 6 × 5) × 18

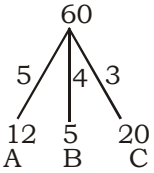
= 2160 unit

Required time for (10 m + 9 w)

$= \frac{18 \times 120}{10 \times 9 + 9 \times 5}$

= 16 days

49. (A)



A + B = (5 + 4) = 9

(A + C) = (5 + 3) = 8

in 2 hours —— 17

6 hours ——51

Now $\frac{9}{9} = 1$

Total time = 6 + 1 = 7 hours

50. (C) $I = \frac{P \times R \times T}{100}$

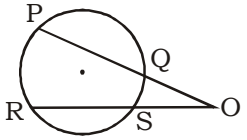
$1 = \frac{55 \times r \times 1}{12 \times 100}$

$r = \frac{1200}{55}$

$r = \frac{240}{11}$

$r = 21\frac{9}{11}\%$

51. (D)



OP × OQ = OS × OR
(6 + 8) × 8 = 7 × OR
14 × 8 = 7 × OR
OR = 16
16 – 7 = 9 cm

52.(A) Length of transverse tangent

$(8) = \sqrt{(xy)^2 - (r_1 + r_2)^2}$

$64 = (xy)^2 - 100$

$164 = xy^2$

$xy = 2\sqrt{41}$

53. (B) Let profit = x
CP = $80 - x = 96 - 3x$
$2x = 16$
$x = 8$
cost price = 80 – 8 = 72
Required Profit percentage

$= \left(\frac{90-72}{72}\right) \times 100 = \frac{18}{72} \times 100$

= 25%

54. (C) $\frac{1-\left(\frac{1}{10}\right)^{-1}}{\left(3^{-1}\right)\left(2^3\right) \times (3)^3 \times 2^{-3} + (-3)^1}$

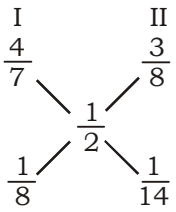
$= \frac{1-10}{3^2+3} = \frac{-9}{12} = \frac{-3}{4}$

55. (B) $B_1 : B_2 : B_3 = 3x : 4x : 5x$
$B_1 : B_2 : B_3 = 5y : 4y : 3y$
Since three is increase in number of orange in first two basket only it means the number of orange remains in third basket.
Now, $5x = 4y$
$3x : 4x : 5x$

$\frac{9y}{5} : \frac{12y}{5} : \frac{15y}{5} = 9y : 12y : 15y$

$5y : 4y : 3y \Rightarrow 25y : 20y : 15y$
Increase in first basket = 16
Increase in second basket = 8
Ratio = 2 : 1

56. (B)



Ratio = 7 : 4

57. (B)

	Suraj	:	Apurva
Income	$5x$	:	$5x$
Exp	$3y$	:	$4y$
Saving	1800	:	1600

$\frac{5x-1800}{6x-1600} = \frac{3y}{4y}$

$2x = 2400$
$x = 1200$
Income of Aproova
= 1200 × 6
= 7200

58. (A) $\frac{\text{speed of } A}{\text{speed of } B} = \sqrt{\frac{\text{Time of } B}{\text{Time of } A}}$

$= \sqrt{\frac{36}{16}} = \frac{6}{4} = 3 : 2$

59. (B) $7\frac{1}{2} = \frac{15}{2}$ minute in 1 km.

$\frac{15}{2} \times 8$ —— 8 km/h.

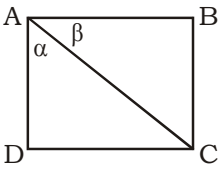
$\frac{1}{2}(8 + 5) = 6\frac{1}{2}$ km/h.

60. (B) $\frac{5}{3} \times \frac{7}{5} \times \ldots \frac{1001}{999}$

$\frac{1}{3} \times 1001$

$= \frac{1001}{3}$

61. (C)

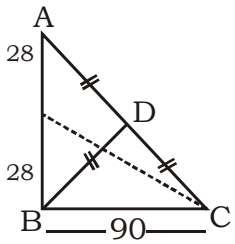


$(\tan^2 \alpha + 1) \sin^2\beta$
$(\tan^2 45^\circ + 1) \sin^2 45$

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

$= 2 \times \frac{1}{2} = (1)$

62. (B)



BD = 53 cm
AD = CD = BD = 53 cm
$\because$ AC = 2 × 53 = 106 cm
AB + BC + AC = 2 × 126 cm
= 252 cm
AB + BC = 146 cm
Let AB = x cm
BC = (146 – x) cm
$AB^2 + BC^2 = AC^2$
$x^2 + (146 - x)^2 = (106)^2$
$x^2 + 21316 + x^2 - 292x = 11236$
$2x^2 - 292x + 10080 = 0$
$x^2 - 146x + 5040 = 0$
$x^2 - 90x - 56x + 5040 = 0$
$x = 90$
$x = 56$

