Mock CAT – 4

Answers and Explanations

1	b	**2**	b	**3**	b	**4**	b	**5**	d	**6**	d	**7**	a	**8**	b	**9**	a	**10**	b
11	a	**12**	a	**13**	a	**14**	a	**15**	a	**16**	b	**17**	b	**18**	a	**19**	b	**20**	b
21	d	**22**	a	**23**	a	**24**	c	**25**	b	**26**	c	**27**	c	**28**	d	**29**	b	**30**	a
31	a	**32**	a	**33**	d	**34**	c	**35**	b	**36**	c	**37**	c	**38**	a	**39**	d	**40**	a
41	a	**42**	b	**43**	c	**44**	d	**45**	b	**46**	d	**47**	b	**48**	c	**49**	b	**50**	b
51	c	**52**	b	**53**	a	**54**	d	**55**	a	**56**	c	**57**	d	**58**	d	**59**	a	**60**	b
61	c	**62**	a	**63**	d	**64**	c	**65**	a	**66**	d	**67**	b	**68**	a	**69**	d	**70**	c
71	b	**72**	c	**73**	d	**74**	d	**75**	a	**76**	b	**77**	c	**78**	c	**79**	b	**80**	b
81	a	**82**	d	**83**	a	**84**	b	**85**	a	**86**	c	**87**	a	**88**	c	**89**	b	**90**	b
91	c	**92**	b	**93**	d	**94**	b	**95**	d	**96**	d	**97**	c	**98**	a	**99**	b	**100**	b
101	d	**102**	d	**103**	b	**104**	b	**105**	b	**106**	d	**107**	d	**108**	b	**109**	d	**110**	a
111	a	**112**	b	**113**	a	**114**	b	**115**	c	**116**	a	**117**	b	**118**	d	**119**	b	**120**	a
121	c	**122**	b	**123**	d	**124**	a	**125**	a	**126**	c	**127**	d	**128**	c	**129**	a	**130**	c
131	c	**132**	b	**133**	c	**134**	b	**135**	d	**136**	b	**137**	c	**138**	d	**139**	c	**140**	a
141	c	**142**	d	**143**	c	**144**	d	**145**	d	**146**	d	**147**	a	**148**	a	**149**	c	**150**	a

Scoring table

Section	Question number	Total questions	Total attempted	Total correct	Total wrong	Net score	Time taken
QA	1 to 50	50					
EU + RC	51 to 100	50					
DI + DS + AR	101 to 150	50					
Total		150					

1. b $x + y = 2$ or, $x = 2 - y$
Again
$xy - z^2 = 1$ or, $1 + z^2 - xy = 0$
or, $1 - y(2 - y) + z^2 = 0$
or, $1 - 2y + y^2 + z^2 = 0$
or, $(y - 1)^2 + z^2 = 0$
Now sum of two squares can be zero if and only if each of them is zero.
$\therefore y - 1 = 0$ or, $y = 1$ and $z = 0$
$\therefore x = 2 - 1 = 1$
$y = 1$ and $z = 0$
is the only solution of the system of equations.

2. b $V! + (V + 1)! + (V + 2)! = V! + (V + 1)\,V! + (V + 2)(V + 1)\,V!$

$$= V!\left(1 + V + 1 + V^2 + 3V + 2\right)$$

$$= \left(V^2 + 4V + 4\right)V! = (V + 2)^2\,V!$$

Now this will be a multiple of 36 for
$V = 4, 6, 7, 8, 9, 10, 11, 12, 13$ and 14.
$\therefore$ It is possible for 10 values of V.

3. b $$V = \frac{1}{2} - \frac{2}{4} + \frac{3}{8} - \frac{4}{16} + \frac{5}{32} - $$

$$\frac{V}{2} = \frac{1}{4} - \frac{2}{8} + \frac{3}{16} - \frac{4}{32} + \ldots.$$

$$V + \frac{V}{2} = \frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \frac{1}{32} - \ldots..$$

$$\text{or, } \frac{3V}{2} = \frac{\frac{1}{2}}{1 - \left(-\frac{1}{2}\right)} = \frac{\frac{1}{2}}{\frac{3}{2}} = \frac{1}{3}$$

$$\text{or, } V = \frac{1}{3} \times \frac{2}{3} = \frac{2}{9}$$

4. b We have $\log 2 = a$ and $\log 3 = b$
Now,
$\log(1) + \log(1 + 3) + \log(1 + 3 + 5) + \ldots + \log(1 + 3 + 5 + \ldots + 19) - 2[\log 1 + \log 2 + \log 3 + \log 4 + \ldots + \log 7]$
$= \log 1 + \log 4 + \log 9 + \ldots + \log 100 - 2[\log 1 + \ldots + \log 7]$
$= \log 1^2 + \log 2^2 + \log 3^2 + \ldots + \log 10^2 - 2[\log 1 + \ldots + \log 7]$
$= 2[\log 1 + \log 2 + \ldots + \log 10] - 2[\log 1 + \ldots + \log 7]$
$= 2[\log 8 + \log 9 + \log 10]$
$= 2[3\log 2 + 2\log 3 + 1]$
$= 6\log 2 + 4\log 3 + 2$
$= 2 + 6\log 2 + 4\log 3 = 2 + 6a + 4b = p + qa + rb$
$\therefore p = 2, q = 6$ and $r = 4$
$\therefore p + 2q + 3r = 2 + 2 \times 6 + 3 \times 4 = 26$

For questions 5 to 7:
Let $ab = x$ and $cd = y$ (x and y are two 2-digit numbers.)
$abcd = 100x + y$
We have,
$100x + y = (x + y)^2$
or, $99x + x + y = (x + y)^2$
or, $99x = (x + y)^2 - (x + y)$
$= (x + y)(x + y - 1)$
Now $(x + y)$ and $(x + y - 1)$ are two co-prime numbers and their product is a multiple of 99.
Now their can be many cases:
Case I:

$$x + y = 99K \text{ and } (x + y - 1) = \frac{x}{K}$$

(Where K is a natural number)
$\because$ x and y are both two-digit numbers.
$\therefore K \le 2$
If $K = 2$ then $x + y = 190$ that is impossible
$\therefore K = 1$ and so we have
$x + y = 99$ and $x + y - 1 = x$
or, $x = 98 \Rightarrow y = 1$
$\therefore$ One such possibility is $9801 = (98 + 01)^2$
But this is not admissible as here y is 1 and not a two-digit number.
Case II:

$$x + y = 11K \text{ and } (x + y - 1) = \frac{9x}{K}$$

Since x and y are two digit numbers so $K \le 18$. Again $(x + y - 1)$ has to be a multiple of 9 and $\therefore$ K is either 5 or 14.
When K = 5

$$x + y = 55 \text{ and } x + y - 1 = \frac{9x}{5}$$

$$\text{or, } 54 = \frac{9x}{5},\ x = 30 \Rightarrow y = 25$$

$\therefore$ One possible number is 3025 as $3025 = (30 + 25)^2$.
When K = 14

$$x + y = 154 \text{ and } x + y - 1 = \frac{9x}{14}$$

$$\text{or, } 153 = \frac{9x}{14} \text{ or, } x = 238 \text{ [Impossible]}$$

Case III:

$$x + y = 9K \text{ and } (x + y - 1) = \frac{11x}{K}$$

Now again K is either 5 or 16 as $x + y - 1$ has to be a multiple of 11.
When K = 5

$$x + y = 45 \text{ and } x + y - 1 = \frac{11x}{5}$$

$$\text{or, } 44 = \frac{11x}{5} \text{ or, } x = 20 \Rightarrow y = 25$$

One more such possible number is 2025 as $2025 = (20 + 25)^2$.
$K \ne 16$ as then x becomes a 3-digit number.
So we see that these are only two such numbers 2025 and 3025 and hence the answers:
[Mind you 9801 is not admissible here.]

