SSC TIER II (MATHS) MOCK TEST - 46 (SOLUTION)

1. (A) Let, the number be x,
Then,
$\Rightarrow \quad 32\%x - 17\%x = 120$
$\Rightarrow \quad \frac{32x}{100} - \frac{17\%}{100} = 120$
$\Rightarrow \quad \frac{15x}{100} = 120$
$x = 800$
Then, the number is 800

2. (C) ATQ,
$x = 2 + \sqrt{3}$
$\Rightarrow \quad 2x = 4 + 2\sqrt{3}$
$= (\sqrt{3})^2 + 1^2 + 2\sqrt{3}$
$\Rightarrow \quad 2x = (\sqrt{3} + 1)^2$
$\Rightarrow \quad \sqrt{2x} = \sqrt{3} + 1$
$\Rightarrow \quad \frac{1}{\sqrt{2x}} = \frac{\sqrt{3}-1}{2}$
then
$\Rightarrow \quad \sqrt{2x} + \frac{1}{\sqrt{2x}} = \sqrt{3} + 1 + \frac{\sqrt{3}-1}{2}$
$= \frac{3\sqrt{3}+1}{2}$

3. (A) A.T.Q,
$\Rightarrow \frac{CP}{MP} = \frac{5}{9}, \frac{SP}{CP} = \frac{6}{5}$ ⌒ 20% → Profit
CP SP MP
5 6 9
Discount% $= \frac{3}{9} \times 100$
$= 33\frac{1}{3}\%$

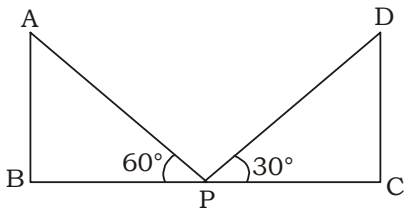
4. (A) A.T.Q,
3A = 6B = 8C
Divide by LCM of 3, 6, 8 i.e. = 24
$\Rightarrow \frac{A}{8} = \frac{B}{4} = \frac{C}{3}$
$\Rightarrow$ A : B : C
8 : 4 : 3

5. (A) A.T.Q,
Milk : Water
$17x : 3x$
$17x + 3x = 400$ litres
$20x = 400$
$x = 20$ litres
Milk : Water
$\therefore$ 340 : 60
After adding y litres of milk, the ratio becomes
Milk : Water
7 : 1
$\therefore \frac{340 + y}{60} = \frac{7}{1}$
$\Rightarrow 340 + y = 420$
$y = 420 - 340$
$y = 80$ Litres

6. (D) CP = ₹ 80
100 oranges - ₹ 80
20 oranges are rotten
Remaining fresh oranges is (100 – 20)
Seller wants 25% profit on CP
$= \frac{80 \times 25}{100} =$ ₹ 20(profit)
S.P. of 80 oranges is ₹ 100
S.P. of one orange $= \frac{100}{80} = \frac{5}{4} =$ ₹ 1.25

7. (C) $\sin480° - \sin60° + \sin780° + \cos120°$
$= \sin(360° + 120°) - \sin60° + \sin(2\times 360 + 60°)$
$= \sin120 - \sin60° + \sin60° - \sin30°$
$= \cos30° - \sin30°$
$= \frac{\sqrt{3}-1}{2}$

8. (B) For equal roots
D = 0
(where D represent discriminants)
A.T.Q,
$kx(x - 2) + 6 = 0$
$\Rightarrow kx^2 - 2kx + 6 = 0$
$\Rightarrow D = b^2 - 4ac = 0$
$\Rightarrow 4k^2 - 4 \times 6k = 0$
$\Rightarrow k = 0$
$\Rightarrow k = 6$
$k = 0$, (Doesn't satisfy equation)
Hence, $k = 6$

9. (C)


A.T.Q,
AB = DC = x

$\tan 60 = \frac{AB}{BP} \Rightarrow \sqrt{3} = \frac{x}{BP}$

$BP = \frac{x}{\sqrt{3}}$ ...(i)

$\tan 30 = \frac{DC}{PC} \Rightarrow \frac{1}{\sqrt{3}} = \frac{x}{PC}$

$PC = x\sqrt{3}$ ...(ii)

Adding (i) and (ii)

$BP + PC = \frac{x}{\sqrt{3}} + x\sqrt{3}$

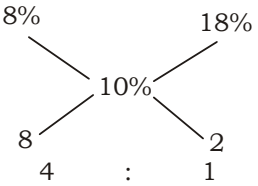
$BP + PC = 50$

$50 = x\left(\frac{4}{\sqrt{3}}\right)$

$x = 50 \times \frac{\sqrt{3}}{4}$

$x = 21.65$ mitres

10. (B) Using alligation method
Amount ₹16000



Ratio 4 : 1
4 units → ₹ 16000
5 units → ₹ 20000

11. (D) Let present age is 'x'
A.T.Q
$3(x + 3) - 3(x - 3) = x$
$\Rightarrow 3x + 9 - 3x + 9 = x$
$\Rightarrow x = 18$

12. (B) Let the radius of ball is r and of the cylinder the radius given is 12 cm

$27 \times \frac{4}{3}\pi r^3 = \pi r^2 \times l$

$27 \times \frac{4}{3}\pi r^3 = \pi \times 12 \times 12 \times 6.75$

$r = 3$ cm

13. (C) P does the whole work in 10 days

one day work done by P is = $\frac{1}{10}$

P does the work in 4 days = $\frac{4}{10} = \frac{2}{5}$

remaining work = $1 - \frac{2}{5} = \frac{3}{5}$

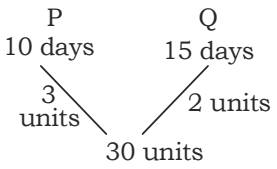
Q does the remaining work in 9 days

$= \frac{3}{5}$ unit → 9 days

1 unit → $\frac{9 \times 5}{3}$ days

1 unit → 15 days

and P does the 1 unit work in → 10 days

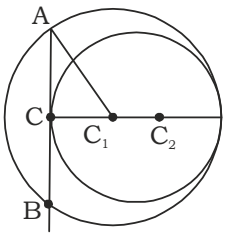


30 units of work is done by P and Q together is

$\Rightarrow \frac{30}{5} = 6$ days

14. (A) Given
$(1640)^2 + (1641)^2 + (1662)^2 + (1693)^2$
Unit digit
$= 0^2 + 1^2 + 2^2 + 3^2$
$= 0 + 1 + 4 + 9 = 14$
$\therefore$ unit digit = 4

