

JMET 2007

Answers and Explanations

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

1. A Incomprehensive is closest to inexplicable -which means means one cannot explain it - hence cannot understand it.
2. B The tertiary meaning of the word is 'to cause to grind'.
3. A 'Searching for' would be the correct option.
4. B By subject-verb agreement "flower" will take 'were' instead of "was".
5. B The passage comes on to 'accomodating change' towards the end. (a) is too narrow and (d) too broad. (c) can be ruled out as "obsolescence" is not really discussed.
6. B Refer to line 1, para 4.
7. D Ref. last para - where the author talks about change over the past 2 centuries and not just from the 60's & 70's.
8. D Only "flourish" fits in the second blank and "culture of tolerance" seems logical.
9. B We would believe" someone whom we consider "honest".
10. C Stigma means a blot on someone's reputation and hence opposite to "honour".
11. A "Tyro" - "beginner" is opposite to expert.
12. C Many of the CEOs who were intuitive did not realize that they had intuitive powers. So stepping out of time boundaries can make us intuitive but it may not be the only way or the necessary condition to make one intuitive.
13. B The passage is talking about the role of intuition in decision making as a C.E.O. and also as a part of our daily life. Hence b.
14. C Ref. para 1 & 2 where the answer can be easily gauged.
15. D "Buccaneer" is synonymous to "Pirate". "Gyrate" and "Pirouette" are dance movements.
16. C Commune is commonly used when we communicate with God or even people. Commute means to travel. Hence choice C.
17. A "Provincialism" & "Parochialism" are synonymous - both meaning "narrow - minded" likewise, "dilettante" and "inexpert" mean the same.
18. A It should be "... as well as in France".
19. C "Will" should be converted to "would", in reported speech.
20. A In B "has been a leading" is flawed. In C, "infrastructures" and "substenable" are erroneous. In D "farther along" and "there are" are erroneous.
21. B (A), (C) and (D) can be inferred. In (B) the word "auditory" may not exactly mean the "singing and dancing" mentioned in the first line.
22. B "Quality" has not been dealt with sufficiently in the passage.
23. D A, B, E, C are direct inferences. D seems to be an extended inference.
24. D Choice (d) is the literal meaning of "Raison d'etre".
25. A In B, it should be besides instead of beside. In C, the modifier 'inspite of the rain' should come at the start. In D, it should be 'except for'.
26. B In A, the error is parallelism- 'as it was yesterday' instead of 'as it happened yesterday'. In C, it should be 'who' instead of 'whom'. In D, it should be 'she is' and not 'she's'.
27. D In (D) there is emphasis on the "studying of English" being complete; the perfect fense has been rightly used there.
28. C (C) can be seen from the last para of the passage.
29. B 'Developing countries' cannot be inferred clearly from the passage.
30. B Choice can be directly found in the last para.
31. A Choice A is clear from the 2nd line of the para. It is given that confusion and other elements promote misinterpretation and miscommunication.
32. C The paragraph deals predominantly with confusion.
33. A (A) is in line with the meaning of "commotion" which means disturbance, noise etc.
34. C (C) can be inferred from the discussion on economically productive work in the 9th line, 2nd para of the passage.
35. A The objective of the passage is to highlight the differences between industrial and knowledge intensive firms (as clearly evident from the 1st para).
36. C (C) is incorrect because the passage nowhere says that knowledge firms do not have "employers" - It just says the term "employees" is not appropriate for the knowledge firms.
37. D Choice D has the words which are closest in contextual meaning to the words in the question.

38. C The raw materials for printer are ink and paper. Similarly brake oil and petrol are raw materials for a car. A vending machine usually works if you put a coin inside and the output could be cola ,coffee etc. So it need not be only a coffee vending machine.
39. B TV and air-conditioner are machines .Vision and feel are related to sense organs. Vision of movies and feel of air are similar.
40. D A bird can be seen directly and clearly flying in the sky and thunder is heard in the background. Similarly text is directly seen on paper and watermark is in the background.
41. C Statements 3 and 5 are deducible. The rest cannot be deduced.