Area = $\frac{1}{2} \times 28 \times 90$

= 1260 cm^2

63. (B) $\pi r^2 = 3$

$r = \sqrt{3}$

$DE = 2r^2 - 2r^2 \cos 120^\circ$

$DE = r^2$ ($\because \sqrt{3} = r$)

But AB = 2DE

$AB = 2r^2$

$AB = 2 \times (\sqrt{3})^2$

AB = 6

Perimeter of triangle = 3 × 6 unit

64. (B) $640 \times \frac{40}{100} + 360 \times \frac{20}{100}$

256 + 72 = 328

Total students = 1000

$\frac{328}{100} \times 100 = 32.8$

65. (C) Increased metro fare

$\frac{120}{100} \times 30 = 36$

Increased bus fare

$\frac{110}{100} \times 20 = 22$

Ratio = 36 : 22 = 18 : 11

66. (C) $A = P\left(1 + \frac{R}{100}\right)^T$

$\frac{27}{8}x = x\left(1 + \frac{R}{100}\right)^3$

$\frac{1}{2} = \frac{R}{100}$

R = 50%

67. (D)

68. (B) Distance covered in 2nd minute
= 90 – 50 = 40
Distance covered in 3rd minute
= 130 – 90 = 40 meter
$\because$ Required distance
= 50 + 40 + 560
= 50 + 560
= 610 meter.

69. (C) $\frac{\sqrt{2}}{12} a^3$

$= \frac{\sqrt{2}}{12} \times 6 \times 6 \times 6 = 18\sqrt{2}$ cu.cm

70. (D) $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$ ...(i)

$\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ ...(ii)

$-\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ ...(iii)

Adding (i), (i) and (iii) we have

$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 3$ ...(iv)

$\frac{x^2}{a^2} = 1 \Rightarrow x = \pm a$

$\frac{y^2}{b^2} = 1 \quad y = \pm b$

$\frac{z^2}{c^2} = 1 \quad z = \pm c$

71. (B) $\sin A = 1 - \sin^2 A = \cos^2 A$
$\Rightarrow \sin^2 A = \cos^4 A$
$\Rightarrow 1 - \cos^2 A = \cos^4 A$
$\Rightarrow \cos^4 A + \cos^2 A = 1$
Cubing both sides
$\Rightarrow \cos^{12} A + 3\cos^{10} A + 3\cos^8 A + \cos^6 A = 1$
$\Rightarrow \cos^{12} A + 3\cos^{10} A + 3\cos^8 A + \cos^6 A - 1 = 0$
Now comparing the variables we have,
$a = 1$, $b = 3$, $c = 3$, $d = 1$
Hence the value of

$b + \frac{c}{a} + d = 3 + \frac{3}{1} + 1 = 7$

72. (B) Let $n + (n + 1) + (n + 4) + (n + 6) = k$

$\because 3n = 2(n + 4)$

$n = 8$

$k = 8 + 10 + 12 + 14$

$k = 44$

73. (C) $\frac{2t}{1+t^2}$

74. (B) Interior angle of pentagon

$= 180 - \frac{360}{5} = 108$

$\because$ Interior angle of required polygon

$= \frac{5}{6} \times 108 = 90^\circ$

Each exterior angle of the polygon
$= 180^\circ - 90^\circ$

Number of side $= \frac{360}{90} = 4$

75. (A) $\left(1+\frac{1}{(a+1)}\right)\left(1+\frac{1}{(a+2)}\right)\left(1+\frac{1}{a+3}\right)\left(1+\frac{1}{a+4}\right)$

$= \left(\frac{a+2}{a+1}\right)\left(\frac{a+3}{a+2}\right)\left(\frac{a+4}{a+3}\right)\left(\frac{a+5}{a+4}\right) = \frac{a+5}{a+1}$

76. (C) $\frac{1}{2}(25 + 15) \times 7 = 140\ cm^2$

77. (B) $\operatorname{cosec}\theta - \sin\theta = a^3$

$\frac{1-\sin^2\theta}{\sin\theta} = a^3 \Rightarrow \frac{\cos^2\theta}{\sin\theta} = a^3$

$\cos^2 a = a^3 \sin\theta$ ...(i)

$\sec\theta = \cos\theta = b^3$

$\frac{1-\cos^2\theta}{\cos\theta} = b^3 \Rightarrow \frac{\sin^2\theta}{\cos\theta} = b^3$

$\sin^2\theta = b^3 \cos$ —(ii)

$\because \cos\theta = \frac{\sin^2\theta}{b^3}$ put the value in (i)