15. (C)



Given
[C_1 = Centre of larger circle
C_2 = Centre of smaller circle]
In ΔACC_1
$AC_1^2 = AC^2 + CC_1^2 \Rightarrow 8^2 = AC^2 + 4^2$
$AC^2 = 64 - 16 = 48$

$AC = 4\sqrt{3}$ cm

Hence, Length of chord AB = $8\sqrt{3}$ cm

16. (B) $\sin^2\theta + \frac{1+\cos\theta}{\sin\theta} + \frac{1}{\sec^2\theta} - \frac{\sin\theta}{1-\cos\theta}$

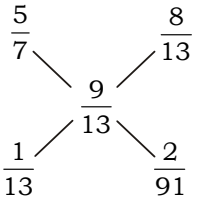
$= \sin^2\theta + \cos^2\theta + \frac{1-\cos^2\theta-\sin^2\theta}{\sin\theta(1-\cos\theta)}$

$= 1$ $\left\{\because 1-\cos^2\theta = \sin^2\theta \text{ and } \sin^2\theta + \cos^2\theta = 1\right\}$

17. (A) Part of acid in vessel A = $\frac{5}{7}$

Part of acid in vessel B = $\frac{8}{13}$

Part of acid in new mixture = $\frac{9}{13}$

$\therefore$ 

$\frac{1}{13} : \frac{2}{91} = 7 : 2$

Required ratio = 7 : 2

18. (A) $f(x) = \frac{1}{x^2+3x+5}$

for maximum value

$f'(x) = 0$

$\frac{d}{dx}\left[\frac{1}{x^2+3x+5}\right] = 0$

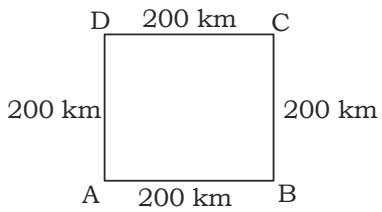
$\Rightarrow \frac{(x^2+3x+5)\times 0-(2x+3)}{(x^2+3x+5)^2} = 0$

$2x + 3 = 0$

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

$[f(x)]_{max} = \frac{1}{\left(\frac{-3}{2}\right)^2 - 3\times\frac{3}{2}+5} = \frac{4}{11}$

$\left(\text{at } x = \frac{-3}{2}\right)$

19. (C) 

Average speed

$= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{800}{\frac{200}{20}+\frac{200}{40}+\frac{200}{60}+\frac{200}{80}}$

$= \frac{800}{10+5+\frac{10}{3}+\frac{5}{2}} = \frac{800}{\frac{60+30+20+15}{6}}$

$= \frac{800\times 6}{125} = \frac{32\times 6}{5} = \frac{192}{5}$

$= 38\frac{2}{5}$ km/hr

20. (D) Let x should be added to each number

$(8 + x) : (21 + x) :: (13 + x) : (31 + x)$

$(8 + x)(31 + x) = (21 + x)(13 + x)$

$248 + 8x + x^2 + 31x = 273 + 13x + 21x + x^2$

$39x - 34x = 273 - 248$

$5x = 25$

$x = 5$

5 is added to each numbers

21. (B) Let the salaries of Amit, Rakesh and Sunil are $5x$, $4x$ and $3x$ respectively

A. T. Q,

$4x + 3x = 3500$

$x = 500$

Salary of Rakesh = 4 × 500

= ₹2000

Salary of Sunil = 3 × 500

= ₹1500

Required percent = $\frac{500}{1500}\times 100$

$= 33\frac{1}{3}\%$

22. (C) Side of regular octagon = 16 cm

Height of pyramid = 30 cm

Volume of pyramid

$= \frac{1}{3}\times$ base area × height

$= \frac{1}{3}\times 2(\sqrt{2}+1)\, a^2 \times h$

$= \frac{1}{3}\times 2(\sqrt{2}+1)\times 16\times 16\times 30$

$= 5120\,(\sqrt{2}+1)\ \text{cm}^3$

23. (A) $\frac{\left(\sqrt{6}+\sqrt{4}\right)}{\left(\sqrt{6}-\sqrt{4}\right)} + \left(\frac{\sqrt{6}-\sqrt{4}}{\sqrt{6}+\sqrt{4}}\right)$

$= \frac{\sqrt{6}+2}{\sqrt{6}-2} + \frac{\sqrt{6}-2}{\sqrt{6}+2}$

$= \frac{(\sqrt{6}+2)^2+(\sqrt{6}-2)^2}{6-4} = \frac{10+10}{2} = 10$

24. (C) $\frac{a}{\text{cosec}\,\theta} + b\cos\theta = c$

$a\sin\theta + b\cos\theta = c$ ...(i)

Let $\frac{a}{\sec\theta} - b\sin\theta = x$

$a\cos\theta - b\sin\theta = x$ ...(ii)