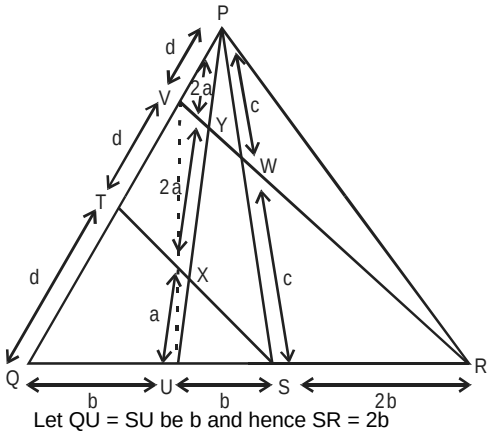
5. d

6. d

7. a

8. b V = 7777 … 77 (1001 sevens)
Any digit written 6 or a multiple of 6 consecutive times is divisible by 1001.
∴ 7 written 996 times is exactly divisible by 1001. The required remainder is the remainder when 77777 is divided by 1001, that is 700.

For questions 9 to 11:
QS = SR, QU = SU, PW = WS and ST || RV



Let QU = SU be b and hence SR = 2b
In ΔPXS
YW II SX and W is the mid-point of PS therefore Y will be the mid-point of PX.
PY = YX = 2a (say)
In ΔUYR, SX II RY and US / SR = 1 : 2

$$\therefore \frac{UX}{XY} = 1:2$$

9. a In a ΔPSU, the area of the triangle ΔSUX

$$= \frac{1}{5} \text{ Area of the } \Delta PSU$$

$$\text{Area of the } \Delta PSU = \frac{1}{4} \text{ Area of the } \Delta PQR$$

$$\text{Area of the } \Delta PSX = \text{Area of the } \Delta PUS - \text{Area of the } \Delta SUX = \frac{4}{5} \text{ Area of the } \Delta PSU = \frac{4}{5}\times\frac{1}{4} \text{ Area of } \Delta PQR$$

$$\therefore \frac{\text{Area of } \Delta PSX}{\text{Area of } \Delta PQR} = \frac{1}{5}$$

10. b In ΔQRV, ST || RV and S is the mid-point of QR.
∴ T is the mid-point of QV, So QT = TV.
In ΔPTS, VW || TS and W is the mid-point of PS
∴ V is the mid-point of PT so TV = VP
∴ QT = TV = VP

$$\text{Area of } \Delta PQU = \frac{1}{4} \text{ of Area of } \Delta PQR$$

$$\text{Area of } \Delta PVY = \frac{2}{5}\times\frac{1}{3} \text{ of area of } \Delta PQU$$

$$\therefore \text{Area of } \Delta PVY = \frac{2}{5}\times\frac{1}{3}\times\frac{1}{4} \text{ of Area of } \Delta PQR$$

$$\therefore \frac{\text{Area of } \Delta PVY}{\text{Area of } \Delta PQR} = \frac{1}{30}$$

11. a From solution of Question 9

$$\text{Area of } \Delta SUX = \frac{1}{5} \text{ Area of } \Delta PUS$$

$$\text{and Area of } \Delta PUS = \frac{1}{4} \text{ Area of } \Delta PQR$$

$$\therefore \text{Area of } \Delta SUX = \frac{1}{20} \text{ Area of } \Delta PQR$$

12. a $(p + r - q)x^2 + 2rx + (q + r - p) = 0$
Let α, β be the roots of this equation. Since α and β are both rational.
$\therefore \alpha \times \beta$ will also be rational.

$$\alpha\times\beta = \frac{q+r-p}{p+r-q} = K \text{ [Where K is a rational number.]}$$

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

$$\text{or, } \frac{2r}{2q-2p} = \frac{r}{q-p} = \frac{K+1}{K-1}$$

$\because$ K is rational.

$$\therefore \frac{K+1}{K-1} = \frac{r}{q-p} \text{ is also rational.}$$

13. a The percentage of milk when the customer gets the milk from first milk man, is 33% and from the second 25%. The customer gets 33% milk when he pays Rs. 60 and the customer gets 25% milk when he pays Rs. 80. So obviously he purchases milk from first milkman.

14. a $V^{256} = (V^{64})^4$
$\because$ V is of the form 2K + 1.
$\therefore$ It is odd.
$\Rightarrow V^{64}$ is also odd.
$(V^{64})^4$ when divided by 16 will leave a remainder of 1 as fourth power of any odd number divided by 16 leaves a remainder 1.

15. a V_1, V_2, V_3 and V_4 are in G.P., let the common ratio of this G.P. be r and so we have
$V_2 = V_1r$, $V_3 = V_1r^2$ and $V_4 = V_1r^3$
V_1 and V_2 are the roots of $x^2 - 3x + a = 0$

$$\therefore V_1V_2 = a \text{ and } V_1 + V_2 = 3$$

$$\text{or, } V_1 + V_1r = 3$$

V_3 and V_4 are the roots of $x^2 - 12x + b = 0$
$\therefore V_3V_4 = b$ and $V_3 + V_4 = 12$
or, $V_1r^2 + V_1r^3 = 12$

$$\text{or, } r^2(V_1 + V_1r) = 12$$

$$\text{or, } 3r^2 = 12$$

or, r = 2
Now $V_1 + 2V_1 = 3$ or, $V_1 = 1$,
$V_2 = 2$, $V_3 = 4$ and $V_4 = 8$
So, $ab = V_1V_2V_3V_4 = 1 \times 2 \times 4 \times 8 = 64$

16. b $\log_y x = 10$ or, $x = y^{10}$

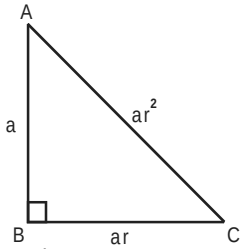
$$\log_{x^3} y^6 = \log_{y^{30}} y^6 = \frac{6}{30}\log_y y = \frac{1}{5}$$

17. b It is a three stage process. Let R denote a red ball and B denote a black ball.
Again R_1 — Picking up a red ball in the first turn
B_1 — Picking up a black ball in the first turn
R_2 — Picking up a red ball in the second turn
B_2 — Picking up a black ball in the second turn
R_3 — Picking up a red ball in the third turn
Therefore the required probability of drawing a red ball finally is
$P = P_1(R_1B_2R_3) + P_2(R_1R_2R_3) + P_3(B_1R_2R_3) + P_4(B_1B_2R_3)$
$P_1(R_1B_2R_3)$ — Probability of choosing Red, Black, Red.
$P_2(R_1R_2R_3)$ — Probability of choosing Red, Red, Red.
$P_3(B_1R_2R_3)$ — Probability of choosing Black, Red, Red.
$P_4(B_1B_2R_3)$ — Probability of choosing Black, Black, Red.

$$P = \frac{6}{10}\times\frac{6}{11}\times\frac{5}{10} + \frac{6}{10}\times\frac{5}{11}\times\frac{6}{10} + \frac{4}{10}\times\frac{4}{11}\times\frac{7}{10} + \frac{4}{10}\times\frac{7}{11}\times\frac{6}{10}$$

$$= \frac{180}{1100} + \frac{180}{1100} + \frac{112}{1100} + \frac{168}{1100} = \frac{640}{1100} = \frac{32}{55}$$

18. a Let the sides of the right angled triangle be a, ar and ar^2, where r > 1.



