

# Unproctored Mock-17 2011

## Answers and Explanations

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1	a	2	d	3	c	4	d	5	a	6	b	7	d	8	b	9	b	10	b
11	c	12	b	13	a	14	d	15	a	16	b	17	b	18	c	19	a	20	d
21	a	22	d	23	c	24	b	25	d	26	b	27	d	28	a	29	d	30	d
31	d	32	a	33	c	34	b	35	b	36	a	37	a	38	c	39	a	40	b
41	d	42	c	43	d	44	b	45	d	46	c	47	c	48	a	49	b	50	d
51	b	52	b	53	c	54	d	55	c	56	d	57	d	58	d	59	a	60	d

1. a Seats won by JNC = 200  
 Seats won by CJP = 130  
 Seats won by CSP = 110  
 Seats won by OCP = 50  
 Seats won by DPI (M) = 250  
 Seats won by DPI = 80  
 Seats won by SJD = 120  
 Seats won by TP = 70
2. d In every region there is atleast one party whose allotted expenditure is more than that of JNC.  
 Also, the total number of seats won by JNC is the highest. Therefore, the party which performs the best is JNC.  
 The total number of seats won by DPI(M) is the least among all the given parties. Also, in every region the expenditure allotted to DPI(M) is the highest. Therefore, the party which performs the worst is DPI(M).
3. c The total number of seats won by all the parties in North, South, East and West is 220, 140, 200 and 250 respectively. It is clear that the expenditure allotted to all the parties in the North and East is the highest and lowest respectively.  
 So, the Return ratio in East and North is the highest and lowest respectively.  
 The total expenditure allotted in the West and in the South is 192 lakhs and 115 lakhs respectively and the Return ratios in the West and in the South is 1.3 and 1.22 respectively.  
 Hence, the region West had the second highest Return ratio.
4. d Given that the total number of draws as a percentage of the total number of matches played in the tournament is 22 percentage points less than the number of wins/losses as a percentage of the total number of matches played in the tournament.  
 Therefore, the number of draws as a percentage of total number of matches =  $\left(100 - \frac{(100 + 22)}{2}\right) = 39\%$   
 To minimise the number of wins/losses as a percentage of the total number of matches in which 2 goals were scored, we need to maximise the number of draws as a percentage of total number of such matches.  
 For this we have to assume that no match in which a total of 4 and 6 goals were scored ended in a draw. However the matches with score line (0 – 0) must have been a draw.  
 Hence, out of the total matches, a maximum of 29% matches had two goals in them and ended as a draw.  
 The minimum number of wins/losses as a percentage of total number of matches in which 2 goals were scored-  

$$= \frac{0.36 - 0.29}{0.36} \times 100\%$$
  
 Required percentage =  $\frac{175}{9}\%$
5. a Given that the total number of draws as a percentage of the total number of matches played in the tournament is 22 percentage points less than the number of wins/losses as a percentage of the total number of matches played in the tournament.  
 Therefore, the number of draws as a percentage of total number of matches =  $\left(100 - \frac{(100 + 22)}{2}\right) = 39\%$   
 Given that the total number of matches played in the tournament is 200.

Therefore, the number of matches in which 0, 1, 2, 3, 4, 5 and 6 goals were scored is 20, 10, 72, 36, 30, 16 and 16 respectively.

Also, the total number of matches that ended in a draw is 39% of 200 = 78.

Also, it is given that all the matches in which 6 goals were scored ended in a win/loss, therefore out of the matches in which either a total of 2 goals or 4 goals were scored, there must be  $78 - 20 = 58$  matches that ended in a draw.

So, in order to maximise the number of matches that resulted in a win/loss and in which a total of 2 goals were scored, we need to minimise the number of draws.

So, we have to assume that all the matches in which a total of 4 goals were scored ended in a draw.

Required Answer =  $72 - (58 - 30) = 44$ .

6. b Given that the total number of draws as a percentage of the total number of matches played in the tournament is 22 percentage points less than the number of wins/losses as a percentage of the total number of matches played in the tournament.

Therefore, the number of draws as a percentage of total

$$\text{number of matches} = \left(100 - \frac{(100 + 22)}{2}\right) = 39\%$$

The number of matches in which only one team scored goal(s) must have one or the other of the score lines (1 – 0), (2 – 0) and (5 – 0).

So, the number of goals scored in such matches is either 1 or 2 or 5.

Also, there must be atleast  $(39 - 10 - 15 - 8) = 6\%$  of the matches in which 2 goals were scored and it resulted in a draw.

Therefore, maximum possible number of matches in which only one team scored goal(s) is  $(5 + 36 - 6 + 8) = 43\%$  of the total number of matches played in the tournament.

7. d Sum of the ages of the residents of the group is  $10 \times 30 = 300$ .  
 Let, the age of Ramdhari be equal to 'x' years.