Adding equation (i) and (ii) after taking square

$a^2\sin^2\theta + b^2\cos^2\theta + 2ab\sin\theta\cos\theta$

$+ a^2\cos^2\theta + b^2\sin^2\theta - 2ab\sin\theta\cos\theta = x^2 + c^2$

$x = \pm\sqrt{a^2 + b^2 - c^2}$

$\therefore \frac{a}{\sec\theta} - b\sin\theta = \pm\sqrt{a^2 + b^2 - c^2}$

25. (D) Diagonal of cube = $7\sqrt{3}$ cm

Side of cube = $\frac{7\sqrt{3}}{\sqrt{3}}$ = 7 cm

Volume of cube = $a^3 = 7^3 = 343$ cm^3

Total surface area of cube

$= 6a^2 = 6 \times (7)^2$

$= 6 \times 49$

$= 294$ cm^2

26. (A) Product of n postive integers = n^n

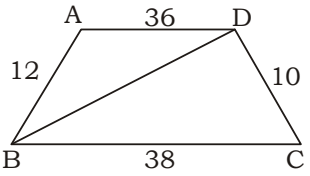
According to options,

The sum of n positive integers $\neq$ A negative number $\neq$ A fraction $\neq n$ always

$\therefore$ Sum of n positive integer

= Never less than n^2

27. (C)



In a triangle the sum of two sides is greater than the third side and difference of two sides is less than the third side

In ΔBCD

$38 - 10 < BD < 38 + 10$

$28 < BD < 48$ ...(i)

In ΔABD

$36 - 12 < BD < 36 + 12$

$24 < BD < 48$ ...(ii)

$\therefore$ Length of BD

$= 28 < BD < 48$

28. (D) Ratio of incomes of Geetika and Surbhi = 5 : 3

Ratio of expenses of Geetika, Surbhi and Roshani = 8 : 5 : 2

$\therefore$ Expense of Roshani = ₹3000

Expense of Surbhi = ₹$\frac{3000 \times 5}{2}$

= ₹7500

Expense of Geetika = ₹$\frac{3000}{2} \times 8$

= ₹12000

$\therefore$ Income of Surbhi = 7500 + 1500

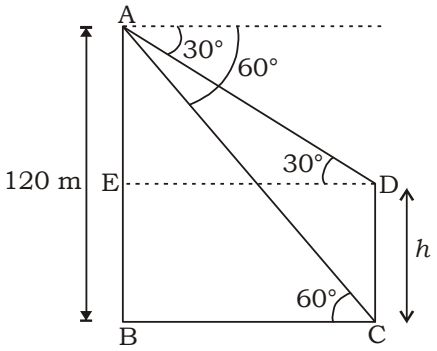
= ₹9000

$\therefore$ Income of Geetika = $\frac{9000 \times 5}{3}$ = ₹15000

$\therefore$ Saving of Geetika = ₹(15000 – 12000)

= ₹3000

29. (B)



Let the height of the building is h metre

In ΔABC

$\tan 60° = \frac{AB}{BC} \Rightarrow BC = \frac{120}{\sqrt{3}}$

$BC = 40\sqrt{3}$ metres ...(i)

In ΔAED

$\tan 30° = \frac{AE}{ED}$ [$\because$ BC = ED]

$AE = 40\sqrt{3} \times \frac{1}{\sqrt{3}}$

AE = 40 m

Height of the second building

= 120 – 40

= 80 metres

30. (C) Given,

$a^x = (x + y + z)^y$

$a^y = (x + y + z)z$

$a^z = (x + y + z)^x$

$\therefore a^x.a^y.a^z = (x + y + z)^{x+y+z}$

$\Rightarrow a^{(x+y+z)} = (x + y + z)^{(x+y+z)}$

$\therefore a = x + y + z$

31. (C) $\frac{4}{5} = .80$, $\frac{7}{8} = .87$

$\frac{6}{7} = .85$ $\frac{5}{6} = .83$

$\Rightarrow \frac{4}{5} < \frac{5}{6} < \frac{6}{7} < \frac{7}{8}$

32. (A) $8.3\bar{1} = \frac{831-83}{90} = \frac{748}{90}$

$.\bar{6} = \frac{6}{9}$

$.00\bar{2} = \frac{2}{900}$

Now,

$8.3\bar{1} + .\bar{6} + .00\bar{2}$

$\frac{748}{90} + \frac{6}{9} + \frac{2}{900}$

$\frac{8082}{900} = 8\ \frac{882}{900} = 8\frac{979-97}{900}$

$= 8.97\bar{9}$

33. (D) (1 * 2)* 3

A.T.Q,

$= (1 + 8 \times 2) + 8 \times 3$

$= 17 + 24$

$= 41$

34. (A) One digit positive number

1, 2, 3, ...$9 = 9 \times 10^0$

Two digits positive number = 10, 11, 12 ....9, = $99 - 9 = 9 \times 10^1$

Three digits positive number = $999 - 100 = 9 \times 10^2$

Similarly,

100 digits positive number = 9×10^{99}

35. (B) A.T.Q,

$S = \frac{1}{1\times3\times5} + \frac{1}{1\times4} + \frac{1}{3\times5\times7} + \frac{1}{4\times7} + \frac{1}{5\times7\times9} + \frac{1}{7\times10} +$..... 20 terms

This series is sum of two different series one is 2 terms and another is 3 terms. Here, total 20 terms two digits series have 10 terms and three digits have 10 terms

First we take 2 term series.

$S_1 = \frac{1}{1\times4} + \frac{1}{4\times7} +$.....

(1, 4, 7,.....