We have

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

or, $1 + r^2 = r^4$

or, $r^4 - r^2 - 1 = 0$

or, $r^2 = \frac{1 \pm \sqrt{5}}{2}$ [But it can not be $\frac{1-\sqrt{5}}{2}$ as that is –ve]

or, $r = \sqrt{\frac{\sqrt{5}+1}{2}}$

Since the tangents of the acute angles will be $\frac{1}{r}$ and r

i.e. $\sqrt{\frac{2}{\sqrt{5}+1}}$ and $\sqrt{\frac{\sqrt{5}+1}{2}}$.

19. b Take as A.P. — 1, 3, 5
Here k = 3 and d = 2

$$\therefore V = 3^2 - \frac{1^2 + 3^2 + 5^2}{3} = 9 - \frac{35}{3} = -\frac{8}{3}$$

Now put k = 3 and d = 2 in options.

Only option (b) gives $-\frac{8}{3}$

20. b $V = 3\log_e K = \log_e 3K$

or, $\log_e K^3 = \log_e 3K$

or, $K^3 = 3K$ or, $K^3 - 3K = 0$ or, $K\left(K^2 - 3\right) = 0$

or, $K = 0, \sqrt{3}$ or $-\sqrt{3}$

but K > 0 as log is defined for only positive numbers.
$\therefore$ $K = \sqrt{3}$ is the only possible solution of the system of the given equations. Hence only one solution exists.

21. d For three real numbers a, b and c we have

$$\frac{1}{2}\left\{(a-b)^2 + (b-c)^2 + (c-a)^2\right\} \geq 0$$

or, $a^2 + b^2 + c^2 - ab - bc - ca \geq 0$

or, $a^2 + b^2 + c^2 \geq ab + bc + ca$

or, I $\frac{a^2 + b^2 + c^2}{ab + bc + ca} \geq 1$ or, $V \geq 1$ … (i)

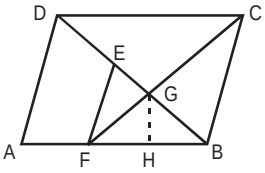
But it is given that $V \leq 1$ … (ii)
$\therefore$ V = 1 [From (i) and (ii)]
Now $a^2 + b^2 + c^2 = ab + bc + ca$
or, $a^2 + b^2 + c^2 - ab - bc - ca = 0$

or, $\frac{1}{2}\left\{(a-b)^2 + (b-c)^2 + (c-a)^2\right\} = 0$

or, $(a-b)^2 + (b-c)^2 + (c-a)^2 = 0$

or, a = b = c

22. a AD || FE and $\frac{AF}{FB} = \frac{2}{3}$



Let GH be parallel to EF intersecting AB at H.
$\because$ ΔBHG and ΔBFE are similar.

$$\therefore \frac{GH}{EF} = \frac{HB}{BF} \quad \text{… (i)}$$

Now $\because$ ΔFGH and ΔFCB are similar.

$$\therefore \frac{GH}{BC} = \frac{FH}{FB} \quad \text{… (ii)}$$

$$\frac{GH}{EF} + \frac{GH}{BC} = \frac{HB}{BF} + \frac{FH}{BF} = 1$$

or, $GH\left(\frac{1}{EF}+\frac{1}{BC}\right)=1$

or, $\frac{1}{GH}=\frac{1}{EF}+\frac{1}{BC}$

ΔBFE and ΔBAD are similar and AD || FE

$\therefore \frac{AF}{FB}=\frac{DE}{EB}=\frac{AD}{EF}=\frac{2}{3}$

or, $AD=\frac{2}{3}EF$

or, $BC=\frac{2}{3}EF \qquad [\because AD=BC]$

Now $\frac{1}{GH}=\frac{1}{EF}+\frac{3}{2EF}=\frac{5}{2EF}$

or, $GH=\frac{2EF}{5}=\frac{2}{5}\cdot\frac{3}{2}AD$

or, $\frac{GH}{AD}=\frac{3}{5}$

$\frac{BG}{GD}=\frac{GH}{AD}=\frac{3}{5}$ [As Δ's BHG and BAD are similar]

For questions 23 to 25:

$p^2 + q^2 + r^2 + s^2 - pq - qr - rs - s + \frac{2}{5} = 0$

or,

$\left(p-\frac{q}{2}\right)^2+\frac{3}{4}\left(q-\frac{2r}{3}\right)^2+\frac{2}{3}\left(r-\frac{3s}{4}\right)^2+\frac{5}{8}\left(s-\frac{4}{5}\right)^2=0$

But it is possible if and only if

$p-\frac{q}{2}=0\Rightarrow p=\frac{q}{2}$

$q-\frac{2r}{3}=0\Rightarrow q=\frac{2r}{3}$

$r-\frac{3s}{4}=0\Rightarrow r=\frac{3s}{4}$ and

$s-\frac{4}{5}=0\Rightarrow s=\frac{4}{5}$

as p, q, r and s are all real numbers.

Now $r=\frac{3s}{4}=\frac{3}{4}\cdot\frac{4}{5}=\frac{3}{5}$

$q=\frac{2}{3}r=\frac{2}{3}\cdot\frac{3}{5}=\frac{2}{5}$

$p=\frac{q}{2}=\frac{1}{2}\cdot\frac{2}{5}=\frac{1}{5}$

23. a $p+q+r+s=\frac{1}{5}+\frac{2}{5}+\frac{3}{5}+\frac{4}{5}=\frac{10}{5}=2$

24. c $(p+q)^2+(r+s)^2=\left(\frac{1}{5}+\frac{2}{5}\right)^2+\left(\frac{3}{5}+\frac{4}{5}\right)^2$

$=\frac{9}{25}+\frac{49}{25}=\frac{58}{25}$

25. b $(p-q)^2+(r-s)^2=\left(\frac{1}{5}-\frac{2}{5}\right)^2+\left(\frac{3}{5}-\frac{4}{5}\right)^2$

$=\frac{1}{25}+\frac{1}{25}=\frac{2}{25}$

26. c If we take out 42 balls first, we shall definitely get at least 7 balls of the same colour in the worst case we shall get exactly 7 balls of each of the mix colours and with that balls of brown colour would be over. Now the available balls are yellow – 6, Green – 12, Red – 20, Black – 3, White – 7. Now if we take out 15 balls in an extreme case we shall get exactly 3 balls of each available colours.
Now the available balls are Yellow – 3, Green – 9, Red – 17, White – 4.
Now if we take out 3 balls of each colour we shall have taken out a total of 42 + 15 + 12 = 69 balls and these balls are

Yellow – 13	Green – 13
Red – 13	White – 13
Black – 10	Brown – 7

Now at this stage no matter which single ball we take out, we shall have exactly 14 balls of one of Green, red or white colours.
$\therefore$ Total number of balls to be taken out = 69 + 1 = 70

27. c Let α and β be roots of the equation
$x^2 + px + q = 0$
$\because$ α and β are both positive so we have
$\alpha+\beta=-p>0\Rightarrow p<0,$
$\alpha\beta=q>0$ and
$p^2-4q\geq 0$
or, $\left(p+2\sqrt{q}\right)\left(p-2\sqrt{q}\right)\geq 0$
Either $p\geq 2\sqrt{q}$
or, $p\leq -2\sqrt{q}$
But $p < 0$
$\therefore p\leq -2\sqrt{q}$

Note: If all those people who have marked options (a) or (b) should realise that the conditions given in those options are necessary and not sufficient.
THOSE PEOPLE MARKING OPTION (d) SHOULD GET BACK TO BASICS.