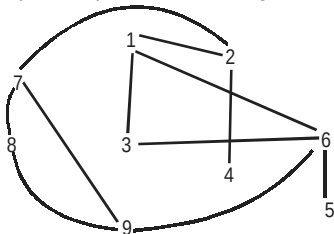
For questions 42 to 44:

Windows → 1 2 3 4 5 6

Products → $\bar{z}$ ($\bar{z}$ denotes z can't come at 6)

42. D As given W is immediately left of X so, X can't be placed in window number 1. Hence X is the answer.
43. B If X is placed in window number 3 and W is left of X so, W must be placed in window number 2.
44. C When U is placed in window number 5 we know that V cannot be adjacent to U so 'V' can't come in window number 6. Also W & X are coming together. So, from the given options only Y can come in number 6 window.
45. D Let us assume that "A < B" denotes A is shorter than B. By applying same concept we can say that
 (i) C < I (I stands for Italian, C for Chinese)
 (ii) A < F (A stands for American and F for French)
 (iii) F > C
 So, we can conclude that A > F > C & I > C. So, from the given inference, we can only say that A > C
 Hence option 'D' is correct.
46. C Here Q is coded as S, U as W, E as G..... we can easily identify that the different between the alphabets is 2 so, "RECEPTIONIST" will be written as "TGEGRVKQPKUV".

For questions 47 and 48: Let us consider the 9 shops as 9 randomly taken points. From the given information.

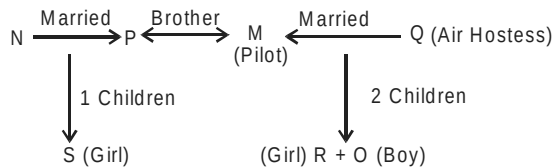


47. C Maximum number of shops a person can visit without visiting any shop more than once is seven i.e. 1278963 or 1378965.
48. C From the graph it can easily be seen that shops 4 & 5 are connected to only one shop so to visit shop 4 a person has to go by "shop 2" but then to visit "shop 5" he has to come back to "shop 2" and then only he can visit "shop" so, from the given option only "option 3" is FALSE.
49. C As we wanted to find the minimum difference between the Harry & Randeep so, we will try to connect them. Let us assume Harry is 1 year old as Latif is elder to Harry so minimum age of Latif is '2'. Now Mahesh is at same age as of Latif. So age of Mahesh is also '2' years. Randeep is exactly 5 years older than Mahesh so Randeep's minimum age will be 7 years. Now Sonam is elder to Harry by at the most 4 years so, minimum age of Sonam is "2 years" and Randeep is elder to Sonam so age of Randeep is 3 years but that can't be possible because from earlier conditions we are getting the age of Randeep to be 7 years. Hence the minimum age difference between Randeep & Harry is 6 years.

For questions 50 to 52: J & L patronize the telecom industry with their own industry similarly M & P patronize the computer industry with their own industry and J, L, M & P can't be seated together.

50. C From the options we find that in option (A) KMLNJL & M are to sitting together Hence not possible from option (B) JPQOL, J&P are sitting together so not possible from option (C). JKLMN there are no two Businessman patronising more than their own industry sitting together. Hence option (C) is right.
51. A M shouldn't sit next to J, L & P so from the given option only (A) is true.
52. D As there is no constraint for 'O' so from the options given any one can sit with 'O'. Hence option (D) is correct.
53. B Since A, C & D are incorrect. By process of elimination one can arrive at option B. In option A an individual who is not practising lawyer can have an MBBS degree. In option C a person who is not a practising lawyer can have an MBBS degree. In option D, even if a person is not a practising lawyer he may not have an MBBS degree. He could be just an LLB degree holder.

54. A The only possible relation is



Hence O is son of M. Hence option (A) is right.