$T_{10} = 1 + 9 \times 3 = 28$)

$S_1 = \frac{1}{1\times4} + \frac{1}{4\times7} +.....+ \frac{1}{28\times31}$

$= \frac{1}{3}\left[\frac{1}{1} - \frac{1}{4} + \frac{1}{4} - \frac{1}{7} + ... + \frac{1}{28} - \frac{1}{31}\right]$

$= \frac{1}{3}\left[1 - \frac{1}{31}\right]$

$= \frac{10}{31}$

Now take 3rd term series,

$S_2 = \frac{1}{1\times3\times5} + \frac{1}{3\times5\times7} +...+ \frac{1}{19\times21\times23}$

($\because T_{10} = 1 + 9 \times 2 = 19$)

$= \frac{1}{4}\left[\frac{1}{1\times3} - \frac{1}{3\times5} + \frac{1}{3\times5} - \frac{1}{5\times7} +... \frac{1}{19.21} - \frac{1}{21\times23}\right]$

$S_2 = \frac{1}{4}\left[\frac{1}{3} - \frac{1}{21\times23}\right]$

$= \frac{483-3}{3\times4\times21\times23} = \frac{40}{483}$

Now,

$\Rightarrow S = S_1 + S_2$

$= \frac{10}{31} + \frac{40}{483}$

$S = \frac{6070}{14973}$

36. (C) $\sqrt[3]{1+\sqrt{3}} \times \sqrt[6]{4-2\sqrt{3}}$

$= \sqrt[3]{(1+\sqrt{3})} \cdot \sqrt[6]{(\sqrt{3}-1)^2}$

$= \sqrt[3]{(1+\sqrt{3})} \times \left(\sqrt{3}-1\right)^{2/6}$

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

$= \left[(\sqrt{3}-1)(\sqrt{3}+1)\right]^{1/3}$

$= (3 - 1)^{1/3} = 2^{1/3}$

37. (B) Number of seconds in 400 days

$= 400\times24\times60\times60$

$\therefore$ Number of drops = $400\times24\times3600$

1000 Drops = 200ml

5000 Drops = 1000 ml = 1 Litre

$= \frac{400\times24\times3600}{5000}$

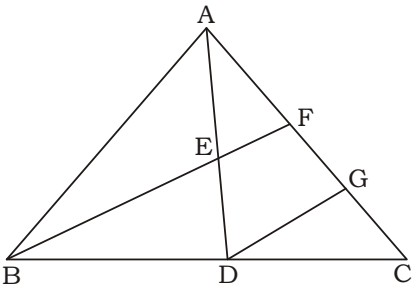
= 6912 Litres

38. (C) $\frac{x}{ax+by+cz}=\frac{y}{ay+bz+cx}=\frac{z}{az+bx+cy}$
$= k$
$\Rightarrow (x+y+z) = k[x(a+b+c) + y(a+b+c) + z(a+b+c)]$
$\Rightarrow (x+y+z) = k(x+y+z)(a+b+c)$
$k = \frac{1}{a+b+c}$

39. (A) Total quantity of mixture = 154 Litres
Quantity of milk in mixture = $154 \times \frac{7}{11}$
= 98 Litres
Quantity of water in mixure = 154 – 98 = 56 litres
Let x litre water to be added in mixture,
$\frac{98}{56+x} = \frac{21}{16}$
$16 \times 98 = 21 \times 56 + x \times 21$
$16 \times 98 = 21 \times 56 + 21x$
$21x = 16 \times 98 - 21 \times 56$
$x = \frac{392}{21}$
$x = \frac{56}{3}$ Litres

40. (A) Let maximum marks = x
Minimum passing marks = $\frac{x \times 35}{100}$
$\therefore 80 + 32 = \frac{35x}{100}$
$x = \frac{112 \times 20}{7}$
$x = 320$
$\therefore$ Maximum marks = 320

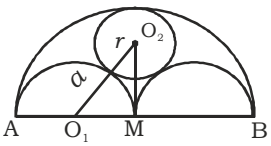
41. (A)



Draw line Segment DG paralle to BF
In ΔADG
BF or EF | | DG and AE = ED
$\therefore$ AF = FG ...(i)
In ΔBCF
DG | | BF and BD = DC
CF = 2FG ...(ii)
From equation (i) and (ii)
CF = 2AC/3
AF + FC = 3FG
AC = 3FG
....(iii)
Now, from eq^n (ii) and eq^n (iii)
$CF = \frac{2}{3}$ AC

42. (D) Area of circle with diameter
$= \frac{\pi(AB)^2}{4}$
$\therefore \frac{\pi(AB)^2}{4} = 1414$
$AB = \sqrt{\frac{1414}{\pi} \times 4}$
$AB = 2 \times \sqrt{\left(\frac{1414}{\pi}\right)}$ metres
$AD = DC = CB = \frac{AB}{3} = \frac{2}{3}\sqrt{\frac{1414}{\pi}}$ m
$AC = \frac{4}{3}\sqrt{\frac{1414}{\pi}}$ metres
$\therefore$ Area of shaded portion
= 2[Area of semicircle with AC as diameter – Area of semicircle with AD as diameter]
$= \frac{2\pi(AC)^2}{8} - \frac{2\pi(AD)^2}{8}$
$= \frac{2\pi}{8}\left[\frac{16}{9} \times \frac{1414}{\pi} - \frac{4}{9} \times \frac{1414}{\pi}\right]$
$= \frac{1414}{3}$ m^2
$\therefore$ Cost of levelling the shaded
Portion = $\frac{1414}{3} \times 126 =$ ₹ 59388

43. (A) Two circles touch each other externally if distance between their centres is equal to the sum of their radii



$\therefore O_1O_2 = r + a$
$O_2M = 2a - r$, $O_1M = a$

In right ΔO_1MO_2

$(O_1O_2)^2 = (O_1M)^2 + (O_2M)^2$

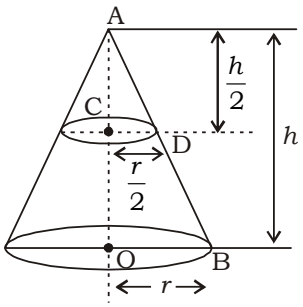
$(r + a)^2 = a^2 + (2a - r)^2$

$r^2 + a^2 + 2ar = a^2 + r^2 - 4ar + 4a^2$

$6ar = 4a^2$

$r = \frac{2a}{3}$

44. (B)



In ΔAOB and ΔACD

$\Delta AOB \sim \Delta ACD$

$CD = \frac{r}{2}$

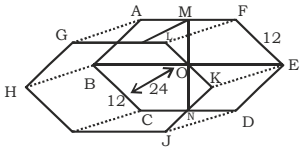
$AC = \frac{h}{2}$

$\text{Required ratio} = \frac{\text{Volume of larger cone}}{\text{Volume of smaller cone}}$