28. d $Vy^2 - 6Vy + 5V + 1 > 0$
or, $V\left(y^2-6y+9\right)+1-4V>0$
or, $V(y-3)^2+1-4V>0$
Now for non-negative values of V, $V(y-3)^2$ is always non-negative for all real values of y.

$\therefore V(y-3)^2 + 1 - 4V > 0$ if $1 - 4V > 0$

or, $4V < 1 \Rightarrow V < \frac{1}{4}$

$\therefore$ We have $0 \le V < \frac{1}{4}$

Note: How many of you marked options (a) or (c)?

29. b If $1 - V \ge 0$ or, $V \le 1$ then $|1 - V| = 1 - V$

So, $|1 - V| - V \ge 0$

or, $1 - V - V \ge 0$ or, $1 - 2V \ge 0$ or, $2V \le 1$

or, $V \le \frac{1}{2}$

If $1 - V < 0$ or, $V > 1$ then $|1 - V| = V - 1$

So, $|1 - V| - V \ge 1$ or, $V - 1 - V \ge 0$ or, $-1 \ge 0$.

This is impossible and hence we have

$V \le \frac{1}{2}$

30. a Let the numbers be
1 – 3d, 1 – 2d, 1 – d, 1, 1 + d, 1 + 2d and 1 + 3d
(Their sum is 7.)
Given that
1 – 3d = 7 × 1
or, 3d = 1 – 7 = –6
or, d = –2
$\therefore$ The sixth term is 1 + 2d = 1 – 4 = –3.

31. a Let the cubic expression be
K(v + 2) (v – 1) (v + a)
When v = 3
K × 5 × 2(3 + a) = 100
or, K(3 + a) = 10 … (i)
When v = 2,
K × 4 × 1 × (2 + a) = 28
or, K(2 + a) = 7 … (ii)
From equation (i) and (ii)

$\frac{3+a}{2+a} = \frac{10}{7}$

or, 21 + 7a = 20 + 10a

or, 3a = 1 or, $a = \frac{1}{3}$

Now, K(3 + a) = 10

or, $K\left(3 + \frac{1}{3}\right) = 10$

or, $\frac{10}{3}K = 10$ or, K = 3

$\therefore$ The cubic expression is $3(v+2)(v-1)\left(v + \frac{1}{3}\right)$.

= (v + 2) (v – 1) (3v + 1)
= $3v^3 + 4v^2 - 5v - 2$

Alternative method:
Only option (a) gives you 100 as value of the expression when you put v = 3 or by putting v = 1 it is only option (a) that gives you zero.

For questions 32 and 33:
Here
$V_1 = V_5 = V_9 = V_{13} = \ldots\ldots\ldots = V_{97}$,
$V_2 = V_6 = V_{10} = V_{14} = \ldots\ldots\ldots = V_{98}$,
$V_3 = V_7 = V_{11} = V_{15} = \ldots\ldots\ldots = V_{99}$,
$V_4 = V_8 = V_{12} = V_{16} = \ldots\ldots\ldots = V_{100}$.
i.e. $V_n = V_{n+4}$ for n = 1, 2, 3, 4, 5, ……, 96

32. a $V_{99} = V_{95} = V_{91} = \ldots\ldots\ldots = V_3 = 9$

33. d We have $V_5 = V_{89} = 7$. But we have no idea about other terms and hence the option cannot be determined.

34. c Let the two digit number be ab.
Value of ab = 10a + b
We have,
10a + b + 10b + a = 11(a + b) is a perfect square.
$\because$ 11(a + b) is a perfect square.
$\therefore$ (a + b) should also be a multiple of 11 but a + b can not be equal to 22 or more as a and b cannot be more than 9.
$\therefore$ a + b = 11
Now we have these 8 solutions.
(2, 9), (3, 8), … …, (9, 2)

35. b $\because$ V is a root of $x^5 - 1 = 0$
$\therefore$ $V^5 - 1 = 0$ or $V^5 = 1$
Now,

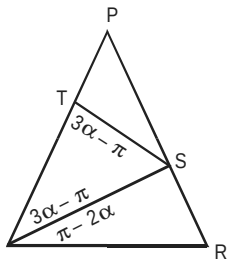
$V^{10} + V^{11} + V^{12} + \ldots\ldots + V^{50}$

$= \frac{V^{10}\left(V^{41} - 1\right)}{V - 1} = \frac{V^{10}(V-1)}{V-1} = V^{10}$

[Since $V^{41} = V^{40} \cdot V = \left(V^5\right)^8 \cdot V = 1^8 \cdot V = V$]

$= V^5 \cdot V^5 = V^5$

36. c



We have PQ = PR
RQ = QS = ST = TP
Let $\angle QRS = \angle QSR = \alpha$ [Say]
$\therefore \angle SQR = \pi - 2\alpha$
$\angle PQR = \angle SRQ = \alpha$
$\therefore \angle TQS = \alpha - (\pi - 2\alpha) = 3\alpha - \pi$

$\therefore \angle STQ = 3\alpha - \pi$

$\angle TSQ = \pi - (6\alpha - 2\pi)$

$= 3\pi - 6\alpha$

$\angle PST = \pi - \angle RSQ - \angle QST$

$= \pi - \alpha - (3\pi - 6\alpha)$

$= \pi - \alpha - 3\pi + 6\alpha = 5\alpha - 2\pi$

$\angle TPS = 5\alpha - 2\pi$

$\angle PTS = \pi - 2(5\alpha - 2\pi) = \pi - 10\alpha + 4\pi$

$= 5\pi - 10\alpha$

$\angle PTS + \angle STQ = \pi$

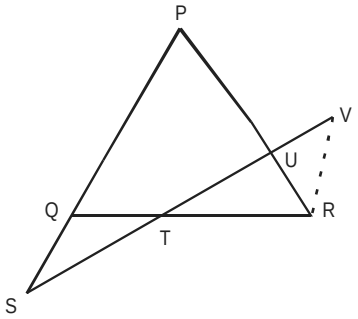
or, $5\pi - 10\alpha + 3\alpha - \pi = \pi$

or, $4\pi - 7\alpha = \pi$

or, $7\alpha = 3\pi$ or, $\alpha = \frac{3\pi}{7}$

$\angle PTS = 5\pi - 10\alpha = 5\pi - \frac{30\pi}{7} = \frac{5\pi}{7}$

37. c We have QT = TR and PU = PS.
UR = 2 units



We draw RV || PS that meets SU extended at V.