55. C From the option $M \text{ \$ } C * N$ is correct as M is the brother of C & C is the mother of N so, M is the uncle of N. Hence option (C)

For questions 56 to 59: Let U, V, X, Y and Z denote the CD's collected by U, V, X, Y and Z respectively.

- (i) $U = V + X$
- (ii) $X = a^3 + 3$ (where 'a' is any positive integer)
- (iii) $U = b^2$ (where b is a natural number)
- (iv) $V = c^2$ or d^3 (Again c & d natural numbers)
- (v) $Y : Z = 4 : 3$

Now possible values of U are 16, 25, 36, 49, 64 only and possible values of X are 11, 30, 67 and values of V can be 16, 25, 36, 49, 64, 27

Now $U = V + X$ so $U \neq 16, 25$ as minimum value of $X + Y = 27$, if $U = 36$, then $Y = 11$ & $V = 25$ if $U = 49, 64$ then there is no possible values of X & V.

Hence $U = 36, X = 11$ & $V = 25$, Now $Y + Z = 100 - (36 + 11 + 25)$
 $Y + Z = 28$

As, $Y : Z = 4 : 3 \therefore Y = 16$ & $Z = 12$

So, $X = 11, Y = 16, Z = 12, U = 36, V = 25$

56. B $U = 36$.

57. B $V = 25$.

58. A $Y - X = 16 - 11 = 5$.

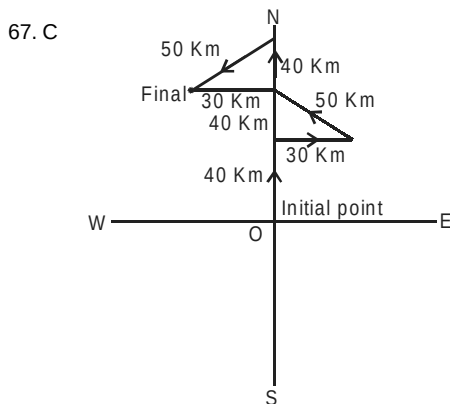
59. B Only X has prime number of CD's, i.e. $X = 11$.

For questions 60 to 63: Based on the information given in the question the following possible combinations can be made.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total Ways
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{S \quad T}^{2 \text{ ways}}$	$\overbrace{P \quad V}^{2 \text{ ways}}$				= 8
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{P \quad V}^{2 \text{ ways}}$	$\overbrace{T \quad S}^{2 \text{ ways}}$				= 4
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{S \quad V}^{2 \text{ ways}}$	$\overbrace{T \quad P}^{2 \text{ ways}}$				= 4
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{P \quad T}^{2 \text{ ways}}$	$\overbrace{V \quad S}^{2 \text{ ways}}$				= 4
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{S \quad P}^{2 \text{ ways}}$	$\overbrace{T \quad V}^{2 \text{ ways}}$				= 4
$\overbrace{S \quad T}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{T \quad V}^{2 \text{ ways}}$	$\overbrace{P \quad S}^{2 \text{ ways}}$				= 4
$\overbrace{P \quad V}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{P \quad V}^{2 \text{ ways}}$				= 8
$\overbrace{S \quad V}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{Q \quad S}^{2 \text{ ways}}$				= 4
$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad V}^{2 \text{ ways}}$	$\overbrace{Q \quad P}^{2 \text{ ways}}$				= 4
$\overbrace{T \quad P}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad V}^{2 \text{ ways}}$	$\overbrace{Q \quad S}^{2 \text{ ways}}$				= 4
$\overbrace{S \quad P}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{Q \quad V}^{2 \text{ ways}}$				= 4
$\overbrace{T \quad V}^{2 \text{ ways}}$	$\overbrace{R}^{1 \text{ way}}$	$\overbrace{Q \quad U}^{2 \text{ ways}}$	$\overbrace{Q \quad S}^{2 \text{ ways}}$				= 4
							56 Ways