Therefore,  $x + 28.5 \times 9 = 300$ .

So,  $x = 300 - 28.5 \times 9 = 43.5$  years.

Let the sum of the ages of the two residents, who now joined the group be 'y' years.

Therefore,  $y + 28.5 \times 9 = 30 \times 11$ .

So,  $y = 73.5$ .

So, the sum of the maximum possible age of any two residents from two different houses must be greater than 73.5.

8. b Let the ages of the residents arranged be  $a - 8d$ ,  $a - 7d$ ,  $a - 6d$ ,  $a - 5d$ ,.....  $a + 7d$  and  $a + 8d$  respectively.

$$\therefore 40 = \frac{(a - 8d + a + 8d)}{2} \Rightarrow a = 40$$

Sum of the ages of the 3<sup>rd</sup>, 7<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup> and the 15<sup>th</sup> resident is equal to  $a - 6d + a - 2d + a + 2d + a + 6d = 5a$ .

Average age of the residents whose right to reside has been terminated by the president of the residential colony is 'a'.

Since,  $a = 40$ , the average age of the remaining residents is also equal to 40.

9. b Sum of the ages of the residents of the group is  $10 \times 30 = 300$ .  
 Let, the age of Ramdhari be equal to 'x' years.

Therefore,  $x + 28.5 \times 9 = 300$ .

So,  $x = 300 - 28.5 \times 9 = 43.5$  years.

Therefore, he must belong to house H(7).

10. b **From statement I:**  
Nothing can be inferred about the weight of Seema.

**From Statement II:**

Since, the average or total weight of the students is not known, so a unique solution cannot be arrived at.

**Using both I and II:**

Average wt. of students (in kg)	Weight of Seema (in kg)
26	$900 - 26 \times 29 = \text{Even number}$
27	$900 - 27 \times 29 = 117$
28	$900 - 28 \times 29 = \text{Even number}$
29	$900 - 29 \times 29 = 59 \text{ (Prime number)}$
30	$900 - 29 \times 30 = \text{Even number}$

Hence, weight of Seema is 59 kg.

11. c **Using statement I:**  
The unit's digit of  $N + 2$  has to be either 3 or 7. Hence,  $N$  can be either 1 or 5.

**Using statement II:**

The unit's digit of  $(N - 2)^2$  has to be either 9 or 1. So,  $N - 2$  can be either of 1, 3, 5 or 9.

**Combining both I and II:**

Let us assume the unit's digit to be 5. It satisfies both I and II. Putting unit's digit of  $N = 1$ , also yields the same result. Therefore, an unique answer cannot be arrived at.

12. b Let Amit has 'a' rupees and Ramesh has 'b' rupees

**From statement I:**

If Amit gives 'c' rupees to Ramesh then,  
 $b + c = 3b = 24$   
 $\Rightarrow b = 8, c = 16$   
 $\Rightarrow$  Value of 'a' is unknown  
Hence, statement I is insufficient.

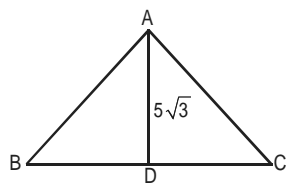
**From statement II:**

$b + 16 = 1.5a$   
Hence statement II is insufficient.

**Combining both I and II:**

$a = 16$

13. a **From statement I:**



If  $AB = 2x$ ,  $BD = x$  and  $BC = 2x$ . Also assume that  $AC = y$ .  
 $AB^2 + AC^2 = 2(AD^2 + BD^2)$   
 $4x^2 + y^2 = 2 \times (75 + x^2)$   
Only possible integral solution is  $x = 5$  and  $y = 10$   
Statement I alone is sufficient to answer the question.

**From statement II:**

$AB \cdot AC = 100$   
Statement II alone is not sufficient

14. d It is already known that Pikalu did not pass out from BHU or DU.  
From additional information (ii) and (iv), it is clear that he must have passed out from either JNU or PU.

It is also given that Pikalu has installed Slackware on his desktop, but in additional information (v), it is mentioned that one who passed out from JNU has installed Novell, so he cannot be Pikalu.  
So, Pikalu passed out from PU and stayed in Mumbai.

Since, Gandhi, Pikalu and Mishra had passed out from BHU, PU and DU respectively, either Dugati or Ubuntu could have passed out from JNU. From additional information (v), it is clear that Dugati had passed out from JNU and had installed Novell.

From additional information (iv), Gandhi must have installed Debian.

So, Mishra must have installed Redhat.

One or the other of Ubuntu, Mishra and Gandhi could have stayed in one or the other of the three cities Bangalore, Pune and Kolkata.