In ΔQST and ΔTVR

$\angle QTS = \angle VTR$ [Opposite angles]

$\angle QST = \angle TVR$ [Alternate angles as PS || VR]

QT = TR

$\therefore \Delta QST$ and ΔTVR are congruent.

$\therefore$ QS = VR … (i)

Now $\angle QST = \angle PUS = \angle VUR = \angle UVR$

$\therefore$ In ΔUVR

$\angle VUR = \angle RVU$

or, RV = UR = 2 … (ii)

From (i) and (ii)

QS = VR = UR = 2 units

For questions 38 to 40:

Here the number system used is of base 3 as 3 different symbols have been used.
c is equivalent to zero.
a is equivalent to one and
b is equivalent to two.

38. a $(17)_{10} = (122)_3 = abb$

39. d $abcabc = (120120)_3 = 420$

40. a $acbacb = (102102)_3 = 308$

41. a Let E_A = The event of A becoming secretary.
Similarly E_B and E_C

$P(E_A) = \frac{1}{3}, P(E_B) = \frac{2}{9}, P(E_C) = \frac{4}{9}$

Let, E_L = The event of ladies becoming members.

$\therefore P\left(\frac{E_L}{E_A}\right) = 0.6, P\left(\frac{E_L}{E_B}\right) = 0.7, P\left(\frac{E_L}{E_C}\right) = 0.5$

$\therefore$ Then required probability

$P = \frac{1}{3} \times \frac{6}{10} + \frac{2}{9} \times \frac{7}{10} + \frac{4}{9} \times \frac{5}{10} = \frac{26}{45}$

42. b Let n = number of steps taken by Anuj per minute.

Therefore his speed will be $\frac{n}{5}$ km/hr.

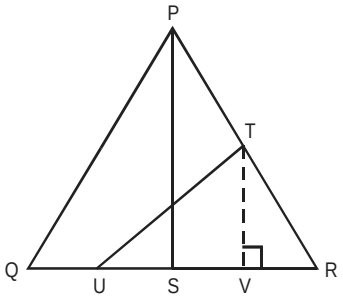
Again, let us assume
x = Distance in meters he covers in each step.
Therefore distance covered by Anuj in meters per min = n × x
$\therefore$ Distance covered by him per hour in km will be

$= \frac{n \times x \times 60}{1000}$

$\therefore \frac{n \times x \times 60}{1000} = \frac{n}{5}$

$x = \frac{10}{3}$ meters.

43. c Given
QR = 16, PS = 12, QU = US and PT = TR



We draw a perpendicular from point T on QR meeting QR at V.

In ΔPSR

TV|| PS and T is the mid-point of PR.

$\therefore$ V is the mid-point of SR and $TV = \frac{1}{2}PS = 6$.

(Mid-point theorem of triangles)

Now V is the mid-point of SR and U is the mid-point of QS.

$\therefore UV = \frac{1}{2}QR = \frac{1}{2}\times 16 = 8$

In ΔUTV
UV = 8, TV = 6

$\therefore UT = \sqrt{8^2 + 6^2} = 10$ units

44. d $(\log_4 a)(\log_a 2a)(\log_{2a} 3a) = \log_{2a} 8a^3$

or, $\frac{\log a}{\log 4}\cdot\frac{\log 2a}{\log a}\cdot\frac{\log 3a}{\log 2a} = \log_{2a}(2a)^3$

or, $\frac{\log 3a}{\log 4} = 3\log_{2a} 2a$

or, $\log_4 3a = 3$ or, $3a = 4^3$ or, $a = \frac{64}{3}$

45. b

day 1 — 5 men
day 2 — 8 men, day 3 — 6 men] 14 men
day 4 — 9 men, day 5 — 7 men] 16 men
day 6 — 10 men, day 7 — 8 men] 18 men

$\therefore$ Total man-days
= 5 + 14 + 16 + 18 + 20 + 22 + 24 + 26
= 5 + 2[7 + 8 + 9 + 10 + 11 + 12 + 13]
= 5 + 2 × 70 = 145 man days
Now, if 29 men paint the wall together then it would take $\frac{145}{29} = 5$ days

46. d Let the distance between Baghbazar Ghat and Ahiritota Ghat be d km.
x = Speed of the swimmer in still water
y = speed of the stream.

$\frac{20}{x-y} + \frac{20+d}{x+y} = \frac{d}{y}$...(i)

Again, time taken upstream = 3 × time taken down stream

$\Rightarrow \frac{d+20}{x-y} = 3\times\frac{(d+20)}{x+y}$

$\Rightarrow \frac{x+y}{x-y} = 3 \;\; \therefore x = 2y$

So, $\frac{20}{y} + \frac{20+d}{3y} = \frac{d}{y}$

$\Rightarrow 20 + \frac{20+d}{3} = d \;\; \Rightarrow 80 + d = 3d$

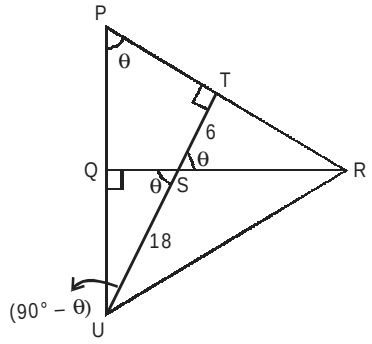
$\Rightarrow d = 40$ km

47. b

$V_0 = 3$	Odd
$V_1 = 3$	Odd
$V_2 = 3 \times 3 + 1 = 10$	Even
$V_3 = 3 \times 10 + 1 = 31$	Odd
$V_4 = 31 \times 10 + 1 = 311$	Odd
V_5 = Odd × Odd + 1 =	Even

So we observe that V_n is even whenever n is of the form 3K + 2 where K = 0, 1, 2, 3, 4, … rest are all odd.
$\therefore$ V_{110} is even and V_{111} is odd.

For questions 48 and 49:
We have
PT = TR, TS = 6, SU = 18



$\therefore$ UT = SU + ST = 18 + 6 = 24
$\angle QSU = \angle TSR = \theta$ [Say]
$\angle QUS = 90 - \theta,\ \angle TPU = \theta$

48. c Δ's STR and PTU are similar.

$\therefore \frac{ST}{PT} = \frac{TR}{UT}$

or, $\frac{6}{PT} = \frac{PT}{24}$ [As PT = TR]

or, $PT^2 = 144$; or, PT = 12
$\therefore$ PR = PT + TR = 12 + 12 = 24

49. b $PU^2 = PT^2 + UT^2 = 12^2 + 24^2 = 12^2(1+4)$

or, $PU = 12\sqrt{5}$
Δ's SQU and PTU are similar.

$\therefore \frac{QU}{UT} = \frac{US}{PU}$

or, $\frac{QU}{24} = \frac{18}{12\sqrt{5}}$ or, $QU = \frac{18\times 24}{12\sqrt{5}} = \frac{36}{\sqrt{5}}$

50. b $(3125^4)! = (5^5)^4! = 5^{20}!$

Total number of consecutive zeroes at the end of

$5^{20}! = \frac{5^{20}}{5} + \frac{5^{20}}{5^2} + \frac{5^{20}}{5^3} + ... + \frac{5^{20}}{5^{20}}$

$= 5^{19} + 5^{18} + 5^{17} + ... + 1$

$= \frac{1(5^{20}-1)}{5-1} = \frac{5^{20}-1}{4}$

51. c D is obviously with G. In F, the activist is imploring the people to vote. Rabri was 'pushed' or forced to opt for botany. In H, droughts and floods are a problem for the country.

