KD Campus
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PLOT NO. 2 SSI, OPP METRO PILLAR 150, GT KARNAL ROAD, JAHANGIRPURI DELHI: 110033

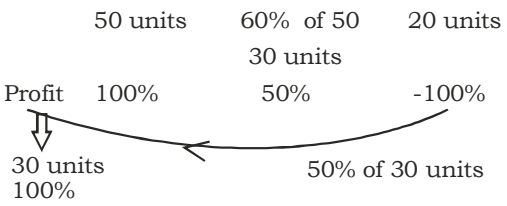
TEST NO. 49 SSC Mains (Maths) Answer with Explanation

1. (A) A.T.Q,

CP	MP
100-% Discount	100 + % Profit
100 - 4%	100 + 35%
16 articles	15 articles

$\therefore$ 6 : 9
or, 2 : 3

2. (C) Let total oranges 100 units



Total profit is 150% of 30 oranges is = 45%

3. (A) A.T.Q,

Rate $\longrightarrow$ 1% more

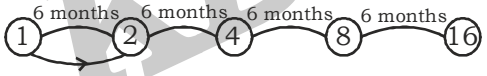
₹ 100 $\xrightarrow{1\text{year}}$ ₹ 1 more

₹ 2400 $\xrightarrow{1\text{year}}$ ₹ 24 years

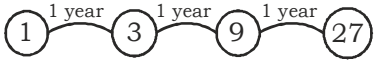
4 years
₹ 96 more

Total amount now after increment in rate by 1% is ₹ (3350 + 96) = ₹ 3446

4. (B) A.T.Q,



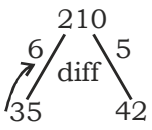
We see that interest is 100% if compounded half yearly,
Now, If compounded yearly then interest become 200%



Total time 3 years

($\because$ ₹ 100 $\xrightarrow{200\%}$ ₹ 300)

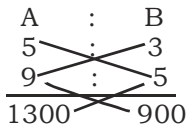
5. (C)



1 $\longrightarrow$ ₹ 210

2 $\longrightarrow$ ₹ 420

6. (A) A.T.Q,



$9 \times 3 - 5 \times 5 \longrightarrow 9 \times 900 - 1300 \times 5$

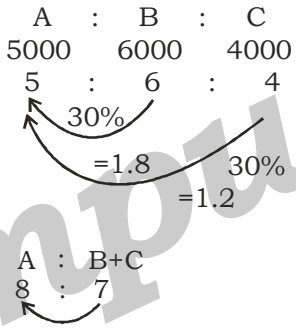
20 units $\longrightarrow$ ₹ 1600

1 unit $\longrightarrow$ ₹ 800

A – 5 units $\longrightarrow$ ₹ 4000

B $\longrightarrow$ ₹ 3 units $\longrightarrow$ ₹ 2400

7. (B) A.T.Q,



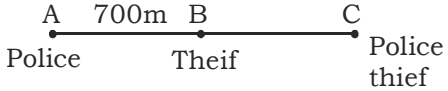
1 unit $\longrightarrow$ ₹ 200

15 units $\longrightarrow$ ₹ 3000

8. (A) $(823)^{933!} \times (777)^{223!} \times (838)^{123!}$
$3^4 \times 7^4 \times 8^4 = 1 \times 1 \times 6 = 6$

9. (B) 8315945 × 8315947
$= (8315946)^2 - 1$
Added number was + 1

10. (A) A.T.Q,



Meeting time is same
Distance × speed

$$\frac{D_P}{D_T} = \frac{S_P}{S_T} = \frac{4.7/34}{4.7/41} = \frac{41}{34}$$

7 units $\longrightarrow$ 700 metres

1 unit $\longrightarrow$ 100 metres

34 units $\longrightarrow$ 3400 metres

11. (A) A.T.Q,
Meeting time,

$t = \sqrt{t_1 \times t_2}$

$= \sqrt{24 \times 54}$

= 36 minutes

Hence meeting time is 10 : 36 am

12. (B) A.T.Q,

Train	Car	Time
60 km	240 km	4 hours
100 km	200 km	4 hours 10 min
+40 km	-40 lm	+10 minutes
×6 ↓	×6 ↓	×6 ↓
240 km	-240 km	60 min more

Total distance covered by train in 5 hours

So, Speed of train = $\frac{300}{5} = 60\frac{\text{km}}{\text{hr}}$

13. (A) A.T.Q,

A + B ⟶ then work will complete
2 days 9 days

If A – work 3 days then B complete the remaining work in 6 days

∴ A = B
1 day 3 days
⇒ A = 3B

$\Rightarrow \frac{A}{B} = \frac{3}{1}$ efficiency

Total units work is = 5

A does the work alone in = $\frac{15}{3}$ = 5 days

B does the work alone in = $\frac{15}{1}$ = 15 days

14. (B) A.T.Q,
Total number is = 17
$x, x+2, x+4, x+6,$ ---------- $x+32$
Total sum of digit are,

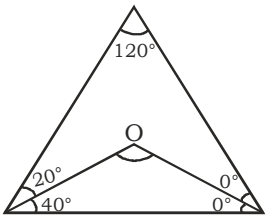
$= \frac{n}{2}(a+l) = \frac{17}{2}(x+x+32)$

Average = $\frac{\frac{17}{2}[x(a+l)]}{17} = 142$

$x + (x+2) = 284$

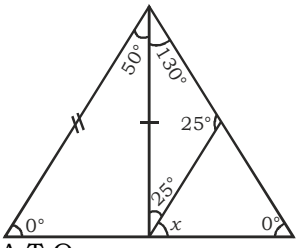
Sum of 1st and last number is = 284
Difference of number is = 32

15. (C)



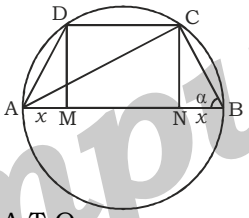
A.T.Q,
We can put values in Geometrically also
Let the angles 0°
∠BDC = 180° – 40° = 140°