The whole information can be tabulated as below

Persons	University	Operating System	City
Dugati	JNU	Novell	Hyderabad
Gandhi	BHU	Debian	Kolkata/Bangalore/Pune
Mishra	DU	Redhat	Kolkata/Bangalore/Pune
Pikalu	PU	Slackware	Mumbai
Ubuntu	HCU	Fedora	Kolkata/Bangalore/Pune

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Pikalu	PU	Slackware	Mumbai
Ubuntu	HCU	Fedora	Kolkata/Bangalore/ Pune

From the table it can be concluded that all the statements except statement B, C and D are possible.  
Statement B is not possible as Mishra has installed Redhat.  
Statement C is not possible as Gandhi has installed Debian.  
Statement D is not possible as Dugati has installed Novell.  
Hence, only two statements are possible.

16. b It is already known that Pikalu did not pass out from BHU or DU.  
From additional information (ii) and (iv), it is clear that he must have passed out from either JNU or PU.

It is also given that Pikalu has installed Slackware on his desktop, but in additional information (v), it is mentioned that one who passed out from JNU has installed Novell, so he cannot be Pikalu.  
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17. b As per the data given in the question there are total two categories of taxpayers Corporate and Individual, which contribute to the Total I-Tax collections.

Year	Budgeted I-Tax collections(In Rs. crore)			Actual I-Tax collections(In Rs. crore)		
	Total	Corporate	Individual = (Total - Corporate)	Total	Corporate	Individual = (Total - Corporate)
2004-05	275	235	40	285	240	45
2005-06	345	300	45	335	307	28
2006-07	395	340	55	405	335	70
2007-08	520	425	95	540	430	110
2008-09	730	560	170	715	500	215

Growth of Total I-Tax collections (Actual) in the year 2008-09 over the previous year

$$= 715 - 540 = \text{Rs. } 175 \text{ crores}$$

Total I-Tax collections (Budgeted) in the year 2006-07

$$= \text{Rs. } 395 \text{ crores}$$

$$\Rightarrow \text{Total I-Tax collections (Budgeted) in the year 2007-08 would have been} = 395 + 175 = \text{Rs. } 570 \text{ crores}$$

$$\Rightarrow \text{Individual I-Tax collections (Budgeted) for the year 2007-08 would have been} = (570 - 425) = \text{Rs. } 145 \text{ crores}$$

18. c For the year 2005-06 and 2008-09

Efficacy Ratio			
	Total	Corporate	Individual
2004-05	0.96	0.98	0.89
2005-06	<b>1.03</b>	<b>0.98</b>	<b>1.5</b>
2006-07	0.98	1.01	0.79
2007-08	0.96	0.99	0.86
2008-09	<b>1.02</b>	<b>1.12</b>	<b>0.79</b>

**Alternate method:**

**2004 - 05:** By visual inspection for both "Total I-Tax" and "Corporate I-Tax" efficacy ratio is less than one, hence we need not check for "Individual I-Tax".

**2005 - 06:** Similarly, efficacy ratio of "Total I-Tax" collections is more than one but for "Corporate I-Tax" it is less than one, calculating for "Individual I-Tax" it comes out to be more than one.

**2006 - 07:** Similarly efficacy ratio of "Corporate I-Tax" is more than one but that of "Total I-Tax" collection is less than one. The same value for "Individual I-Tax" comes out to be less than one.

**2007 - 08:** By visual inspection for both "Total I-Tax" and "Corporate I-Tax" efficacy ratio is less than one, hence we need not check for "Individual I-Tax".

**2008 - 09:** Similarly by visual inspection for both "Total I-Tax" and "Corporate I-Tax", efficacy ratio is greater than one.

19. a For the year 2005-06 in the **Corporate I-Tax**

	Total (Budgeted)	% Grow th	Total (Actual)	% Grow th
2004-05	275	-	285	-
2005-06	345	25.5	335	17.5
2006-07	395	14.5	405	20.9
2007-08	520	31.6	540	33.3
2008-09	730	40.4	715	32.4

	Corporate (Budgeted)	% Grow th	Corporate (Actual)	% Grow th
2004-05	235	-	240	-
<b>2005-06</b>	<b>300</b>	<b>27.7</b>	<b>307</b>	<b>27.9</b>
2006-07	340	13.3	335	9.1
2007-08	425	25	430	28.4
2008-09	560	31.8	500	16.3

20. d I. Percentage contribution of Corporate I-Tax to the

$$\text{Total I-Tax in the year 2005-06} = \left( \frac{307}{335} \right) \times 100 = 91.6\%$$

$$\text{In the year 2008-09} = \left( \frac{500}{715} \right) \times 100 = 70\%$$

II. Simple Annual Growth Rate

$$= \frac{(215 - 45)}{45} \times 100 \times \left( \frac{1}{4} \right) = 94.4\%$$

III. This is also true as evident from the table provided.

21. a The unit's digit can be filled in 3 ways (3, 5 or 7) and once this is done the thousand's digit can be filled in 2 ways. The hundred's and the ten's digit can be filled up with remaining digits in  $3 \times 2 = 6$  ways.  
Total number of ways =  $3 \times 2 \times 6 = 36$ .  
Hence, total such four digit number greater than 3009 = 36.