$\frac{\sin^4\theta}{b^6} = a^3 \sin\theta$

$\sin^3\theta = a^3 b^6$

$\therefore \sin\theta = ab^2$

$\cos\theta = a^2 b$

$1 = a^2 b^4 + a^4 b^2 (a^2 + b^2)$

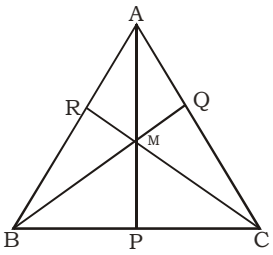
$1 = a^2 b^2 (a^2 + b^2)$

78. (B) $\because \frac{p(y+3)\times 2}{100} - \frac{p \times y \times 2}{100} = 300$

$3P = 15000$

$P = 5000$

79. (B) Let the side



AC = BC = AB = x cm

MP = $\sqrt{3}$

MQ = $2\sqrt{3}$

MR = $5\sqrt{3}$

Area of $\triangle ABC = \frac{1}{2} \times x \times \sqrt{3} + \frac{1}{2} \times x \times 2\sqrt{3} + \frac{1}{2} \times x \times 5\sqrt{3} = \frac{\sqrt{3}}{4} x^2$

$= \frac{1}{2} x\left(\sqrt{3} + 2\sqrt{3} + 5\sqrt{3}\right) = \frac{\sqrt{3}}{4} x^2$

$= \frac{1}{2} x \times 8\sqrt{3} = \frac{\sqrt{3}}{4} x^2$

$x = 16$

$= 16 \times 3 = 48$ cm

80. (C) $\sin x + \cos x = \sqrt{2}\left(\frac{\sin x}{\sqrt{2}} + \frac{\cos x}{\sqrt{2}}\right)$

$= \sqrt{2}\,[\sin(45^\circ + x)]$

$\because$ The minimum value of $\sin(45^\circ + x) = -1$

$(\sin x + \cos x) = -\sqrt{2}$

81. (B) Actual speed of boy = $(p - q)$ km/h

Time taken to cover 1 km $= \left(\frac{1}{p-q}\right)$

$\frac{1}{p-q} = r$

or $\frac{1}{r} = (p - q)$

82. (C) $5^5 = (1 \times 5)^5 = 5$

$10^{10} = (2 \times 5)^{10} = 10$

$15^{15} = (3 \times 5)^{15} = 15$

$20^{20} = (4 \times 5)^{20} = 20$

$(25)^{25} = (5 \times 5)^{25} = 50$

Total = 100

83. (B) @ = 5

84. (B) $l + b + h = 24$ cm

length of diagonal = 15 cm

$\sqrt{l^2 + b^2 + h^2} = 15$

$l + b + h = 225$

$(l + b + h)^2 - 2(lb + bh + lh) = 225$

$(24)^2 = 2(lb + bh + 1h) = 225$

$351 = 2(lb + bh + lh)$

85. (A) Distance travelled in car = $2\pi r$

$= 2 \times \frac{22}{7} \times 21 = 132$ m

So speed $\frac{132}{44} = 3$ m/se

Time taken = $\frac{30,000}{3}$

= 16 mint 40 second

86.(D) Expenditure = 5 (number of family member)^2

$E_1 = 5(n)^2$ ...(i)

$E_2 = 5(n-1)^2$ ...(ii)

$E_1 - E_2 = 95$

$\because\ 5[n^2 - (n-1)^2] = 95$

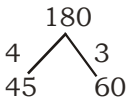
$5n^2 - (n^2 + 1 - 2n) = 95$

$n^2 - n^2 - 1 + 2n = 19$

$2n = 20$

$n = 10$

87. (D)



different = 1 hours

= 60 minutes

= 15 ——— (– 7.5)

60 ——— 22.5

180 ——— $\frac{22.5}{60} \times 180 = 67.5$ km

88. (A) efficiency of A : B = 5 : 8

(E) A : B = 5 : 8

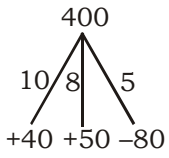
Time = A : B = 8 : 5

A, takes = 12 days

$B = \frac{12}{8} \times 5 = \frac{30}{4} = \frac{15}{2}$

$= 7\frac{1}{2}$ days

89. (B)



A opened at 7.00 am

Fill by A at 12.00 noon

$10 \times 5 = 50$

Fill by B in 3 hours

$= 3 \times 8$

$= 24$

Fill = 74 units

Now A, B, C = 400 – 74 = 326

in 1 minute = 10 + 8 – 5

25 × 1 ——— 13 × 25

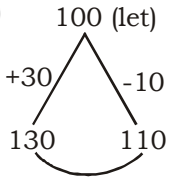
25 min ——— 325

325 – 324 = 1

1 unit = $\frac{1}{13}$ minutes

Total time = $25\frac{1}{13}$ minutes

90. (C)