16. (B)



A.T.Q,
We assumed the value of ∠B = 0° and ∠C = 0°
$x + 0 = 25°$ (By the external angle property)
$x = 25°$

17. (A)



A.T.Q,
Cyclic trapezium = Isosceles trapezium

$\cos\alpha = \frac{x}{BC} = \frac{BC}{AB}$

$\Rightarrow x = \frac{2 \times 2}{8} = \frac{1}{2}$

⇒ CD = MN = (AB – 2x) = 8 – 1
CD = 7 cm

18. (A) A.T.Q,
Milk : Water
5 : 3 = 8 units
(+1 to each)
4 : 4 = 8 units

So, $\frac{1}{5}$

19. (C) $\left(a + \frac{1}{a}\right)^2 = 3$

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

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

$a^3 + \frac{1}{a^3} = 0$

$\therefore \quad a^3 + \frac{1}{a^3} + 3\sqrt{3} = 0 + 3\sqrt{3} = 3\sqrt{3}$

20. (B) Given, $pq + qr + rp = 0$

$\Rightarrow -qr = pr + rp$

$\therefore \quad \frac{p^2}{p^2 - qr} + \frac{q^2}{q^2 - rp} + \frac{r^2}{r^2 - pq}$

$= \frac{p^2}{p^2 + rp + pq} + \frac{q^2}{q^2 + pq + qr} + \frac{r^2}{r^2 + qr + rp}$

$= \frac{p}{p+q+r} + \frac{q}{p+q+r} + \frac{r}{p+q+r}$

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

21. (C) Given,

$u^3 + (-2v)^3 + (-3w)^3 = 3 \times (-2)(-3)uvw$

$\therefore$ u + (–2v) + (–3w) = 0

u – 2v – 3w = 0

u – 2v = 3w

22. (C) $\left(\frac{y-z-x}{2}\right)^3 + \left(\frac{z-x-y}{2}\right)^3 + \left(\frac{x-y-z}{2}\right)^3$

$\left(\frac{y-(z+x)}{2}\right)^3 + \left(\frac{z-(x+y)}{2}\right)^3 + \left(\frac{x-(y+z)}{2}\right)^3$

$\left(\frac{y-(-y)}{2}\right)^3 + \left(\frac{z-(-z)}{2}\right)^3 + \left(\frac{x-(-x)}{2}\right)^3$

$\Rightarrow \left(\frac{2y}{2}\right)^3 + \left(\frac{2z}{2}\right)^3 + \left(\frac{2x}{2}\right)^3 = 3xyz$

(If $a + b + c = 0$, then $a^2 + b^3 + c^3 = 3abc$)

23. (A) $\frac{5}{\sec^2\theta} + \frac{2}{\cot^2\theta} + 3\sin^2\theta$

$= 5\cos^2\theta + \frac{2}{\text{cosec}^2\theta} + 3\sin^2\theta$

$= 5\cos^2\theta + 2\sin^2\theta + 3\sin^2\theta$

$= 5(\cos^2\theta + \sin^2\theta) = 5$

24. (D) Given, Height of aeroplane from the ground AD = 1km;. Initial angle of elevation = 60° and angle of elevation after 10 second = 30°

Let A be the initial position of the aeroplane and E be the position of observer. And B be the position of the aeroplane after 10 second.

Therefore $\angle AED = 60°$, $\angle BEC = 30°$ and AB = CD

We know that in ΔAED,

$\frac{AD}{DE} = \tan 60° = \sqrt{3}$

or $\frac{1}{DE} = \sqrt{3}$, or $DE = \frac{1}{\sqrt{3}}$

Similarly, in ΔBEC,

$\frac{BC}{DE+CD} = \tan 30°$

or $\frac{1}{DE + CD} = \frac{1}{\sqrt{3}}$ or $DE + CE = \sqrt{3}$

or $CD = \sqrt{3} - DE = \sqrt{3} - \frac{1}{\sqrt{3}} = \frac{2}{\sqrt{3}}$

Therefore speed of the aeroplane per hour = $\frac{\text{Distance AB}}{\text{Time taken to travel}}$

$= \frac{2}{\sqrt{3}} \times \frac{60 \times 60}{10} = 240\sqrt{3}$ km/h.

25. (B) Length of median of triangle = $\frac{\sqrt{3}}{2} \times 8$

$= 4\sqrt{3}$

Radius of the in-circle = $\frac{1}{3} \times 4\sqrt{3} cm$

$= \frac{4}{\sqrt{3}}$ cm

$\therefore$ Area of the in-circle = $\pi\left(\frac{4}{\sqrt{3}}\right)^2 \text{cm}^2$

$= \frac{16}{3}\pi \text{cm}^2$

Radius of circumcircle

$= \frac{2}{3} \times 4\sqrt{3} = \frac{8}{\sqrt{3}}$ cm

$\therefore$ Area of the circum–circle = $\pi \times \left(\frac{8}{\sqrt{3}}\right)^2$

$= \frac{64}{3}\pi \text{cm}^2$

$\therefore$ Area of the required region = $\left(\frac{16}{3}\pi - \frac{16}{3}\pi\right)\text{cm}^2 = \frac{48\pi}{3} = 16\pi \text{ cm}^2$

$= \frac{16 \times 22}{7} = \frac{352}{7} = 50\frac{2}{7}\text{cm}^2$

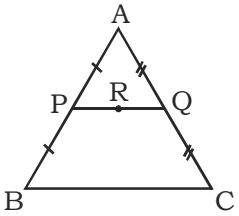
26. (A) Volume of bucket = $\frac{1}{3}\pi h\left(r_1^2 + r_2^2 + r_2 r_2\right)$

$= \frac{1}{3} \times \frac{22}{7} \times 45\left(28^2 + 7^2 + 28 \times 7\right)$