22. d Given that the warfare designer has to place 5 cannons instead of 6.  
So, there has to be one cannon placed in each row.  
It is already known that there is one cannon placed in each of the squares A1 and C3.  
To place one cannon in row B, there is only one possibility, i.e. it is to be placed in the square B5.  
The total number of ways in which a cannon can be placed in each of the 2 rows D and E =  $4 \times 4 = 16$ .  
So, total number of ways is 16.

23. c The last three digits of any number is same as the remainder when the number is divided by 1000.

$$\frac{45^{36}}{1000} = \frac{5^{33} \times 9^{36}}{8}$$

The remainder when  $9^{36}$  is divided by 8 will be 1 as  $9^{36} = (8 + 1)^{36}$

$$\frac{5^{33}}{8} = \frac{5 \times (25)^{16}}{8} = \frac{5 \times (24 + 1)^{16}}{8}$$

So, the remainder when  $5^{33}$  is divided by 8 will be 5.  
So, the remainder when  $45^{36}$  is divided by 1000 will be  $125 \times 5 \times 1 = 625$ .  
The required digit is 6.

24. b Expansion of  $(x + y)^{100} + (x - y)^{100}$   
 $= ({}^{100}C_0 x^{100} y^0 + {}^{100}C_1 x^{99} y^1 + \dots + {}^{100}C_{100} x^0 y^{100}) +$   
 $({}^{100}C_0 x^{100} (-y)^0 + {}^{100}C_1 x^{99} (-y)^1 + {}^{100}C_1 x^{98} (-y)^2 + \dots +$

$${}^{100}C_{100} x^0 (-y)^{100})$$

Clearly, all the terms containing  $(-y)$ ,  $(-y)^3 \dots (-y)^{99}$  will get cancelled.

$$\Rightarrow (x + y)^{100} + (x - y)^{100} = 2[{}^{100}C_0 x^{100} + {}^{100}C_2 x^{98} y^2 \dots + {}^{100}C_{100}]$$

All terms in the expansion of  $(x + y)^{100} + (x - y)^{100}$  contain only non-odd powers of 'x'

$$\Rightarrow \text{Sum of the coefficients} = (1 + 1)^{100} + (1 - 1)^{100} = 2^{100}.$$

25. d  $\frac{154}{125} = 1.232$

$\Rightarrow$  Net change is (+23.2%)

Let us check by options:

**For 20%**

The four successive percentage changes could be one or other of (5, 10, 20), (-5, 10, 20), (5, -10, 20) and (5, 10, -20). None of the above combinations gives a net change of 23.2%.

**For 8%**

Even if we take all the percentage changes (2, 4, 8) as positive, the net percentage change would be less than 14.56%.

**For 200%**

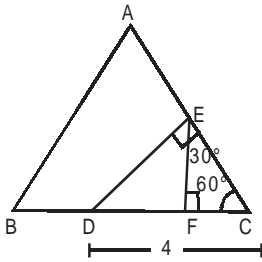
The three successive absolute percentage changes are (50, 100, 200). For any combination of the percentage changes, the net change cannot be equal to 23.2%.

**For 40%**

The three successive absolute percentage changes are (10, 20, 40)

If we take the successive percentage changes as (10, -20, 40), then the net increase is 23.2%.

26. b



Given that  $BC = 6$  cm and  $BD : BC = 1 : 3$ .

So,  $DC = 4$  cm and  $\angle ECF = 60^\circ$

In  $\triangle EFC$ ,  $\angle ECF = 60^\circ$ ,

So,  $\angle FEC = 30^\circ$

In  $\triangle DCE$ ,  $EC = DC \cos 60^\circ = 2$  cm

$FC = EC \cos 60^\circ = 1$  cm

and  $EF = \sqrt{2^2 - 1^2} = \sqrt{3}$  cm

$\therefore$  Area of  $\triangle EFC = \frac{1}{2} \times \sqrt{3} \times 1 = \frac{\sqrt{3}}{2}$  sq. cm.

27. d  $f(x, 10) = a(x - 10)^2 + b(x - 10) + c$   
Given that the roots of the equation  $ax^2 + bx + c = 0$  are 2 and 3.

Therefore, the roots of the equation  $f(x, 10) = 0$  will be  $10 + 2$  and  $10 + 3$ , i.e. 12 and 13.

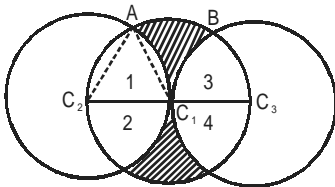
Therefore,  $f(x, 10) = 0$  will attain its minimum value at  $\frac{12+13}{2} = 12.5$ .