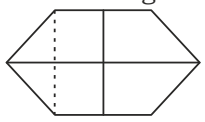
$= \frac{\frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi\left(\frac{r}{2}\right)^2\left(\frac{h}{2}\right)} = \frac{8}{1}$

= 8 : 1

45. (D) 3D - Image



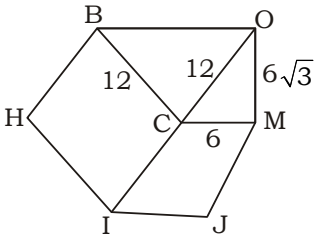
2D image



Here is a 3d image of hexagonal prism, side 12. If prism is cut by two cut MN & BE. There are 4 parts

Total surface area of 1 part shown by third diagram

1st prism



$= 12\times24+6\times24+2\left[\left(\frac{1}{2}\times 6\sqrt{3}\times +6\times 6\sqrt{3}\right)\right]$

$+12\times24+6\times24\sqrt{3}$

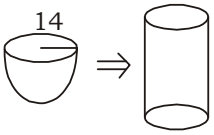
$= 720 + 252\sqrt{3}$

Total surface area of 4 parts

$= 4\left[720 + 252\sqrt{3}\right]$

$= 2880 + 1008\sqrt{3}$

46. (B)



Given,

$\frac{\text{C.S.A. of cylinder}}{\text{T.S.A. of cylinder}} = \frac{2}{3}$

$\frac{2\pi rh}{2\pi r(r+h)} = \frac{2}{3}$

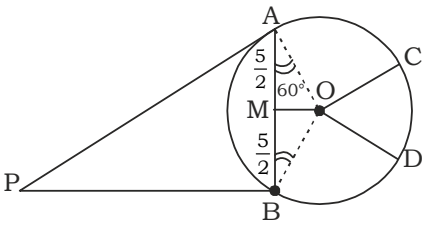
$\frac{r}{h} = \frac{1}{2}$

Volume of hemisphere = volume of cylinder

$\frac{2}{3}\times\pi\times14\times14\times14 = \pi r^2\times2r$

$r = \frac{14}{\sqrt[3]{3}}$

47. (B)



Given

AB = 5 cm

Radius = 5

Hence ΔAOB is an equilateral triangle

So,

AO = OB = radius = AB

$\Rightarrow \angle AOB = 60°$

$\Rightarrow \angle PAM = \angle PBM = 90° - 60° = 30°$ (each)

$\Rightarrow \angle APB = 180° - (30° + 30°) = 120°$

$\Rightarrow \angle COD = 120°$

Because PA||OC & PB||OD

48. (C) Let first no. be x
So, there are 44 odd numbers
Total sum = $x + (x+2) + (x+4) + ...(x+86)$
Total sum = $44x + 2[1+2+3+.....+43]$

$$\text{sum} = 44x + 2\frac{43\times 44}{2}$$

sum = $44x + 43 \times 44$

$$\text{Average} = \frac{44x + 43\times 44}{44}$$

$144 = x + 43$
$x = 101$
Largest number
= 101 + 86 = 187

49. (A) Required number
= (LCM of 5, 15, 25, 45) + 4
= 225 + 4
= 229

50. (A) Let the two digit number is $10x + y$
A.T.Q,
$\Rightarrow (10x + y) - (10y + x) = 3.6 \times 10$
$\Rightarrow 9(x - y) = 36$
$\Rightarrow x - y = 4$

51. (B) Tank : Plane
5 : 3
$5x$, $3x$

$$\Rightarrow \frac{5x-1000}{3x-800} = \frac{2}{1}$$

$x = 600$
Tanks after war
= 5 × 600 – 1000
= 2000

52. (B) Given $28\frac{4}{7}\% = \frac{2}{7}$

7.6 Lakh CP 9.2 Lakh

$\Rightarrow 16x = 9.2 - 7.6$
$\Rightarrow 16x = 1.6$
$\Rightarrow x = .1$ Lakh
CP = 7.6 + 1 = 7.7 Lakhs
sum of digits = 7 + 7
= 14

53. (A) Old CP = 100, Profit = 260%
SP = 360

$$\text{If CP increase by 36\%} = 100 + 100 \times \frac{36}{100}$$

= 136

$$P\% = \left(\frac{360-136}{136}\right)\times 100$$

= 164.7%

54. (B) $x = \frac{1}{2}\left(\sqrt{\frac{9}{8}} - \sqrt{\frac{8}{9}}\right) = \frac{1}{2}\left(\frac{9-8}{\sqrt{8}\times\sqrt{9}}\right)$

$$= \frac{1}{2}\left(\frac{1}{6\sqrt{2}}\right) = \frac{1}{12\sqrt{2}}$$

$$\Rightarrow \frac{18\sqrt{1+x^2}}{x+\sqrt{1+x^2}} = \frac{18\sqrt{1+\frac{1}{288}}}{\frac{1}{12\sqrt{2}}+\sqrt{1+\frac{1}{288}}}$$

$$\Rightarrow \frac{18\frac{17}{12\sqrt{2}}}{\frac{1}{12\sqrt{2}}+\frac{17}{12\sqrt{2}}} = \frac{18\times 17}{18} = 17$$

55. (C) $x^2 + xy + y^2 = 84$ ...(i)

$x - \sqrt{xy} + y = 6$

$x + y = 6 + \sqrt{xy}$
...(ii)
Squaring both side equation (ii)
$x^2 + y^2 + 2xy = 36 + xy + 12\sqrt{xy}$