$= \frac{1}{3} \times \frac{22}{7} \times 45(784 + 49 + 196)$

$= \frac{1}{3} \times \frac{22}{7} \times 45 \times 1029 = 48510 \text{ cm}^3$

27. (D)



$\Delta APQ \sim \Delta ABC$

$\therefore \quad \frac{AP}{PB} = \frac{PQ}{BC}$

$\frac{1}{2} = \frac{PQ}{BC}$

BC = 2PQ

BC = 2(PR + RQ)

BC = 2 × 6

BC = 12 cm

28. (B) $(a - b)^2 = a^2 - 2ab + b^2$

$x^4 - 2x^2 + K = (x^2)^2 - 2 \times x^2 \times 1 + K$

$K = (1)^2 = 1$

29. (D) CD = radius = OC = OD

$\angle COD = 60°$

$\angle CAD = \frac{1}{2}\angle COD$

$\frac{1}{2} \times 60° = 30°$ ....(i)

Now $\angle ADB = 90°$

[Angle of semicircle]

$\Rightarrow \angle ADP = 180° - 90° = 90°$

Now in ΔADP,

$\angle P = 180° - (\angle PAD + \angle ADP)$

$180° - (30° + 90°) = 60°$

30 (A) $\cos(40° - \theta) - \sin(50° + \theta) + \frac{\cos^2 40° + \cos^2 50°}{\sin^2 40° + \sin^2 50°}$

$\cos[90° - 50° + \theta] - \sin(50° + \theta) + \frac{\cos^2 40° + \cos^2(90° - 40°)}{\sin^2 40° + \sin^2(90° - 40°)}$

$\sin(50° + \theta) - \sin(50° + \theta) + \frac{\cos^2 40° + \sin^2 40°}{\sin^2 40° + \cos^2 40°}$

$0 + \frac{1}{1} = 1$

31. (B) $\cot12°\cot38°\cot52°\cot60°\cot78°$

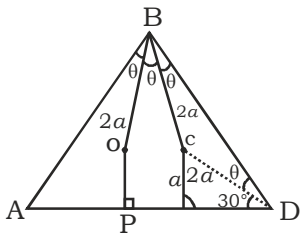
$\Rightarrow (\cot12°\cot78°)(\cot38°\cot52°)(\cot60°)$

$\Rightarrow [\cot12°\cot(90°-12°)][\cot38°\cot(90°-38°)]\cot60°$

$\Rightarrow (\cot12°\tan12°)(\cot38°\tan38°)\cot60°$

$\Rightarrow 1 \times 1 \times \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$

32. (A)



BO = BC

$\therefore$ Circumcentre are equal distance from the each vertices,

So,

DC = 2a

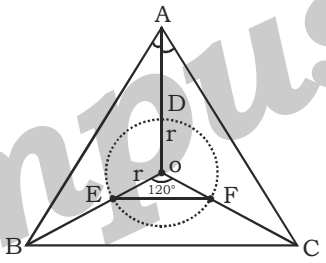
In triangle BPD

$90 + \theta + \theta + \theta + 30° = 180°$

$\Rightarrow 3\theta = 60°$

$\Rightarrow \theta = 20°$

33. (C)



A.T.Q,

$\pi r^2 = 3\pi$

$r = \sqrt{3}$

$\angle BOC = 90° + \frac{\angle A}{2} = 120°$

($\because \angle ABC$ is an equilateral triangle)

Using cosine rule

$\cos120° \frac{(\sqrt{3})^2 + (\sqrt{3})^2 - EF^2}{2 \times \sqrt{3} \times \sqrt{3}}$

$\Rightarrow -\frac{1}{2} = \frac{3 + 3 - EF^2}{2 \times 3}$

$\Rightarrow 6 - EF^2 = -3$

EF = 3

Therefore

AC = AB = BC = 6

($\because$ E and F are midpoint)

34. (D) A.T.Q,

$\because$ Join the points E and C

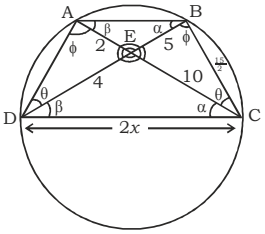
G is midpoints of side FC

FG = GC =1

So, Area of triangle
ΔEFG = 1 unit
And ΔEGC = 1 unit
$\therefore$ Area of ΔEFG become 2 units
$\therefore$ Area of ΔEBC also 2 units
Similarly,
Area of ΔFBD = 2 units
E is midpoints of ΔADB
Area of ΔAEB = 2 units
Simillarly,
Area of ΔAEC = 2 units

$$\frac{\text{Area of } \Delta EFG}{\text{Area of } \Delta ABC} = \frac{1}{8}$$

35. (B)



By the same arc property,
Angle ABD = Angle DAC
Angle ACB = Angle ADB
Vertically opposite angle are equal
$\angle BEC = \angle AED$
ΔADE and ΔBEC are similar triangle

$$\Rightarrow \frac{10}{4} = \frac{5}{2} = \frac{\frac{15}{2}}{AD}$$

$\Rightarrow$ AD = 3
Again using similarity

$$\frac{5}{10} = \frac{2}{4} = \frac{AB}{CD}$$

$\Rightarrow$ CD = 2AB
In $\square ABCD$

$$2x \times x + \frac{15}{2} \times 3 = 12 \times 9$$

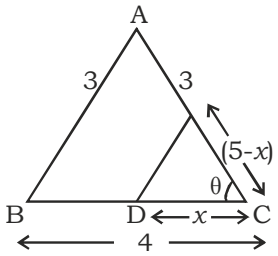
$$x^2 = 54 - \frac{45}{4}$$

$$\Rightarrow x^2 = \frac{171}{4}$$

$$x = \frac{\sqrt{171}}{2}$$

Hence, AB = $\frac{\sqrt{171}}{2}$

36. (C)