28. a The roots of the equation  $c(x - 100)^2 + b(x - 100) + a = 0$  will be the reciprocal of the roots of the equation  $a(x - 100)^2 + b(x - 100) + c = 0$ , since the coefficient of  $(x - 100)^2$  are interchanged with the constant term.

So, the roots of the equation  $cx^2 + bx + a = 0$  will be  $\frac{1}{2}$  and  $\frac{1}{3}$ .

So, the roots of the equation  $c(x - 100)^2 + b(x - 100) + a = 0$  will be  $\frac{1}{2} + 100$  and  $\frac{1}{3} + 100$ .

29. d



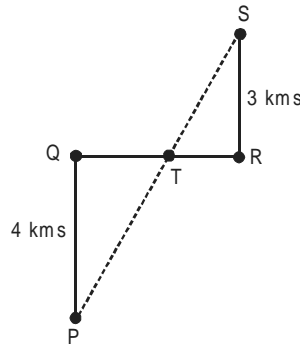
Let us join the three centres by straight line  $C_2C_1C_3$ .  
 $A$  is the point of intersection of the circles with centre  $C_2$  and  $C_1$ .

As  $C_1C_2 = C_1A = C_2A = r$ ,  $\triangle C_1C_2A$  is an equilateral triangle  
Area of shaded region =  $\pi r^2 - \text{area of region } (1 + 2 + 3 + 4)$

$$= \pi r^2 - 4 \times \left[ \left( \frac{\pi r^2}{6} - \frac{\sqrt{3}}{4} r^2 \right) + \left( \frac{\pi r^2}{6} \right) \right] = \pi r^2 - 4 \times \frac{\pi r^2}{3} + \sqrt{3} r^2$$

$$= \sqrt{3} r^2 - \frac{\pi}{3} r^2$$

30. d



Let the line segment  $PS$  meet  $QR$  at the point  $T$ .

$$\triangle PQT \sim \triangle SRT \Rightarrow \frac{PT}{TS} = \frac{4}{3} \Rightarrow PT = 5 \text{ km and } TS = 3.75 \text{ km}$$

$$\text{Therefore } QT = \sqrt{PT^2 - PQ^2} = 3 \text{ km}$$

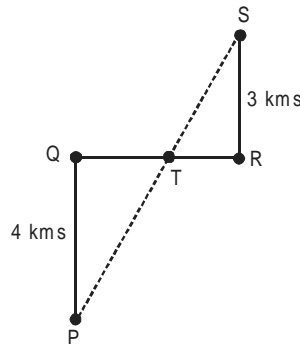
$$\Rightarrow TR = \frac{3}{4} \times 3 = 2.25 \text{ km}$$

Let, 'S' kmph be the speed at which  $M$  and  $N$  walk.

$$\therefore \frac{PT + QR + RS}{S} = \frac{PT + TS}{S} + \frac{1}{4}$$

$$\frac{(4 + 3 + 2.25 + 3)}{S} = \frac{5 + 3.75}{S} + \frac{1}{4} \Rightarrow S = 14$$

31. d



Let the line segment  $PS$  meet  $QR$  at the point  $T$ .

At  $t = 30$  minutes  $M$  has covered 7 km. That means he is at point  $T$ .

Similarly at  $t = 30$  minutes,  $N$  has moved for only 15 minutes and covered a distance of 3.5 km along the line  $PT$ .

So the distance between them is  $(5 - 3.5) = 1.5$  km

32. a Given that  $x^2 + y^2 + z^2 = 3125$

**Case I:**  $y = 51$

$$x^2 + z^2 = 524, \text{ therefore } 1 \leq z \leq 22$$

For every possible value of 'z', 'x' can take 2 values.

$$\Rightarrow \text{Number of solutions} = 1 \times 22 \times 2 = 44.$$

**Case II:**  $y = 50$

$$x^2 + z^2 = 625, \text{ therefore } 1 \leq z \leq 25$$

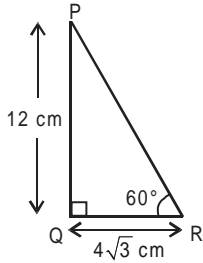
For  $z = 25$ , 'x' can take only one value, i.e.  $x = 0$

$$\text{Number of solutions} = 1 \times 25 \times 2 - 1 = 49$$

$$\text{Total number of solutions} = 44 + 49 = 93$$

33. c From the given figure,  
 $f(x) = x \dots (i)$   
 $\frac{x}{k} + \frac{g(x)}{k} = 1$   
 $x = k - g(x) \dots (ii)$   
 Combining (i) and (ii), we get  $g(x) = k - f(x)$

34. b



Since, the ratio of length of PQ to QR is  $\sqrt{3}$  and the measure of angle PRQ is 60 degrees, therefore PQR is a right angled triangle right angled at Q.