$x^2 + y^2 + xy = 36 + 12\sqrt{xy}$
from equation (i)
$84 = 36 + 12\sqrt{xy}$

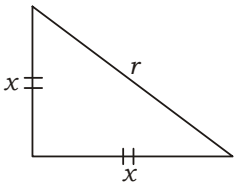
$\sqrt{xy} = 4 \Rightarrow xy = 16$

putting the value of $\sqrt{xy}$ in eq (ii)
$x + y = 10$ ...(iii)
Now,

$x - y = \sqrt{(x+y)^2 - 4xy}$

$x - y = 6$ ...(iv)
equation (iii) & (iv)
$x = 8, y = 2$
$\Rightarrow x^3 + y^3 = 8^3 + 2^3 = 512 + 8$
= 520

56. (A)



Let the base of prism ΔABC has side x, x and r respectively
$\therefore x^2 + x^2 = r^2$

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

$\therefore$ Volume of prism = Base area × height

$= \frac{1}{2} \times \frac{r}{\sqrt{2}} \times \frac{r}{\sqrt{2}} \times s = \frac{r^2 s}{4}$ cm^3

57. (C) Taking power of 12 in all terms

$I : \frac{1}{31^3} > \frac{1}{13^4} > \frac{1}{6^6} = \frac{1}{29791} > \frac{1}{28561} > \frac{1}{46656}$

$II : \frac{1}{6^6} > \frac{1}{13^4} > \frac{1}{13^4} = \frac{1}{46656} > \frac{1}{28561} > \frac{1}{29791}$

$III : \frac{1}{13^4} > \frac{1}{31^3} > \frac{1}{6^6} = \frac{1}{28561} > \frac{1}{29791} > \frac{1}{46656}$

Now, We know that number with smaller denominator will be larger

$\therefore$ Statement III is correct

58. (C) $\tan 2\theta . \tan 3\theta = 1$

$2\theta + 3\theta = 90°$

$5\theta = 90°$

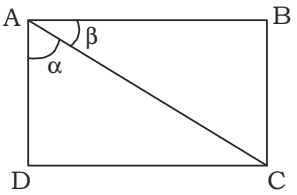
(If $\tan A . \tan B = 1$ then $A + B = 90°$)

$\Rightarrow 2\cos^2 \frac{5\theta}{2} - 1$

$\Rightarrow 2\cos^2 45° - L$

$\Rightarrow 2 \times \frac{1}{2} - 1 = 0$

59. (C)



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

$= (\tan^2 45° + 1) \sin^2 45°$

$\Rightarrow 2 \times \frac{1}{2} = 1$

60. (B) $x\%$ of $x + y\%$ of $y = 2\%$ of xy

It can be written as;

$.01x^2 + .01y^2 = .02xy$

$x^2 + y^2 = 2xy$

$(x - y)^2 = 0$

$x = y$

$\therefore x$ is 100% of y

61. (B) Since the car gives the mileage of $26\frac{2}{3}$ $\frac{\text{km}}{\text{litre}}$ in the return journey;

$\therefore$ Quantity of petrol used in return journey = 920/(80/3) = 34.5 litres

$\therefore$ Quantity of petrol used in whole journey = 46 + 34.5 = 80.5

$\therefore$ Mileage given by the car in the whole journey = $\frac{920 + 920}{80.5}$ = 22.85 km/litre

62. (D) Let total number of workers = x

Number of married women $= \left(\frac{x}{3}\right) \times \frac{1}{2} = \frac{x}{6}$

Number of married men $= \frac{2x}{3} \times \frac{3}{4} = \frac{x}{2}$

$\therefore$ Ratio of married women to married men = $\frac{x/6}{x/2}$ = 1 : 3

63. (B) Since one root is irrational so other root will be = $3 - \sqrt{2}$

A.T.Q,

$ax^2 + bx + c = 0$

$\Rightarrow [x - (3 + \sqrt{2})][x - (3 - \sqrt{2})] = 0$

$\Rightarrow x^2 - 6x + 7 = 0$ comparing eq^n

$\Rightarrow a = 1, b = -6$ and $c = 7$

Putting these value in given equation

$\Rightarrow a^2 + b^2 + c^2 = 1 + 36 + 49 = 86$

64. (A) 1st year interest $11\frac{1}{9}\% = \frac{1}{9}$

2nd year interest $7\frac{9}{13}\% = \frac{1}{13}$

Let Principal = 13 × 9 units

= 117 units

Ist year $\rightarrow$ 13

IInd year $\rightarrow$ 9 1

Difference of CI & SI is 1 unit

1 unit $\rightarrow$ 360

117 units $\rightarrow 360 \times 117$

₹42120

65. (B) Since the article is marked up by 150%

Marked price = 2.5P

After giving 16% discount, it is sold at ₹945;

$\therefore$ 2.5P × .84 = ₹ 945

$\Rightarrow$ P = ₹450

$\therefore$ Cost price of the article = ₹450

66. (A) Let the sum = ₹P

Differece (CI – SI) for two years

= interest on SI of 1st year

$\Rightarrow 50 = \frac{\text{SI of } 1^{st} \text{ year} \times 10 \times 1}{100}$

$\Rightarrow$ SI of 1st year = 500

$\therefore 500 = \frac{P \times 10 \times L}{100}$

$\Rightarrow P = ₹5000$

Sum of money = ₹5000

67. (B) Total distance covered by the man in 4 minutes $= 12 \times \frac{4}{60} = 0.8$ km

= 800 metres

Since the distance of the car to man was 2.4 km at the time of disappearance of the car.