A.T.Q,
AB + BD + DE + EA = DC + CE + ED

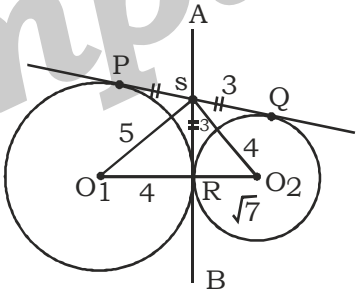
$$\underbrace{AB + BD + AE}_{5} = \underbrace{DC + CE}_{5}$$

Area of ΔDCE = area of $\frac{\Delta ABC}{2}$

$$\Rightarrow \frac{1}{2}x \times (5-x) = \frac{1}{2} \times 4 \times 3 \times \frac{1}{2}$$

$5x - x^2 = 6$
$x^2 - 5x + 6 = 0$
x = 3, 2
DC = 3 cm
BD = 1 cm

37. (B)

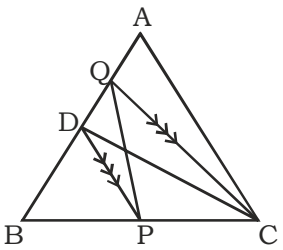


A.T.Q,
PQ = 6 cm
PS = SQ = SR = 3 cm
In ΔO_1RS
$O_1R^2 = O_1S^2 - SR^2$
$= 25 - 9 = 16$
Q_1R = 4 cm
In ΔO_2RS
$O_2R^2 = 16 - 9 = 7$
$O_2R = \sqrt{7}$ cm
Area of ΔO_1SO_2

$$= \frac{1}{2} \times (4 + \sqrt{7}) \times 3$$

$$= \frac{3}{2} \times (4 + \sqrt{7}) \text{cm}^2$$

38. (A)

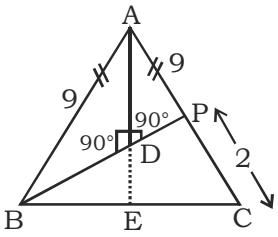


A.T.Q,
In ΔBPQ
Area of ΔBPQ = ΔBDP + ΔDPQ
= ΔBDP + ΔDPC
= ΔBDC

$$\text{Area of } \Delta BPQ = \text{Area of } \frac{\Delta ABC}{2}$$

[If two lines are parallel on same base both are equal area
Area of ΔDPC = Area of ΔDPQ]
(∴ D is mid points of side AB)
Area of ΔABC = 2 area of ΔBPQ

39. (A)



A.T.Q,
∴ AD is angle bisector and altitude
ΔAPB is Isosceles triangle
AP = 9 cm
BE = 2 cm
Draw a line between points D and E.
E is midpoints of line BC,
So, DE = 1 cm

40. (A) A.T.Q,

$$\frac{B}{A} = \frac{3}{4}, \frac{B}{C} = \frac{6}{5}$$

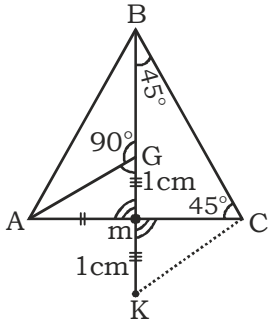
	A	:	B	:	C
	8	:	6	:	5
Before →	800	:	600	:	500
	↓ +25%		↓ -10%		↓ +20%
After increment	1000		540		600

Total income before = 1900 units
Total income after increment = 2140 units

$$\text{Increment} = \frac{2140 - 1900}{1900} \times 100$$

= 12.63% = 13%

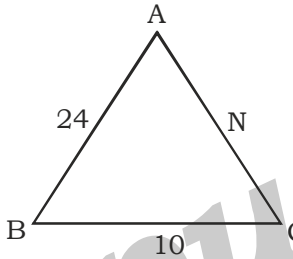
41. (B)



A.T.Q,
AM = Mc and GM = MK
ΔAMG and ΔKMC
ΔKMC and ΔAMG – SAS
∴ ∠BCK = 45° and opposite side BK = 4 cm
∠KBC = 45° opposite side KC = 4 cm

BC = $4\sqrt{2}$ m

42. (B)



A.T.Q,
If ΔABC an acute angle triangle
$N^2 + 10^2 > 24^2$ ....(i)
$10^2 + 24^2 > N^2$ ....(ii)
From equation (i)
$N^2 > 24^2 - 10^2$
N > 21
$N^2 < 676$
N < 26
21 < N < 26

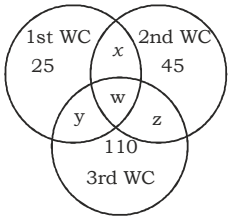
43. (D) Since a , b, c, d, e, f, g be consecutive even numbers;
Suppose a = 2, b = 4, c = 6, d = 8, e = 10, f = 12 and g = 14.
Since j, k, l, m, n be consecutive odd numbers;
Suppose j = 1, k = 3, l = 5, m = 7 and n = 9.
∴ Average of all the numbers = (a + b + c + d + e + f + g + j + k + l + m + n)/12
Putting the values of every term as supposed above;

$$\therefore \text{ Average of all the numbers} = \frac{56 + 25}{12}$$

$$= \frac{81}{12} = \frac{27}{4}$$

On checking with the options, any option will not be satisfied with this data.
∴ None of the above

44. (B) Ratio of people who got 1 kg box, 2 kg box and 500 gm box = 4 : 3 : 6
Since 4 boxes of 1 kg are still remaining and Total number of 1 kg boxes was 16 more than total number of 2 kg boxes;
$\therefore$ $4x + 4 = 3x + 16$
$\Rightarrow x = 12$
Number of people who recieved the gift = $12 \times 13 = 156$
Since 9 boxes are remaining;
$\therefore$ Total number of gift boxes = 156 + 9 = 165

45. (B) 

From the figure
$x + y + w + 25 = 0.45 \times 400 = 180$
$x + z + w + 45 = 0.575 \times 400 = 230$
$y + z + w + 110 = 0.725 \times 400 = 290$
And,
$x + y + z + w + 25 + 45 + 110 = 400$
$\Rightarrow x + y + z + w = 220$
Solving all 4 equations:
$\Rightarrow x = 40$, y = 35, z = 65 and w = 80
Number of players who played in both 1st WC and 2nd WC but not in 3rd WC = x = 40