Let the inradius and the circumradius of the triangle be 'r' and 'R' respectively.

$$r = \frac{\Delta}{s} = \frac{\left(\frac{1}{2} \times PQ \times QR\right)}{\frac{1}{2}(PQ + QR + PR)} = \frac{4\sqrt{3}}{\sqrt{3} + 1},$$

where 's' is the semi-perimeter of the triangle.

$$\text{Also, } R = \frac{PR}{2} = 4\sqrt{3} \Rightarrow \frac{r}{R} = \frac{1}{\sqrt{3} + 1}$$

35. b In base 2, 10 means 2 and in base 3, 10 means 3.  
 Similarly in base 26, 10 means 26.  
 In base 10, 10 is obtained by multiplying 2 and 5.  
 Similarly in base 26, it is obtained by multiplying 2 and 13.

To find the number of zeroes in base 26, we need to see the number of 2's and 13's in 2146!. Since, number of 2's is much more than 13's, so we count number of 13's, which comes out to be

$$\left[ \frac{2146}{13} \right] + \left[ \frac{2146}{13^2} \right] = 165 + 12 = 177$$

36. a Initially, the students had a total of  $15xy$  pencils with them, where  $xy = 120$ .  
 Let, the total number of pencils given to the students by Rajesh be 'J' and the total number of pencils given by the students to Ramesh be 'M'.  
 $\therefore J = (y + 2y + \dots + xy)$  and  $M = (x + 2x + \dots + yx)$   
 $\Rightarrow J = y(1 + 2 + \dots + x)$  and  $M = x(1 + 2 + \dots + y)$   
 $\Rightarrow J = xy \left( \frac{x+1}{2} \right)$  and  $M = xy \left( \frac{y+1}{2} \right)$   
 Given that  $15xy + xy \left( \frac{x+1}{2} \right) - xy \left( \frac{y+1}{2} \right) = 16xy$  and  $xy = 120$   
 $\Rightarrow \frac{xy}{2}(30 + x - y) = 16xy \Rightarrow x - y = 2$   
 Therefore, the values of 'x' and 'y' will be 12 and 10 respectively.  
 $\therefore J = 120 \left( \frac{12+1}{2} \right) = 780$  and  $M = 120 \left( \frac{10+1}{2} \right) = 660$

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 Let, the total number of pencils given to the students by Rajesh be 'J' and the total number of pencils given by the students to Ramesh be 'M'.  
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$$\Rightarrow J = xy \left( \frac{x+1}{2} \right) \text{ and } M = xy \left( \frac{y+1}{2} \right)$$

$$\text{Given that } 15xy + xy \left( \frac{x+1}{2} \right) - xy \left( \frac{y+1}{2} \right) = 16xy \text{ and } xy = 120$$

$$\Rightarrow \frac{xy}{2}(30 + x - y) = 16xy \Rightarrow x - y = 2$$

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$$\therefore J = 120 \left( \frac{12+1}{2} \right) = 780 \text{ and } M = 120 \left( \frac{10+1}{2} \right) = 660$$

38. c  $f(x) = x^3 - \beta x^2 - \frac{\alpha}{2}x - \gamma$

Also, the roots of the equation  $f(x) = 0$  are  $\alpha, \beta$  and  $\gamma$ .

$$\text{So, } \alpha + \beta + \gamma = \beta \Rightarrow \alpha + \gamma = 0 \dots (i)$$

$$\text{Also, } -\frac{\alpha}{2} = \alpha\beta + \alpha\gamma + \beta\gamma \Rightarrow -\frac{\alpha}{2} = \beta(\alpha + \gamma) + 2\gamma$$

$$\Rightarrow -\frac{\alpha}{2} = \beta \times 0 + \alpha\gamma \Rightarrow -\frac{\alpha}{2} = \alpha\gamma$$

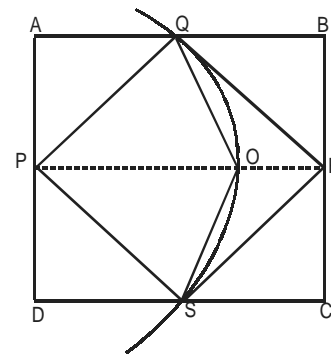
$$\Rightarrow \gamma = -\frac{1}{2}, \Rightarrow \alpha = \frac{1}{2} \dots (ii)$$

$$\text{And } -\alpha\beta\gamma = -\gamma$$

$$\alpha\beta = 1, \Rightarrow \beta = 2$$

$$\Rightarrow f(3) = (3-2) \left( 3 - \frac{1}{2} \right) \left( 3 + \frac{1}{2} \right) = \frac{35}{4}$$