$\therefore$ Distance covered by car in 4 minutes = 800 + 2400

= 3200 $\Rightarrow$ 3.2 km

$\therefore$ Speed of the car $= \frac{\frac{3.2}{4}}{60} = \frac{3.2 \times 60}{4}$

= 48 km/hr

68. (B) When 40% area is removed and cone is made from 60% of the circle

$\therefore 0.6 \times \pi \times 15 \times 15 = \pi \times r \times 15$

$\Rightarrow r = 9$ cm

Height of cone (H) $= \sqrt{225 - 81} = 12$ cm

$\therefore$ Volume of that cone $= \frac{1}{3} \times \pi \times 9 \times 9 \times 12$

$= 324\pi$ cm^3

69. (B) $(2\cos\theta)^2 + 8\cos\theta\sin\theta - 2$

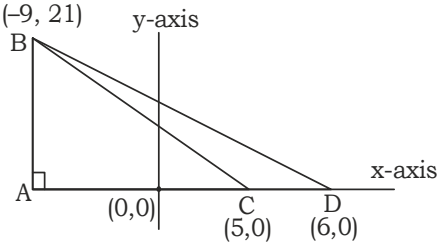
$\Rightarrow 4\cos^2\theta - 2 + 8\cos\theta\sin\theta$

$\Rightarrow 2\cos2\theta + 4\sin2\theta$

$\therefore$ Maximum value $= \sqrt{4 + 16}$

$= 2\sqrt{5}$

70. (A)



$7x + 5y = 42$ ...(i)

$3x + 2y = 15$ ...(ii)

After solving eq (i) and (ii)

interecting point is (–9, 21)

Now, x-axis $y = 0$

from eq(i) $x = 6$

from eq(ii) $x = 5$ and

Points of Δ, (5, 0), (6, 0), (–9, 21)

AC = 9 + 5 = 14

AD = 9 + 6 = 15

AB = 21

Area of ΔCDB = Area of ΔADB - Area of ΔACB

$= \frac{1}{2} 21 \times 15 - \frac{1}{2} 21 \times 14$

= 10.5 units^2

71. (B) Let cost price of the article be ₹x

MP = $1.6x$

SP = $1.6x \times 0.9 \times 0.75 = 1.08x$

A.T.Q,

$\Rightarrow 1.6x - 1.08x = 3744$

$x = 7200$

$\therefore$ CP = ₹7200

72. (D) One day work of Rajni = $\frac{1}{x}$

3 days work of Rajni = $\frac{3}{x}$

4 days work of Geetika = $\frac{4}{x+4}$

A.T.Q,

$\Rightarrow \frac{\frac{3}{x}}{\frac{4}{x+4}} = \frac{15}{16}$

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

$4x + 16 = 5x$

$x = 16$

73. (A) $40\%\ [(516 \times 645) \div 43^2] + 141$

$= 40\%$ of $[(43 \times 12 \times 43 \times 15) \div (43 \times 43)] + 141$

$= 40\%$ of 180 + 141

= 72 + 141

= 213

Hence, $x = 213$

74. (B) $[\sin10° \times \sin30° \times \sin50° \times \sin70°]$

We can write the expression as;

$[\sin(90 - \theta) = \cos\theta]$

$\Rightarrow \left[\cos80° \frac{1}{2} \times \cos40° \times \cos20°\right]$

$\Rightarrow \frac{1}{2} \times [\cos20° \times \cos40° \times \cos80°]$

[We know the indentity;

$\cos A.\cos2A.\cos4A = \frac{1}{4}\cos3A$]

$\Rightarrow \frac{1}{2} \times \frac{1}{4} \times \cos60° \Rightarrow \frac{1}{16}$

75. (D) $x = \sec A + \tan A - 1$

$\sec A + \tan A = x + 1$

$\sec A - \tan A = \frac{1}{x+1} \quad (\because \sec^2 A - \tan^2 A = 1)$

Substracting equation 1 and 2

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

$2\tan A = \frac{x^2+2x+1-1}{x+1}$

$\tan A = \frac{x^2+2x}{2(x+1)} = \frac{x(x+2)}{2(x+1)}$

$\cot A = \frac{2(x+1)}{x(x+2)}$

76. (A) Let the angles are x and y

$x + y = 105°$ ....(i)

Difference of the length of arc subtented by these two angles in a circles of radius is 82.5 cm;

$\therefore (x-y)\frac{\pi}{180} = \frac{82.5}{105}$

$\Rightarrow (x-y)\frac{22}{7\times180} = \frac{82.5}{105}$

$\Rightarrow (x-y) = 45°$ ....(ii)

Solving both equation ;

$\Rightarrow x = 75°$ and $y = 30°$

77. (A) $\sin\alpha = 3\sin(\beta + 2\alpha)$

Put $\alpha = 0$

$\Rightarrow 0 = 3\sin\beta \Rightarrow \beta = 0$

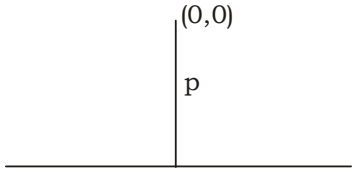
Putting $\alpha = \beta = 0$ in the given expression;

$\Rightarrow \tan(2\alpha + \beta) + 2\tan\alpha$

$\Rightarrow \tan 0 + 2\tan 0$

$\Rightarrow 0$

78. (C)

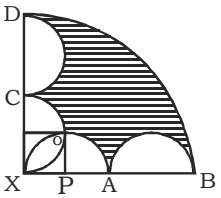


$\frac{x}{a} + \frac{y}{b} - 1 = 0$

$p = \left|\frac{0+0-1}{\sqrt{\frac{1}{a^2}+\frac{1}{b^2}}}\right| = \frac{1}{\sqrt{\frac{1}{a^2}+\frac{1}{b^2}}}$

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

79. (C)



Here, XA = 7

Radius of semicircle = $\frac{7}{2}$ cm

All semicircles = $\frac{7}{2}$ cm

So radius = $\frac{7}{2}$ (each) cm

Here XPQR form square with side $\frac{7}{2}$ cm

Area of shaded region is =

[Total Area of quadrant with radius 14 cm]–[Area of 2 semicircles + Area of semicircle + Area of square]

$= \frac{\pi}{4}(14)^2 - \left[\pi\left(\frac{7}{2}\right)^2 + \frac{\pi}{2}\times\left(\frac{7}{2}\right)^2 + \left(\frac{7}{2}\right)^2\right]$