46. (B) Numbers divisible by 3 = $\frac{699}{3} = 233$

Numbers divisible by 7 = $\frac{700}{7} = 100$

Numbers divisible by 21 (Both 3 and 7)
$= \frac{693}{21} = 33$

$\therefore$ Total number between 1 and 700 that not divisible by 3 or 7 = 700 – [233+100–33]
= 400

Number divisible by 3 = $\frac{948}{3} = 316$

Number divisible by 7 = $\frac{945}{7} = 135$

Number divisible by 21 (Both 3 and 7)
$= \frac{945}{21} = 45$

$\therefore$ Total number between 1 and 700 that are not divisible by 3 or 7 = 950 – [316 + 135 – 45] = 544

$\therefore$ Number between 700 and 950 that are not divisible by 3 or 7 = 544 – 400 = 144

47. (D) LCM of $[(3^3)^{333} + 1]$ and $[(3^3)^{334} + 1]$ = [(LCM of 3^{333} and $3^{334} + 1$)]
$\Rightarrow + 1$
$\Rightarrow [(3^3)^{334} + 1]$

48. (C) Suppose CP of a notebook is ₹. P and thus CP of a pen will be ₹. 2P.
Since Ratio of selling price of pen and notebook is 2 : 3;
Suppose SP of a notebook is ₹ 3k and thus SP of a pen will be ₹ 2k
Profit percentage on selling X notebooks = $[(Y \times 2k)/(X \times P)] \times 100$
Loss percentage on selling X pens

$= \frac{[(Y+1) \times 3k]}{X \times 2P} \times 100$

$\therefore$ $\frac{[(Y \times 2k)]}{(X \times P)} \times 100 = \frac{[\{(Y+1) \times 3k\}]}{(X \times 2P)} \times 100$

$\Rightarrow 4Yk = 3Yk + 3k$
$\Rightarrow Yk = 3k$
$\Rightarrow Y = 3$
Value of X and the CP's can't be determined.

49. (B) Ratio of which the profit should be shared = $(9 \times 8) : (6 \times 12) : (14 \times 6) = 72 : 72 : 84 = 6 : 6 : 7$
Suppose total profit = ₹ x
$\therefore$ B kept ₹ $0.05x$ and distributed ₹ $0.95x$
$\therefore$ Amount received by C out of remaining

$= \frac{0.95x \times 7}{19}$ = ₹ $0.35x$

Since the amount received by C is ₹ 10500
$\therefore$ $0.35x = 10500$
$\Rightarrow x$ = ₹ 30000
$\therefore$ Amount received by B out of total profit

$= \frac{0.95x \times 6}{19} + 0.05x = 0.35x$

$\Rightarrow 0.35 \times 30000$ = ₹ 10500

50. (B) Suppose the seller buys 300 product and the cost price of a product is ₹ 100.
Amount paid = ₹ 30000
Since he got cheated by 20% volume while buying:
Quantity he actually received for ₹ 30000 = $300 \times 0.8 = 240$
Since he offers "buy 2 get 1 free" offer to the customer.
That means he receives selling price of

200 produced by giving 300 products.
But he cheats by 25% volume.
He actually gives 225 = (300 × 0.75) products at the selling price of 200 products.
He marked the product above 80% of the cost price?
Amount of money received by selling 225 product = 100 × 1.8 × 200 = ₹ 36000

$$\text{Cost price of 225 products} = \frac{30000}{240} \times 225$$
$$= ₹\ 28125$$

$$\text{Profit percentage} = \frac{36000 - 28125}{28125} \times 100$$
$$= 28\%$$

51. (A) Interest rate for 1st and 2nd years are $11\frac{1}{9}\%$ and $7\frac{9}{13}\%$ compound yearly.

$\therefore$ r(1st year) = $\frac{1}{9}$ and r(2nd year) = $\frac{1}{13}$

Suppose money borrowed by the person = (9 × 13) = ₹ 117

$\therefore$ Simple interest for 2 years = $(117 \times \frac{1}{9})$

$+ (117 \times \frac{1}{13}) = 13 + 9 = ₹\ 22$

And compound interest for 2 years = (SI for 2 years) + (Interest on SI of 1st year)

$22 + (13 \times \frac{1}{13}) = ₹\ 23$

$\therefore$ Difference of compound and simple interest for two years (CI – SI) = 360.

$\therefore$ Principal amount of money borrowed by him = 360 × 117 = ₹ 42120

52. (D) A.T.Q,

$$\left[\sqrt{a^2 + b^2 + ab} + \sqrt{a^2 + b^2 - ab}\right] = 1$$

Let b = 0
$a + a = 1$

$$a = \frac{1}{2}$$

$$\Rightarrow (1 - a^2)(1 - b^2) = \left(1 - \frac{1}{4}\right)(1 - 0) = \frac{3}{4}$$

53. (B) A.T.Q,

$$\sqrt{(1 - p^2)(1 - q^2)} = \frac{\sqrt{3}}{2}$$

Let q = 0

$$\sqrt{(1 - p^2)} = \frac{\sqrt{3}}{2} \Rightarrow 1 - p^2 = \frac{3}{4}$$

$$P = \frac{1}{2}$$

$$\Rightarrow \sqrt{2p^2 + 2q^2 + 2pq} + \sqrt{2p^2 + 2q^2 - 2pq}$$

Put q = 0

$$\Rightarrow \sqrt{2p^2} + \sqrt{2p^2}$$

$$\Rightarrow 2\sqrt{2}p$$

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

54. (A) A.T.Q,
$x + y + z = 0$
Let z = 0
$\Rightarrow x + y = 0$
$\Rightarrow x = -y$

$$\Rightarrow \frac{3y^2 + x^2 + z^2}{2y^2 - xy} = \frac{3x^2 + x^2}{2x^2} = 2$$

55. (C) A.T.Q,
$x + y = 3$
Put y = 0
x = 3
$\Rightarrow x^3 + y^3 + 9xy = 0$
$\Rightarrow 27$