52. b In F, when we talk about the oil that can be stored in a vessel, we are basically referring to the physical capacity; while in E, Musharraf's silence speaking volumes denotes size or magnitude. In H, the level of noise made by the protestants kept increasing.

53. a To follow an open door policy is to have a 'free' or unrestrained policy. Hence A is with H. In E the debate was undecided, and hence left open to the public. In F, his honest and straightforward statements left no room for doubt. To open in theatres implies a launch or commencement.

54. d India is the 'best' example of unity in diversity. Nitrogen is the chief ingredient of air. Mittal spent the most part (implying 'size') of his life in a village. 'Prime' as a verb means to prepare or make ready.

55. a In E, there is a striking difference between their points of view. In F, we have to distinguish our wants and needs. In H, she is a complete contrast to her portrait. D is unmistakably with G.

56. c To take French leave is to go without permission.

57. d A person is said to be in a soup when he or she gets into trouble.

58. d To call a spade a spade is to be frank.

59. a To spin a yarn is to tell an untrue story.

60. b 'In the twinkling of an eye' implies suddenly.

61. c DB is a mandatory pair. D explains the areas of expansion in A, and A elucidates the rise in government expenditure mentioned in C.

62. a The first sentence introduces electromagnetic force. Sentence D talks about "it" and is comparing "it" to gravitational force making it the second sentence. Sentence E talks about the two types of electric charges and the genesis of electromagnetic force. Sentence C describes the nature of electric charge and sentence B mentions this in the case of big bodies. Sentence F talks about the significance of the same. This makes choice (a) correct.

63. d Sentence A mentions the fact that this house has no name. The comment made in sentence C explains why. Sentence D further mentions details of the house, and sentence B ends on the statement that they had made it the house for the rest of their lives which is further supported by the comment made in sentence E. The last sentence F presents the writer's comment. This makes choice (d) correct.

64. c Sentence C mentions the origin of a term, and sentence D mentions the fact that it was recognized by an organization. Sentence B mentions one of the opinions about the disease and sentence E mentions the other side of it, especially of Julie Gregory and sentence A describes why in her particular case the documents are present to corroborate it. This makes choice (c) correct.

65. a Out of the options, sentence B starts off by talking about the general status of the "beings" and also the enduring residue of belief. Sentence E talks about one of the outcomes of this belief. Sentence C mentions how Ms. Virtue regards her angels and sentence D quotes her on the subject and sentence A further qualifies her statement made in the prior quote about angels and the material world. This makes choice (a) correct.

66. d Banshee, poltergeist and spirit and synonyms of ghost. Drink is not.

67. b A cygnet is the young one of a swan. Gosling is a young goose. A leveret is a young hare.

68. a Mainstay, cardinal and consequential are synonyms for important or chief.

69. d Diatribe, opprobrium and excoriate refer to excessive criticism. Whereas, platitudes are oft-repeated sayings.

70. c Cloud nine, seventh heaven, and rapture are synonyms of extreme happiness. Sixth sense refers to the power of intuition.

71. b The author makes this point in paragraph 1 and these examples are mentioned in paragraph 2. At the end of the first paragraph, it is clearly mentioned that: "Many show justice……sacrifices". This is best expressed in choice (b). The rest of the options mention rationale that is not mentioned in the paragraph. Thus, choice (b) is correct.

72. c The third paragraph mentions the movie. Statement (c) is incorrect when one looks at the last line in the paragraph: "Only when the …… remains in doubt". This is the correct choice.

73. d This statement is mentioned in the fourth paragraph from the movie *The Ox-Bow Incident*, but it is mentioned with reference to law. Nowhere does this sentence appear with reference to the civil rights movement.

74. d This movie is mentioned in paragraph five and the author mentions how an individual's perseverance leads to justice. Statement (d) is not borne out by the paragraph. In fact the movie is seen to make a case for democracy.

75. a The sixth paragraph talks about this movie and mentions that: "During Cora's trial…..the proceedings", making choice (a) correct. The rest of the choices are not borne out by the paragraph.

76. b This is mentioned in the last paragraph and the author mentions in the last sentence that: "This was the usual …... achieving justice". This makes choice (b) correct.

77. c This issue is tackled in the second paragraph and the author answers by saying that although the general impression is that irreparable damage is caused, in reality, ways have been found to accommodate them. Choice (a) is incorrect; choice (b) mentions the general impression as being correct which is refuted by the author. Choice (c) is the best interpretation of the reality and is correct.

78. c This issue is mentioned in the second paragraph. Choice (a) is incorrect as the unilateral repudiation is clearly mentioned as being intolerable. This makes choice (c) correct. Choices (b) and (d) mention the World Bank as an actor in the proceedings, which is not borne out from the passage.

79. b This is mentioned in the third paragraph and its clear that though debtors are allowed some relief, the lenders do not abandon their claims. Choice (b) is correct. Choice (a) mentions only one of the relief clauses for the debtors and the interference of the international institutions is not mentioned in the paragraph.

80. b This statement is made by the author in the fourth paragraph. The first statement does mention asymmetry which is a cause but it further qualifies this as existing between the first and the third world countries which is not mentioned by the author. The author mentions the moral hazard of the risks not being large enough to discourage unsound lending practices, which is mentioned in choice (b), making it correct.

81. a This statement is made in the second last paragraph and the author mentions this in the context of the relationship between the monetary policy of the countries at the center and the periphery. He mentions that because the countries at the periphery are dependent upon the countries at the center for the monetary policy, which in turn are impacted by domestic considerations, the countries at the periphery are helpless. Choice (a) mentions this and is correct. The rest of the choices are not borne out by the passage.

82. d The author reflects upon this relationship in the first paragraph when he says that: 'But Broadway in the forties was in what might be called a "classical" phase … when there were absolutely definite rules of playwriting whose nonobservance brought failure. … *The Man Who Had All the Luck* was manifestly non-objective in this sense, and therefore "unnatural." Moreover, neither I nor its director, a dear fellow named Joe Fields, really understood its anti-realistic thrust.' This makes choice (d) correct.

83. a The author mentions this in the second paragraph where he talks about how the handicap of his character was brushed off by critics, but a former sports reporter supported it. This makes choice (a) correct.

84. b This paradox is mentioned in the sixth paragraph when the author reflects upon the question "Are you religious?" asked by a critic. While considering his play, the author thinks "If anything …his work", and further "A play's action …... life itself". This is most aptly stated in choice (b) making it the correct one.

85. a This encounter is mentioned in the third and the fourth paragraphs. The comment appears in the fourth paragraph: "You've ……. you've done." Before this, Mr. Anderson comments in the third paragraph "but I sensed … writing tragedy". This makes choice (a) correct.

86. c The first paragraph mentions this change: "The regime … … their own followers or clients". This makes choice (c) correct and the rest of the options are not corroborated by the paragraph.

87. a The two methods are mentioned in the second paragraph where the author explicitly states "In the process…..exploited". This clearly makes choice (a) correct.

88. c The fourth paragraph mentions this viewpoint. The author says that: "Since the 1960s … different communities". This makes choice (c) correct.

89. b This statement appears towards the end of the seventh paragraph and the author clearly mentions "However, elements ……. current situation". This makes choice (b) correct.