After solving this $\left(\pi = \frac{22}{7}\right)$

$= 84\ cm^2$

80. (A) A.T.Q,

$N = .\overline{369}$

$N = \frac{369}{999} = \frac{41}{111}$

$M = .\overline{531}$

$M = \frac{531}{999} = \frac{59}{111}$

$\Rightarrow \frac{1}{N} + \frac{1}{M} = \frac{111}{41} + \frac{111}{59}$

$= \frac{6549+4551}{2419}$

$= \frac{11100}{2419}$

81. (B) A.T.Q, $1200 \times 25\% \times 0.09\%$

$1200 \times \frac{1}{4} \times \frac{.09}{100} = 12 \times \frac{1}{4} \times \frac{9}{100} = .27$

82. (C) C.P. → 4 bananas → ₹3
3×
S.P. → 3 bananas → ₹4
4×
C.P. → 12 bananas → ₹9
S.P. → 12 bananas → ₹16
Profit = S.P. – C.P.
= 16 – 9 = 7

$$\text{Profit\%} = \frac{\text{Profit}}{\text{C.P}} \times 100 = \frac{7}{9} \times 100 = 77.77\%$$

83. (D) A.T.Q,
Cost price of single packet tea powder = ₹25
Price of tea powder in a single cup of tea

$$= ₹\frac{25}{20} \Rightarrow ₹1.25$$

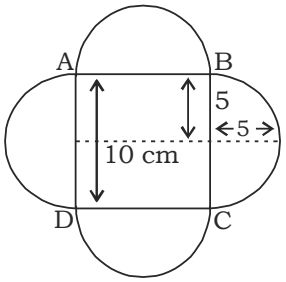
1000 ml (1 Litre) milk price = ₹35

$$250 \text{ ml price} = ₹\frac{35 \times 250}{1000}$$

= ₹8.75
Total price of 1 cup of tea = (1.25 + 8.75)
= ₹10

$$\text{Selling price} = \frac{130 \times 10}{100} = ₹13$$

84. (C)



ABCD is a square of side length = 10 cm
Semi circle radius = 5 cm
Therefore,
Area = (area of square)
+ 4 (are of semi circles)

$$= 10^2 + 4\left(\frac{\pi}{2}\right)(5)^2$$

$= 50(2 + \pi)$ cm^2

85. (A) A.T.Q,

$$a + \frac{1}{a} = -2 \quad \text{....(i)}$$

squaring both sides and we get

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

$$\Rightarrow \left(a - \frac{1}{a}\right)^2 = 0$$

$$\Rightarrow a - \frac{1}{a} = 0 \quad \text{...(ii)}$$

$$\Rightarrow a + \frac{1}{a} = -2 \quad \text{...(ii)}$$

from eq(i) and eq(ii)
$\Rightarrow a = -1$

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

$= -2$

86. (C) A.T.Q,
The tank is filled in 15 hours.
Therefore
capacity of tank = $15(A_{inlet} + B_{inlet} - C_{outlet})$
= 15(35 + 45 – 50) Litres
= 15 × 30 Litres
= 450 Litres

87. (B) Let the ages be $5x$, $7x$ and $9x$

$$\text{Average} = \frac{5x + 7x + 9x}{3} = 7x$$

$\Rightarrow 7x = 28 \Rightarrow x = 4$
age of eldest girl = 9 × 4
= 36 years

88. (B) $10\% = \frac{1}{10}$, $20\% = \frac{1}{5}$

Intial → Final
$\frac{10}{5}$ → $\frac{11}{6}$
50 → 66
(+16)

$$= \frac{16}{50} \times 100 \Rightarrow 32\%$$

89. (C) A.T.Q,

$$= \frac{\cos^2 x - \sin^2 x}{1 - \tan^2 x}$$

$$= \frac{\cos^2 x - \sin^2 x}{\cos^2 x - \sin^2 x} \times \cos^2 x$$

$= \cos^2 x$

90. (B) According to option,
Put A = 3, $x = y = z = 1$
All three eq^n are satisfied

$$\Rightarrow \sqrt{x} = \sqrt{y} = \sqrt{z} = \frac{A}{3}$$

$\Rightarrow 1 = 1 = 1 = 1$

91. (B) Percentage of crop B = $\frac{72°}{360} \times 100 = 20\%$

92. (B) Crop F (45°) = 1.5 Million

Total food grains = $\frac{360°}{45°} \times 1.5 = 12$ Millions

93. (C) 50% = 180°

Only option C, A + B + C = 180°

94. (A) Crop F (45°) = 1.5 Millions

Total quantity of D & E (18° + 18° = 36°)

$= \frac{1.5}{45°} \times 36° = 1.2$ millions

95. (C) A. T. Q,

Ratio of A & C

$= \frac{3 \times 72°}{1 \times 36°} = \frac{6}{1}$

96. (A) In the year 2007

Decrease in percentage = $\frac{60-50}{60} \times 100$

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

97. (C) Required percentage

$= \frac{60+60}{50+40} \times 100 \Rightarrow 133.3\%$

98. (B) Average production flavour P = $\frac{300}{3}$

Flavour Q = $\frac{328}{3}$ – Maximum

Flovour R = $\frac{300}{3}$

99. (B) Percentage decrease = $\frac{60-40}{60} \times 100$

$= 33.33\%$

100. (D) Average production of flavour Q during

2008, 2009 and 2010 = $\frac{55+50+55}{3}$

$= \frac{160}{3}$ lakh bottles

Average Production of flavour P during 2005, 2006 and 2007

$\Rightarrow \frac{50+40+55}{3} = \frac{145}{3}$ lakh bottles

Required difference = $\frac{160}{3} - \frac{145}{3} = \frac{15}{3}$

= 5 lakh bottles

SSC TIER II (MATHS) MOCK TEST - 46 (ANSWER KEY)

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

Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts. Join the group and you may also share your suggestions and experience of Sunday Mock

Note:- If you face any problem regarding result or marks scored, please contact 9313111777