56. (C) A.t.Q,

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

Let $x = 2$
y = 0
and z = 1

$$\Rightarrow \left[\frac{y}{y - 2}\right] + \left[\frac{x}{x - z}\right] = \frac{2}{2 - 1} = 2$$

57. (C) A.T.Q,
A + B + AB = 65
Let, A = 10
B = 5
$\Rightarrow$ A – B = 10 – 5 = 5

58. (B) A.T.Q,
$a = q + r$
$b = r + p$
$c = p + q$
Put r = 0, q = 0
$p^3 + q^3 + r^3 - 3\ pqr = 4$
a = o, b = p, c = p
$\Rightarrow a^3 + b^3 + c^3 - 3\ abc$ = o + p³ + p³ – 0
= 2p³ = 8

59. (B) A.T.Q,

$x^{y+z} = 1$, $y^{x+z} = 1024$ and $z^{x+y} = 729$

Let x = 1

$y^{1+z} = 1024$

$z^{1+y} = 729$

Let y = 2

z = 9

$(z+1)^{y+x+1} = 10^4 = 10000$

60. (B) A.T.Q,

milk Vessels A 40 litres → water Vessels B 22 litres

8 litres mixture taken out

Water = 22 litres

Milk = 8 litres

W : M = 22 : 8 = 11 : 4

Step – II

When 6 litres mik is taken out from vessels B

15 units = litres

$4 \text{ units} = 4 \times \frac{6}{15} = \frac{8}{15}$ litres

$11 \text{ units} = 11 \times \frac{6}{15} = \frac{22}{5}$ litres

Now, total milk ini vessels,

$A = 32 + \frac{8}{5} = \frac{168}{5}$

Remaining water in vessels $B = 22 - \frac{22}{5}$

$= 22 \times \frac{4}{5}$

Required ratio $= \frac{\frac{168}{5}}{22 \times \frac{4}{5}} = 21 : 11$

61. (A) $x = \left(\frac{a}{b}\right) + \left(\frac{b}{a}\right)$, $y = \frac{b}{c} + \frac{c}{b}$, $z = \frac{c}{a} + \frac{a}{c}$

Let, $a = b = 1$

$x = 2$, y = 2 and z = 2

$\Rightarrow xyz - x^2 - y^2 - z^2 = 2 \times 2 \times 2 - 4 - 4 - 4$

$= -4$

62. (C) A.T.Q,

Let, CP ⟶ candles ⟶ x

CP ⟶ Pen ⟶ $2x$

$\Rightarrow \frac{3P}{x} \times 100 = \frac{4C}{2x} \times 100$

$\Rightarrow \frac{C}{P} = \frac{3}{2}$

63. (D) A.T.Q,

$25\% = \frac{1}{4}$

Let CP = 16 units

Profit = 25%

S.P = 20 units

Profit = 4 units

If profit is calculated on S.P 25% of 20

profit = 5 units

Profit on CP and Profit on SP is 1 unit more.

Now, 5% of 16 = 0.8

Total profit is 1unit more

Hence,

5% of 16 + 0.2

0.2 ⟶ ₹ 80

16 units ⟶ $\frac{80 \times 16}{0.2}$ = ₹ 6400

64. (B) A.T.Q,

$x^4 + y^4 + x^2y^2 = 481$, $xy = 12$

Let $x = 4$

y = 3

$\Rightarrow x^2 - xy + y^2 = 16 - 12 + 9 = 13$

65. (B) $a + b + c = 9$

$ab + bc + ca = 26$

$a^3 + b^3 = 91$

$b^3 + c^3 = 72$

$c^3 + a^3 = 35$

Let $a = 3$

$b = 4$

c = 2

$\Rightarrow abc = 3 \times 4 \times 2 = 24$

66. (B) A.T.Q,

$$3\sqrt{\frac{1-a}{a}} + 9 = 19 - 3\sqrt{\frac{a}{1-a}}$$

$$\Rightarrow \left[\sqrt{\frac{1-a}{a}} + \sqrt{\frac{a}{1-a}}\right] = \frac{10}{3}$$

$$\Rightarrow \sqrt{\frac{1-a}{a}} + \sqrt{\frac{a}{1-a}} = 3\frac{1}{3}$$

$$\Rightarrow \sqrt{\frac{1-a}{a}} = 3$$

$$\Rightarrow \frac{1-a}{a} = 9$$

$\Rightarrow 1 - a = 9a$

$\Rightarrow a = \frac{1}{10}$

67. (B) A.T.Q,

20% Profit
CP : SP = 5 : 6
= 15 : 18
10% Profit more ↓ 5 units
CP : SP = 10 : 13

5 units ⟶ ₹ 20

15 units ⟶ ₹ 60

68. (B) $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$

$\Rightarrow \sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = 2$

$\Rightarrow \sqrt{\frac{a}{b}} = 1$

$\Rightarrow a = b$
$\Rightarrow a + b = 10$
$\Rightarrow a = 5,\ b = 5$
$\Rightarrow 3ab + 4a^2 + 5b^2 = 3 \times 5 \times 5 + 100 + 125$
$= 300$

69. (D) Total profit = $\frac{20000 \times 10 \times 1}{100}$ = ₹ 2000

According to the question,

Case (I): Interest = $\frac{12000 \times 8 \times 1}{100}$ = ₹ 960

Remaining interest (profit) = (2000–960)
= ₹ 1040

Remaining principal = (20000 – 12000)
= ₹ 8000

Required rate % = $\frac{1040}{8000} \times 100$ = 13%

70. (D) ATQ = $\frac{8}{25} \leftarrow \frac{\text{S.I}}{\text{SUM}}$

Time = $\frac{R}{2}$, Rate = R

Now 8 = $\frac{25 \times R \times R}{100 \times 2}$ = $\left[\text{SI} = \frac{P \times R \times T}{100}\right]$