60. C Total number of ways = 56.

61. C If P is scheduled on Wednesday then from the table then T has to be scheduled either on Thursday or Friday.
62. D If S is scheduled on Monday then P is allotted on Sunday only for 2 days. So, option (D) is definitely false.
63. D If T is a sales company and it is given that S is a manufacturing company and as S is scheduled on Saturday so T can't be scheduled on Friday. Hence from table we can conclude that except Friday all other options are possible. Hence option (D) is right.
64. B Let R, Q, S, C and G denote the number got by Ram, Qadir, Sorabji, Charles and Gurdeep respectively
 $\therefore$ Based on the information given in the question we can conclude the following.
 R = even number, $Q > G$ and $S = C$.
 $C + R = \text{odd}$. To get maximum sum of $(G + Q + R + S + C)$ we can say $C = 5$ ($C \neq 6$ as $C + R = \text{odd}$ & R is even)
 Similarly $S = C = 5$ & $R = 6$
 $\therefore G < Q = 4$, $\therefore G < 4 \Rightarrow G = 3$
 $\therefore G + Q + R + S + C = 3 + 4 + 6 + 5 + 5 = 23$
 Hence option (B)
65. B b seems to be a relevant choice for strengthening the argument since it talks about the elderly. A and D do not talk of the expenses involved. C does not talk about the elderly.
66. C It is given that M & P are unmarried women & there is a married couple where Q is a husband so Q is Male. Also N is brother of O so N is also Male. O is Female & married to Q. As women can't be Civil, Mechanical or Chemical engineer
 $\therefore$ So, Q or N are civil engineering or Mechanical engineering professors but N cannot be mechanical engineer.
 $\therefore$ N is civil engineer & Q is Mechanical engineer.
 Hence option (C).



So, option (C) is correct.
 i.e. North - West direction.

68. B 3 provides a contrast to the idea in 4. 1 and 2 give reasons for 3.
69. A 3 looks to be a good starter which states a requirement for establishing a good connection. Then comes the studies on marriage in 1 and 2. 4 sums up the paragraph.

70. B Let the average of first 10 numbers be $\bar{X}_{10} = \frac{\sum_{i=1}^{10} x_i}{10}$ and

the average of first 11 numbers be $\bar{X}_{11} = \frac{\sum_{j=1}^{11} x_j}{11}$

$\therefore$ eleventh number $X_{11} = \sum_{j=1}^{11} x_j - \sum_{i=1}^{10} x_i$

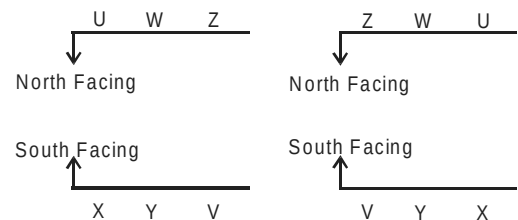
$$X_{11} = 11\bar{X}_{11} - 10\bar{X}_{10}$$

Hence option (B) is correct.

71. A Speed of first train = T_1 & speed of second train = $T_2 = 80 \text{ km / hr}$
 $T_1 = 1.2 T_2$
 $T_1 = 1.2 \times 80 = 96 \text{ km / hr}$
 Relative speed of 1st train w.r.t. other train can be = $(80 + 96) = 176 \text{ km / hr}$ (when trains move towards each other)
 Also relative speed can be = $96 - 80 = 16 \text{ km / hr}$ (when they move towards each other).
 So both the statements together are not sufficient to answer the question.
72. D The para says that attrition is due to lack of training. D states that training leads to attrition, thus weakening the statement.

For questions 73 and 74:

From the given information we get two different combinations.



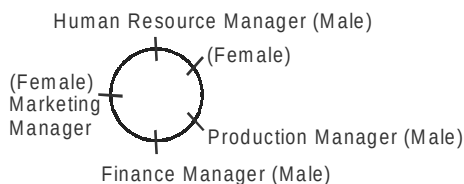
73. B 'Y'.

74. B 'V' & 'U'.

75. D This is a very straight logical conclusion. Reena and Meena often quarrel since they are sisters and it is known that sisters often quarrel.