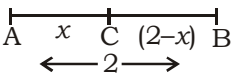
Reduce = $\frac{20}{110} \times 100$

$= 18\frac{2}{11}\%$

91. (B) $\frac{10}{11} \times 891 = 810$

92. (A) given $AC^2 = AB \times CB$

$x^2 = 2 \times (2 - x)$



$x^2 = 4 - 2x$

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

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

$x = -1 \pm \sqrt{5}$

Now BC = $2 - (-1 \pm \sqrt{5})$

$= 3 - \sqrt{5}$ unit

93. (C) $\frac{1}{2} \times \frac{4}{3}\pi (r_1^3 + r_2^3 + r_3^3)$

$= \frac{2}{3}\pi (1)^3 + (2)^3 + (3)^3$

$= \frac{2}{3}\pi \times 36$

$= 24\pi$

$\because\ \frac{4}{3}\pi r^3 = 24\pi$

$r = \sqrt[3]{18}$

94. (A) $\angle AOC = 2 \times 60^\circ$

$= 120^\circ$

$\angle ABC = \frac{120}{2} = 60^\circ$

95. (A) $\frac{P\left(1+\frac{r}{100}\right)^3 - 1}{\frac{P+r}{100}} = \frac{3.64}{1}$

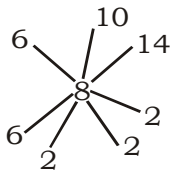
$\frac{\left(1+\frac{r}{100}\right)^3 - 1}{\frac{9}{100}} = 364$

Now go through by option
r = 20%

$\frac{\left(1+\frac{20}{100}\right)^3 - 1}{\frac{20}{100}} = \frac{(1.2)^3 - 1}{0.2}$

$= \frac{0.78}{0.2} = \frac{3.64}{1}$

96. (B)

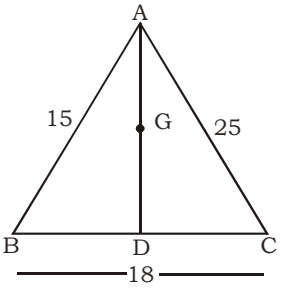


SP of mixture = 11.20 per kg
Profit = 40%

$11.20 \times \frac{100}{140}$

= 8
Ratio = 8 : 2 : 2
= 4 : 1 : 1

97.(B) $AB^2 + AC^2 = 2(AD^2 + BD^2)$
$225 + 625 = 2(AD^2 + 81)$



By apollonius theorem,
$AB^2 + AC^2 = 2(AD^2 + BD^2)$
$225 + 625 = 2(x^2 + 81)$

$\frac{850}{2} = x^2 + 81$

$x^2 = 425 - 81 = 344$

$x^2 = 4 \times 86$

$x = \sqrt{4 \times 86} = 2\sqrt{86}$

$GD = \frac{1}{3}AD$

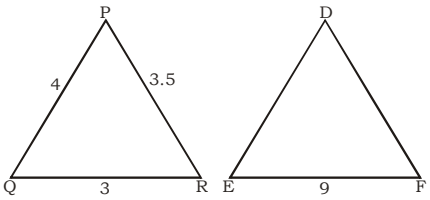
$GD = \frac{2}{3}\sqrt{86}$ cm

98.(C)

CP		**MP**
$(100 - D)$		$(100 + P)$
100 – 10		100 + 44
$\frac{90}{10}$		$\frac{144}{9}$
9	:	16

Ratio of CP : MP = 9 :16

99. (C)



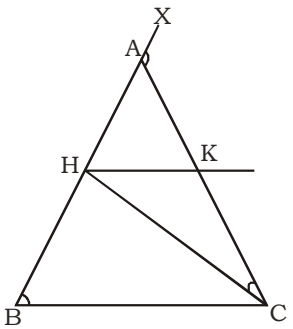
$\frac{3}{9} = \frac{3.5}{DF}$

DF = 10.5

Now = $\frac{3}{9} = \frac{4}{DE}$

DE = 12
Perimeter of DEF = 9 + 12 + 10.5 = 31.5 cm

100. (C) $\angle CAX = 137^\circ$



$\angle ABC = \frac{1}{2}(137^\circ) = 68\frac{1}{2}^\circ$

Therefore, $\angle CHB = 68\frac{1}{2}^\circ$

Therefore, $\angle HCB = 43^\circ$

Hence, $\angle HCX = 68\frac{1}{2}^\circ - 43^\circ = 25\frac{1}{2}^\circ$

SSC MAINS (MATHS) MOCK TEST-17 (ANSWER KEY)

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