$8 = \frac{R^2}{4 \times 2} \Rightarrow 64 = R^2$

R = 8%

71. (C) $\frac{1}{2}A = \frac{1}{3}B = \frac{1}{4}C$

$\therefore$ A : B : C
2 : 3 : 4

$2x + 3x + 4x = 900$
$9x = 900$
$x = 100$

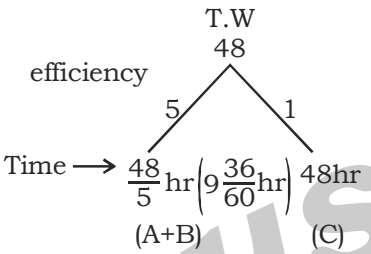
A = 200
B = 300
C = 400

72. (D)

	Milk	:	water
A	3	:	$1 = 4_{\times 7}$
B	5	:	$2 = 7_{\times 4}$

		Milk	:	Water
	A	21	:	7
⇒	B	20	:	8
	New mixture	41	:	15

73. (B) A.T.Q,
A = B + C (efficiency)



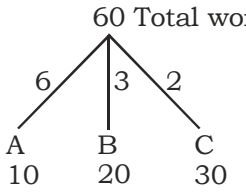
(A + B + C)'s efficiency = 6 units
A should do half of the work by B and C together.
So,

A's efficiency = $\frac{6}{2}$ = 3 units

B's efficiency = 6 – 3 – 1 = 2 units
B will complete whole work in ,

$\frac{48}{2}$ = 24 hours

74. (C)



Complete work in '4' days = 11 × 4 = 44
remaining work = 60 – 44 = 16
New efficiency of A and B
A = 6 × 2 = 12

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

New efficiency of A + B + C = 12+1+3 = 16

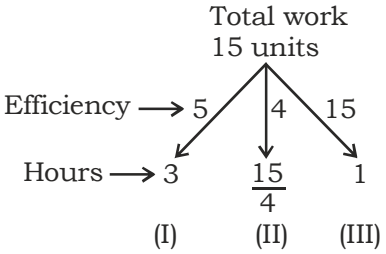
No of day = $4 + \frac{16}{16}$ = 5 days

75. (B) $\left[\frac{m_1 \times h_1 \times T_1}{w_1} = \frac{m_2 \times h_2 \times T_2}{w_2}\right]$

$9_{taps} \times 20_{mins} = T_{taps} \times 15_{mins}$

T = 12 Taps

76. (C)



Ist pipe fills till 3pm = 5 × 2 = 10 units
IInd pipe fills till 3pm = 4 × 1 = 4 units
Total filled = 10 + 4 = 14 units
Now, pipe (III) efficiency = 15 – 9 = 6 units/hrs

Tank will be empty in $= \frac{14}{6} = 2$ hr 20 min

30hr + 2hr 20 min = 5 : 20 pm

77. (D) Distance travelled by driver in 2 hours

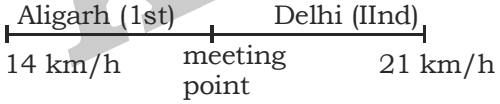
$= 300 \times \frac{40}{100} = 120$ km

Distance to be covered in 2 hours
= 300 – 120 = 180 km

Required speed = $\frac{180}{2} = 90$ km/h

Required difference = $90 - \frac{120}{2}$
= 30 km/hr

78. (B)



Distance travelled by Ist train in 't' time
= 14 km/hr × t h [th = time hours]
Distance travelled by IInd train in 't' time
= 21 km/hr × t h
Difference their distance = 70 km
21 × t – 14 × t = 70
7t = 70
t = 10h
It means both train travelled 10 hr
Ist train complete = 14 km/h × 10 hr
= 140 km
IInd train complete = 21 km/h × 10 hr
= 210 km
Total distance = 140 + 210 = 350 km

79. (B) Let the unit place of the number = x
and the ten = y
Then number will be = 10y + x
According to question
10y + x = 3(x + y)
10y + x = 3x + 3y
7y – 2x = 0 ....(i)
Again,
(10y + x) + 45 = 10x + y
10y + x + 45 = 10x + y
9y – 9x = – 45
x – y = 5 ....(ii)
x = 5 + y
From equation (i)
7y – 2(5 + y) = 0
7y – 10 – 27 = 0
5y = 10
y = 2
Then x = y + 5
x = 7
Sum = x + y = 7 + 2 = 9

80. (B) Number = $xyxyxy$
= $xy \times 1000 + xy \times 100 + xy$
= xy (1000 + 100 + 1)
= xy (10101)

81. (B) Assume weight of water = x
Weight of container = y
So,
That weight of container when it is filled with water,
x + y = 2.25 kg ....(i)
When it is filled 2/ 10th of water then,

$= x \times \frac{2}{10} + y = 0.77$ kg ....(ii)

After solving both equation,

$x = \frac{37}{20}$ kg

y = 0.40 kg
Now, The weight (in kg) of the container when 0.4 part if its is filled with water is,

$= \frac{37}{20} \times \frac{4}{10} + 0.40 = 1.14$ kg

82. (C)

$\sqrt{2}$	$\sqrt[6]{3}$	$\sqrt[3]{4}$	$\sqrt[4]{5}$
↓	↓	↓	↓
$2^{1/2}$	$3^{1/6}$	$4^{1/3}$	$5^{1/4}$
$2^{6/12}$	$3^{2/12}$	$4^{4/12}$	$5^{3/12}$
↓	↓	↓	↓
$(2^6)^{1/12}$	$(3^2)^{1/12}$	$(4^4)^{1/12}$	$(5^3)^{1/12}$
$(64)^{1/12}$	$(9)^{1/12}$	$(256)^{1/12}$	$(125)^{1/12}$
		↑ Largest	