90. b This issue is mentioned in the last paragraph: "Whether this was …… not clear". This obviously makes choice (b) correct.

91. c The author makes this point in the first paragraph when he mentions the "sub-propaganda campaign" and explicates upon it. This is the method by which the attention of the audience is attracted using a message which has nothing to do with the actual product. The main objective is to induce the reader into a "receptive" state of mind, which is mentioned in choice (c). The rest of the choices mention points that are not borne out by the passage.

92. b This aspect is mentioned in the second paragraph where the author mentions the use of emotions and the limited set available to the propagandist which are the ones that are already present through social conditioning. This makes choice (b) correct and the rest of the statements present opinions not borne out by this passage.

93. d The instance of Mother's Day and the intention of the florists is mentioned in the second paragraph where the author wants to make a point regarding the power of emotions such as guilt. He mentions that "Florists, for instance …themselves". This rationale extended to the example mentioned in the question makes choice (d) stand out as the best option and therefore the correct one.

94. b The author broaches this topic at the end of the second paragraph where he mentions the power of the emotion of frustration — "But frustration…….pool?". This

demonstrates the use of frustration, which is mentioned in choice (b). This makes choice (b) correct.

95. d The author makes this point in the fourth paragraph and mentions: "Suggestion, although a powerful weapon, is likely to be effective only when … is in line with the audience's already-existing beliefs, or when the suggestion … is relatively superficial and offers no threat whatsoever to the convictions of his audience.". Choice (d) states both the points and is correct. Choice (a) is incorrect as the author does not mention the talent of the propagandist in the context.

96. d The experiment is mentioned in the last paragraph where the author describes how the two records, which were the same, were introduced differently and compared in an introductory talk. Only 4% of the people present recognized the two as its same.
Given in the preceding paragraph, which makes the answer choice (b) as vague. The correct answer is (d)

97. c The author mentions this in the first paragraph where he talks about the open and the hidden levels and the underlying meaning which is understandably hidden: "There is in fact…..details'. This makes choice (c) correct.

98. a The second paragraph delves into this difference and the author mentions that: "And if we agree……pervading society". These lines make it obvious that choice (a) is correct.

99. b The author mentions these in the second paragraph and then explicates: "The field…..they suggest". This makes choice (b) correct.

100. b The author makes this point in paragraph two when he talks about the work of James Carse. In the last line, he mentions: "Without doubt….final one.". This makes choice (b) correct.

101. d In the table only the percentage break-up of different age groups is given. The total number of people frequenting discotheques is not mentioned anywhere. So the number of 'Gen X' for any city cannot be determined.

102. d In each city, percentage of age group of 20-25 is more than the other age groups but year is not given. So the maximum number of people frequenting discotheque cannot be determined**.**

103. b Revenue earned by Delhi Govt. in 2002 is

Rs. $\frac{12000}{8}\times 100 = \text{Rs. } 150000$

104. b $\frac{21}{100}\times 8 = 1.68\%$

$\therefore$ Total percentage = 21 + 1.68 = 22.68%

For questions 105 to 107:
The graph can be understood in the tabular form as below:

Names	2000	2001	2002	2003	Total for 4 years
Sanjay	550	600	650	900	2700
Harshita	700	750	600	850	2900
Preeti	800	850	900	750	3300
Santosh	500	900	950	550	2900

105. b For Sanjay difference more than 100 is between 2002 - 2003.
For Harshita difference more than 100 is between 2001 - 2002 and between 2002 and 2003.
For Preeti difference more than 100 is between 2002 - 2003.
For Santosh difference more than 100 is between 2002 - 2003 and 2000 - 2001.
Therefore total number of times is difference more than 100 is = 6.

106. d Harshita and Santosh both get a total of 2900 which is the second highest after Preeti who gets the highest total of 3300.

107. d It cannot be determined as the scores given are only for top 4 students of the class.

108. b Since coal supplied to industry in 1994-95 = 10.28 million tonnes
$\therefore$ Cement produced (in million tonnes)
$= \frac{10.28}{0.25} = 41.12$

109. d We don't know that all raw materials other than coal were in abundance or not. So, it cannot be determined.

110. a Production cost of 500 kg = Rs. 4250

Contribution of overhead = $\frac{2.5}{100}\times 4250$ = Rs. 106.25

111. a Consumable contributes 5% and overheads 2.5% additional contribution is 2.5% which corresponds to 2.5% of Rs. 8,500 = Rs. 212.50
Note: 100% more than the solution of question 110.

112. b In 1950-51, the percentage of gold coins was

$\left(\frac{40}{1259}\right)\times 100 \simeq 3.17\%$

In 1985 – 86, it become $\frac{246}{23150}\times 100 \approx 1.06\%$

$\therefore$ Hence percentage reduction

$= \frac{3.17-1.06}{3.17}\times 100 = \frac{2}{3}\times 100 \cong 67\%$

113. a In 1980-81, the foreign securities were worth Rs. 2,364 crore.
Since 17 rupee = 1 US dollar, the worth of foreign securities in US dollar terms

$= \frac{2364}{17} \approx 139$ crore US dollar

= US dollar 1.39 billion.

114. b In 1970-71, the total assets were 273 + 3714 + 183 + 52 = 4222 cr, of which rupee securities constituted 3714. If 4222 cr = 360°, then 3714

$= \left[\left(\frac{3714}{4222}\right) \times 360°\right] \simeq \frac{37}{42} \times 360° \simeq 317°$

115. c Area of any such circle (A) will be proportional to square of its radius 'r'. We thus get, $\frac{A_1}{A_2} = \left(\frac{r_1}{r_2}\right)^2$.

From the graph total assets for 1950-51 (A_1)
= 687 + 478 + 40 + 54 = 1259 cr.
And total assets for 1985-86 (A_2)
= 1564 + 21328 + 246 + 12 = 23150 cr

Since $r_2^2 = r_1^2 \times \frac{A_1}{A_2}$

$r_2^2 = (1)^2 \times \frac{23150}{1259} \simeq \frac{23200}{1260}$

$\simeq \frac{580}{32} = 18$ or $r_2 = \sqrt{18}$

$\therefore r_2$ lies between 4 cm and 5 cm

116. a Statement A: Success rate for males

$= \frac{600}{59000} \times 100 = 1.016\%$

Success rate for females = $\frac{150}{15000} \times 100 = 1\%$

$\therefore$ Statement A is true.
Statement B: Success rate for males in 2003

$= \frac{600}{59000} \times 100 = 1.016\%$

Success rate for males in 2004

$= \frac{640}{60000} \times 100 = 1.06\%$

$\therefore$ Statement B is false

117. b Statement A: % absentees among males in 2003

$= \frac{2000}{61000} \times 100 = 3.27\%$

% absentees among males in 2004

$= \frac{3000}{63000} \times 100 = 4.76\%$

$\therefore$ Statement A is false.

Statement B: % absentees among females in 2003

$= \frac{4000}{19000} \times 100 = 21.05\%$

% absentees among females in 2004

$= \frac{5000}{40000} \times 100 = 12.5\%$

$\therefore$ Statement B is true.

118. d Statement A: % female candidate selected

$= \frac{60}{40000} \times 100 = 0.15\%$

% male candidates selected in 2004

$= \frac{128}{63000} \times 100 = 0.203\%$

$\therefore$ Statement A is false.