39. a Consider the following diagram



Since,  $AQ = AP = DP = DS$ , therefore

$$\angle AQP = \angle APQ = \angle DPS = \angle DSP = 45^\circ$$

By the symmetry of the figure, we can conclude that triangle PQO and triangle PSO are congruent.

$$\therefore \angle POS = \frac{1}{2} \angle QOS = \frac{1}{2} \left( 180^\circ - \frac{1}{2} \angle QPS \right) = \frac{1}{2} (180^\circ - 45^\circ) = 67.5^\circ$$

$$\therefore \angle OSR = 180^\circ - (\angle SOR + \angle ORS)$$

$$\Rightarrow \angle OSR = 180^\circ - (180^\circ - \angle POS + 45^\circ) = 22.5^\circ$$

$$40. b \quad T_n = \frac{n-1}{n!} = \frac{1}{(n-1)!} - \frac{1}{n!} \text{ for } n \geq 4$$

$$\therefore S_\infty = \frac{1}{3!} - \frac{1}{4!} + \frac{1}{4!} - \frac{1}{5!} + \frac{1}{5!} - \frac{1}{6!} + \dots$$

Therefore, the sum of infinite terms of the series is  $\frac{1}{6}$ .

41. d The answer is option (d), 'A & B'. Part C should be '...he who claims to be talented'. 'to claim talent' is very ambiguous. It can convey the inappropriate meaning of claiming for talent. Part D contains an error of subject-Verb agreement. Since the subject is the singular 'he', it should have been 'and still has nothing but scorn for'. Part E seems all right at the outset but a closer look would reveal that this part is a continuation of part C, 'What are we to think of he who...'. This is clearly a question. Therefore, part E should have concluded with a note of interrogation. It should use a question mark instead of a full stop.
42. c The sentence highlights the Westerner's confusion in understanding Iran's political system. The first blank invites a term opposite to unhappiness since the author wants to bring forth a contrasting term which is hinted at by the use of the phrase 'by turns'. On the basis of this we can eliminate option (a). If we closely scrutinize option (b) then we would realize that it is irrelevant as 'dotty' means crazy or eccentric. Now we are left with two options (c) and (d) as both of them have positive choices to fill in the first blank. However, on close scrutiny of the tone of the sentence we can discard (c) on the basis of the strong tone of the word 'repulsive' as it goes against the tone and theme of the sentence. Since the sentence talks about the confusion in the Westerner's mind, 'maddening' fits appropriately, making (c) the correct answer choice.
43. d 'Zealots' in option (d) means fanatics, hence it suitably fills in the first blank; 'smithereens', which means pieces carries the essence of the sentence as 'idols' which would be struck with hammers would break into pieces. Hence option (d) forms the appropriate answer choice. In option (a), even if consider 'warriors' to suit the first blank, 'cinders' which means partly burnt like coal would not fit in the second blank, thus rendering this option incorrect. Similarly in option (b) 'tatters', which means a torn or hanging piece of cloth does not fit in the second blank. In option (c) 'frays', which means an argument is out of context.
44. b Option (a) cannot be inferred from the passage. Infact, it is a distorted statement-the author, in the passage, makes a statement about the lack of the conclusive data with regards to 'theories of CAM' and not 'CAM' as such. Option (c) is narrow in its approach. The author mentions that the post-modernization thesis has been popular among some CAM sociologists as an explanation for the increased presence of CAM, in the second paragraph. However, the author does not confine his discussions to only this thesis. Option (d) is not suggested by the author. Option (b) is correct- the author is just describing the theoretical framework used by sociologists to justify the preference for CAM.

45. d The characteristic of the post-modernization thesis is that individual subjective knowledge is informing the existing medical practices. The characteristic of reflexivity is that there is a collective skepticism against the prevalent scientific practices. Both are active – but one informs individually and the other rejects collectively. Acceptance does not characterize the post-modernization thesis. Options (a), (b) and (c) do not bring out the difference. Option (d) is correct as the post modernization thesis is characterized by 'subjectivity' and the reflexivity is characterized by 'collective skepticism'.
46. c The passage is very structured in its approach. Note the line in the first paragraph- "with numerous attempts made to link CAM use to: a societal shift to 'post-modernity'; processes of reflexive modernization; and the emergence of new forms of 'selfhood'". Post modernity and reflexive modernization have been covered in the 2<sup>nd</sup> and 3<sup>rd</sup> paras. So, 'linking CAM use to new forms of selfhood' is the most likely topic for the 4th para. Options (a) and (b) would have been true if the passage structure had not been so rigid. The author does not seem to be interested in giving any examples- he is just not descriptive in his approach. Option (d) is a lacuna, hence furnishing empirical data would be a very bleak possibility.
47. c The paragraph is descriptive and not biased towards any particular side. It is merely informative and not opinionated or subjective. Option (a) is not extending the last line which talks of 'means of production'. Option (b) slips back to an earlier point and gets repetitive. Option (d) talks of capitalism suddenly and is also opinionated and not factual.
48. a The answer is option (a) 'A,C,D&E'. Part B contains an unnecessary tense shift. It should have been 'very...that she started asking him...'. The whole question is in the past tense and therefore this part should also be in the past tense. However, this concept does not apply to part E. 'is something that can cause one to lose one's way', which is correctly in the simple present tense as it is a universal truth.
49. b The opening lines discuss the main aspects of 20<sup>th</sup> century philosophical thinking which according to the author had two main parts. The author does not mention any other aspect of the thought process. Here analytical is close to questioning ; Option (a) is incorrect as it was the reason for the origin of the movement, Options (c) & (d) are ongoing aspects of both movements.
50. d The passage states that the problem of objectivity is created by the assumption that "consciousness in taking something as object is "creative" of a boundary which cannot be crossed by consciousness", making one deduce that this boundary creation leads to subjectivity. Options (a), (b) and (c) are incorrect because they are not alluded to with respect to the problem per se'.
51. b The paragraph mentions the integration of rules onto ontology, this reference alludes to the break in the logical structure of things. In simple words insertion of rules/imperatives makes it difficult to understand how things are logically integrated as a whole. Option (a) states a fact. It is directly given and hence not an implication, Options (c) and (d) are aspects of the principle which are again given.