83. (B) If $x^2 + \frac{1}{x^2} = 1$

Then, $x + \frac{1}{x} = \sqrt{3}$

$\Rightarrow x^3 + \frac{1}{x^3} = \left(\sqrt{3}\right)^3 - 3\sqrt{3} = 0$

$\Rightarrow x^6 = -1$,or $x^6 + 1 = 0$

then, $x^{102} + x^{96} + x^{90} + x^{84} + x^{78} + x^{72} + 5$

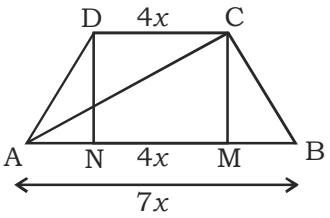
$x^{96}(x^6 + 1) + x^{84}(x^6 + 1) + x^{72}(x^6 1) + 5 = 5$

84. (A) Series :– a, a + 2, a + 4 .....
Sum = na + 2 + 4 + ... upto n terms
Sum = na + S_n

$S_n = \frac{2(2^n - 1)}{2 - 1}$

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

85. (A)



area = $\frac{1}{2}$(sum of parallel sides)×distance between them

$\frac{1}{2}(7x + 4x) \times 2x = 176$

$11x^2 = 176 \Rightarrow x^2 = 16$

$\Rightarrow x = 4$

AB = 7 × 4 = 28 cm

CD = 4 × 4 = 16 cm

CM = 2 × 4 = 8 cm

AM = AN + NM

$\Rightarrow$ AN + 16

$\Rightarrow 6 + 16 = 22$ (AN = BM = $\frac{12}{2}$ = 6)

$AC^2 = CM^2 + AM^2$

$AC^2 = 8^2 + 22^2$

AC = $\sqrt{64 + 484} \Rightarrow \sqrt{548} \Rightarrow 2\sqrt{137}$

86. (C) Diagonal of cube will be equal to diameter of sphere,

$\sqrt{3}a = 2 \times r$

$\sqrt{3}a = 2 \times 6\sqrt{3}$

$a = 12$

Surface area = $6a^2 = 6 \times 12 \times 12$

$\Rightarrow 864 cm^2$

87. (A) $\frac{\sin A}{1 + \cos A} + \frac{\sin A}{1 - \cos A}$

$\Rightarrow \frac{\sin A(1 - \cos A) + \sin A(1 + \cos A)}{(1 + \cos A)(1 - \cos A)}$

$\Rightarrow \frac{\sin A - \sin A \cos A + \sin A + \sin A \cos A}{1 - \cos^2 A}$

$\Rightarrow \frac{2 \sin A}{\sin^2 A} = 2$ cosec A

88. (B) $\sin\left(\frac{\pi x}{2}\right) = x^2 - 2x + 2$

Put value of x from options

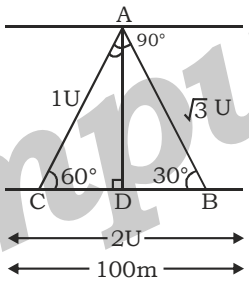
$x = 1$

$\sin\frac{\pi}{2} \times 1 = 1^2 - 2 \times 1 + 2$

$\sin 90° = 1 - 2 + 2$

$1 = 1$

89. (B)



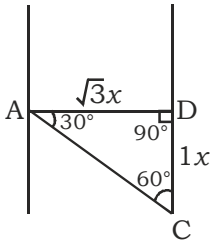
In ∠ABC

2U = 100 m [∴ BC = 100m]

1U = 50 m

Hence, length of AC = 50 m

In ∠ADC



AC = 50 m

AU = 50 m

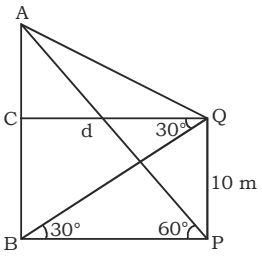
U = 25 m

AD = $\sqrt{3}x$

= $\sqrt{3} \times 25 = 25\sqrt{3}$ m

Hence, the of the canal (AD) = $25\sqrt{3}$

90. (B)



AB = Tower
QP = 10 metres
In ΔQBP

$$\tan 30° = \frac{QP}{PB}$$

$$\frac{1}{\sqrt{3}} = \frac{QP}{PB} \Rightarrow AB : BP = \sqrt{3} : 1 \quad \text{....(i)}$$

In ΔABP

$$\tan 60° = \frac{AB}{BP}$$

$$\sqrt{3} = \frac{AB}{BP} \Rightarrow AB : BP = \sqrt{3} : 1 \quad \text{....(ii)}$$

CB = QP and CQ = BP
Now,

AB	:	BP	:	CB
$\sqrt{3}$	:	1	:	
		$\sqrt{3}$	:	1
3 $\downarrow \times 10$	:	$\sqrt{3}$	:	1 $\downarrow \times 10$
30 metres				10 metres

91. (B) It is clear from the bar diagram. The bar of west Bengal is lowest
92. (B) The bar of West Bengal is largest producer
93. (B) Total production of rice = 24 million tonnes

Haryana share = $\frac{2}{24} = \frac{1}{12}$

94. (C) Maharashtra
95. (D) Uttar Pradesh produces 16 millions tonnes of wheat which is largest in graph
96. (C) Number of students who come to school by car = $\frac{70°}{360°} \times 2160 = ₹\ 420$
97. (B) Car : Bus = 70° : 90° = 7 : 9 or 21 : 27
98. (C) Number of students coming by

$$= \frac{80° \times 90°}{360°} \times 2160 = 1020$$

99. (D) Number of students do not come by train

$$= \frac{360°120°}{360°} \times 2160 = 1440$$

100. (B) Required percentage = $\frac{90° - 80°}{80°} \times 100$
= 12.5%

SSC TIER II (MATHS) MOCK TEST - 49 (ANSWER KEY)

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

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