Statement B:

Males success rate = $\frac{120}{600} \times 100 = 20\%$

Females success rate = $\frac{50}{150} \times 100 = 33.3\%$

$\therefore$ Statement B is false.

119.b Statement A: $\frac{63000 - 40000}{60000 + 35000} \times 100 = 24.21\%$

$\therefore$ Statement A is false.

Statement B: $\frac{120 + 50 + 60 + 128}{450} \times 100 = 79.55\%$

$\therefore$ Statement B is true.

120. a From the given table, we see that United Kingdom gets fifth rank in all four given years.

121. c From the given table, we see that Ireland gets the maximum gain in the rank and Singapore gets the maximum slip in the rank.

122. b The number of countries which have same ranks in 2000 and 2002 is 3, i.e.
Canada (1), United Kingdom (5), South Korea (9).

123. d Growth rate of Germany in the exports from 2000 to 2003.

$= \frac{1618 - 455.9}{455.9} \times 100\% = 254.9\%$

Growth rate of Ireland $\frac{134.4 - 31.3}{31.3} \times 100\% = 325.8\%$

For questions 124 to 127:
Since D got more coins than B and C. So, D has to be in first or second position. But A cannot be in first position. So, D is in first position. A, B and C are in second, third and fourth position respectively.

124. a C ended the race in 4 position.

125. a In 12 participants, B gets 2 coins because D, A, B, C can get 6, 3, 2, 1 or 5, 4, 2, 1 respectively.

126. c If 13 participants took part in the competition and D won 7 coins. So, A won 3 coins, B won 2 coins and C won 1 coin.

127. d If A won 4 coins, then D won 5 coins or 6 coins. So, we cannot decide the number of coins of D.

For questions 128 to 131:
According to given data, we can draw the following eight possibilities:

	1 and 2	3 and 4	5 and 6	7 and 8
A + B + C	3 + 9 + 1	9 + 3 + 1	6 + 5 + 2	5 + 6 + 2
C + D + E	1 + 8 + 4	1 + 8 + 4	2 + 7 + 4	2 + 7 + 4
E + F + G	4 + 7 + 2	4 + 7 + 2	4 + 8 + 1	4 + 8 + 1
G + H + I	2 + 6 + 5 or 2 + 5 + 6	2 + 6 + 5 or 2 + 5 + 6	1 + 9 + 3 or 1 + 3 + 9	1 + 9 + 3 or 1 + 3 + 9

128. c From the table, in each case the value of E is 4.

129. a The sum of C + E + G = 1 + 4 + 2 = 2 + 4 + 1 = 7

130. c A + D + F + I = 3 + 8 + 7 + 6 or 3 + 8 + 7 + 5 or 9 + 8 + 7 + 5 or 9 + 8 + 7 + 6, i.e. 24 or 23 or 29 or 30.
So, the four different sum's are possible.

131. c Check the choice (c), the value of B can be 3, 9, 5 or 6 and the value of C can be 1 or 2.
So, B is never less than C.

For questions 132 to 136:
From the given information, we can say that Chetan, Suraj and Kumar had started the study in Kumar's room. At one given time the maximum number of students in the study room is 4, Rahul had started the study at 11 am and ended at 5.30 am.

132. b

133. c

134. b

135. d We don't know whether Vinay met the other students in canteen or not. So cannot be determined.

136. b From the given information, Srinu spent the least time in the study room.

137. c If a person starts from B, then he can move the following path
$B \to C \to D \to A \to B \to E \to D$.
Similarly, if he start from D, then he can move the following path
$D \to A \to B \to C \to D \to E \to B$.
So, the route starts from B or D.

138. d The following paths can be

$B \to E \to D \to C \to B \to A \to D$

1 2 3 4 5 6 7

Or

$B \to C \to D \to E \to B \to A \to D$

1 2 3 4 5 6 7

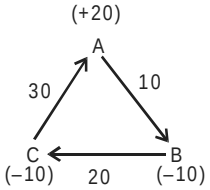
Or

$B \to C \to D \to A \to B \to E \to D$

1 2 3 4 5 6 7

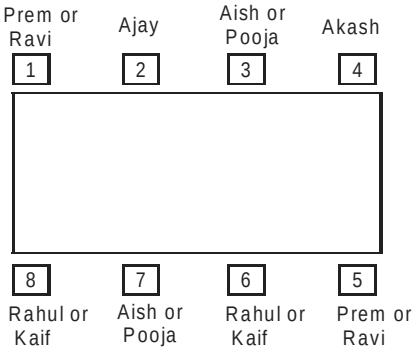
So, city E can be second, fourth or sixth city on the route.

139. c



A gets 20 coins in the process. B looses 10 coins and C looses 10 coins. At the end of the process all have equal coins. So, initially B and C had equal coins.

For questions 140 to 143:
According to given information, we can make the following table.



140. a Ajay occupies seat number 2.

141. c If Rahul and Pooja are on opposite sides, then Pooja can sit only on seat number 3. So, Aish will sit on seat number 7.

142. d Rahul or Kaif can occupy the seat number 8. So, the answer cannot be determined.

143. c Check the choices and see the table.
(a) Ajay and Aish can sit adjacent to each other.
(b) Kaif and Pooja can also sit adjacent to each other.
(c) Ravi and Aish can never sit adjacent to each other.

144. d Nothing is given about the initial expenditure. So, we cannot decide the highest expenditure.

145. d War need not be the cause every time. If at all there is a war, participation decreases but the converse does not always hold. So, we cannot decide.

146. d Cannot be answered even after using both statements.
The ages of the three brothers may be y, y + 3 and y + 6 or it can even be y, y and y + 3. Thus even after using both the statements, we cannot answer the question.

147. a The first statement gives 5 × (4b + 3i) = 4 × (3b + 5i). Using this we can find the ratio of the price of a ball-point pen and an ink pen. So statement I alone is sufficient.
From statement II, we get 6 × (6b + 4i) = 12 × (3b + 2i), which will boil down to 0 = 0. Hence using statement II, we cannot answer the question.

148. a Using statement I, assume x be the yellow card and y be the red card.
x + y = 9 and 3x + 4y = 41.
So x = 2 and y = 7.
Statement II is not needed and nor is it relevant to answer the question. Thus the answer cannot be obtained from statement II alone.

149. c Using both we can measure exactly 1 cm as $L_3 - L_2 - 2L_1 = 1$ cm. Thus any integral multiple of cms can be measured.

150. a Using statement I and assuming the day he made the comment was a Monday, his first statement is true and hence his second statement has to be true. Hence with the assumption we deduce that Nishit speaks truth on Mondays. Assuming the day is not a Monday, his first statement is false and thus his second statement also has to be a lie. Thus he does not speak the truth on a Monday. He speaks the truth on another day of the week, say Tuesday. If the day was other than Tuesday, there is no contradiction and thus both his statements do not give any contradiction whether the day is a Monday or not. Thus we cannot infer anything.
Using statement II and assuming the day is a Monday, his first statement is false and hence his second statement is also false. Thus he does not speak the truth on a Monday and this again is in sync with our assumption. If the day was not a Monday, his first statement is true and thus his second statement also has to be true. But this gives a contradiction as he is speaking a truth on a day other than Monday. Thus the day has to be a Monday and we can infer that he does not speak the truth on a Monday.