52. b The sentence talks about the negative aspects of the world economy in the 1970s, particularly in the United States. The tone of the sentence is descriptive highlighting the negative aspects. Option (b) aptly fills in both the blanks. The sentence talks of high oil prices and devastating famines. Options (a), (c) and (d) can be eliminated on the basis of the option provided to fill in the first blank as 'plummeting', 'precipitating' and 'stable' oil prices would not be a part of the economic crisis.
53. c The answer is option (c), 'A, B, C & D'. Part E has an error of subject-verb agreement. The subject here is 'So many', which is plural and should have been 'Never have so many...' instead of 'Never has so many.' Read this sentence like 'So many have never owed so much to so few', and one would get it in a jiffy!
54. d 'Banter' is playful ridicule/teasing, 'saunter' is a leisurely walk; 'groaned' means howl in pain, 'growled' is the low, guttural, menacing sound made by an animal like a dog; 'suite' is an apartment room, 'suit' is a formal wear; 'circumspect' is careful, 'circumscribe' is to put a boundary/restrict; 'advise' is a verb, 'advice' is a noun and is apt here.
55. c 'Discrete' means separate, 'discreet' means prudent; 'Voracious reader'- means active, interested or a voluminous reader, 'loquacious'- means talkative. 'Fearsome' means causing fear, 'fearful' in this context means afraid or full of fear; You 'approach' someone for something, you 'broach-open' a topic with someone; 'foreword' is a short page of comments about the book, 'forward' which means ahead is incorrect here. Thus options (c) is correct.
56. d The argument revolves around highlighting the dilapidated state of Kolkata and the reasons for such. The argument is chronological and descriptive in nature. Keeping that in view, option (d) sums up the points mentioned in the argument, hence it aptly substantiates as the last line of the argument. (a) is unrelated to the discussion in the argument; it can be eliminated as a very specific answer choice to some other attribute of Kolkata, that is not mentioned in the argument. (b) although related to the argument, hints at a positive change; therefore, it would come after (d). (c) Although the argument mentions Mother Teresa, but on the whole it speaks about the grim state of affairs in Kolkata, which renders (c) as an incorrect option. Moreover (c) is too general a statement and the opinion of an individual which finds no hint in the discussion.
57. d 'Sledge' is a vehicle of various forms, mounted on runners and often drawn by draft animals. 'Hedge' is a row of bushes. 'Empathy' is a quality of compassion which can be found in people, but you feel 'sympathy' for someone. 'Salubrious' is healthy, 'lugubrious' is mournful; 'surged' means full of, 'purged' means emptied of something-usually pent up emotions; 'imminent' means certain, 'eminent' means prominent.
58. d The passage uses the Dolly incident as an example to discuss that cloning is possible. It ends with -what should be our reaction to this fact?. So option (a) is a part of the passage. Option (b) has not been touched upon much in the passage-only in a small way in the last paragraph. Option (c) is again a small part of the passage. Option (d) is what the author is primarily trying to say in the passage. Throughout the passage, the author hints at the acceptance of cloning as a positive development.
59. a The author mentions that bearing children for ill siblings and cloning are ethically similar- because both-children and clones- can be produced with a similar intention of giving a spare supply of body elements to siblings making option (a) correct. Option (b), is not seen to be comparable.
60. d The last paragraph describes cloning as an advantage and the author uses the words 'gigantic leap' earlier. Hence the passage may well be seen in the light of an advance for the process of cloning. Option (b) is a point that is not discussed in the passage. Option (c) is exaggerated.