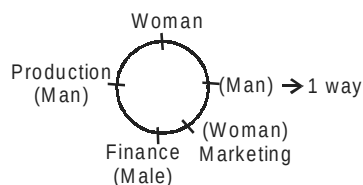
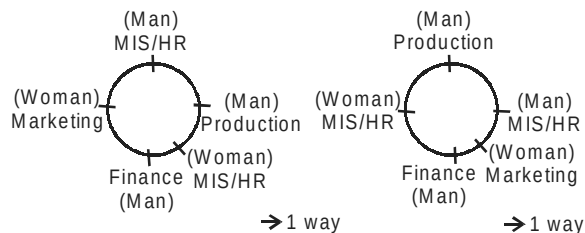
76. D Again a very straight logical conclusion.

For questions 77 and 79:



77. A From the given option. Only option (A) is not correct i.e. The marketing manager is sitting in between the two women.

78. B The possible options can be
MIS : Management Information System Manager.
HR : Human Resource Manager.



There are in total 3 ways. Option (B) is correct.

80. D The correct choice is self-evident here as in the para the main flaw is looking at only new product versions to tide over the current financial crisis.

81. C Interest is 12% per annum

i.e. 1% per month

In January:

The loan amount is Rs.10,00,000

∴ Interest = 1% of Rs.10,00,00

= Rs.10,000

In February:

The remaining loan amount is

= 10,00,000 + 10,000 – 25,000

= Rs.9,85,000

∴ Interest = 1% of 9,85,000

= Rs.9850

∴ Total amount of interest paid in Jan and Feb

= 10,000 + 9850

= Rs. 19850.

82. C $\log_{10}(\log_3 3) + \log_{10}(\log_4 4) + \dots + \log_{10}(\log_{1023} 1024)$
 $= \log_{10}[\log_2 3 \times \log_3 4 \times \log_4 5 \times \dots \times \log_{1023} 1024]$

$$= \log_{10} \left[\frac{\log 3}{\log 2} \times \frac{\log 4}{\log 3} \times \frac{\log 5}{\log 4} \times \dots \times \frac{\log 1023}{\log 1022} \times \frac{\log 1024}{\log 1023} \right]$$

$$= \log_{10} \left[\frac{\log 1024}{\log 2} \right]$$

$$= \log_{10} [\log_2 1024] = \log_{10} [\log_2 (2^{10})]$$

$$= \log_{10} 10 = 1$$

83. C Sum of all angles of a hexagon = 720°

Let the angles (in AP) be

$$\left(120 + \frac{5a}{2}\right), \left(120 + \frac{3a}{2}\right), \left(120 + \frac{a}{2}\right), \left(120 - \frac{a}{2}\right),$$

$$\left(120 - \frac{3a}{2}\right), \left(120 - \frac{5a}{2}\right)$$

Since the hexagon is convex,

$$\left(120 + \frac{5a}{2}\right) < 180^\circ$$

$$\Rightarrow a < 24^\circ$$

If $a = 23^\circ$, the angle $\left(120 + \frac{5a}{2}\right)^\circ$ would not be integer

$\Rightarrow a = 22^\circ$ and then, the greatest angle

$$= \left(120 + \frac{5a}{2}\right) = 175^\circ$$

84. C Checking by options and putting $x = 51$, one can easily see that at $x = 51$, the ratios are already in their simplest forms.

85. B Let the volume of each barrel be 100 ml.
In 1st barrel Ethanol = 60 ml, Gasoline = 40 ml.
In 2nd barrel Ethanol = 30 ml, Gasoline = 70 ml.
Let the ratio of mixture from 1st barrel to 2nd barrel be $x : y$

$$\therefore \frac{60x + 30y}{40x + 70y} = \frac{1}{1}$$

$$\Rightarrow 20x = 40y$$

$$\frac{x}{y} = \frac{2}{1} \text{ Required ratio} = 2 : 1.$$

86. A Expenditure = Price $\times$ Consumption
 $E = P \times C$
New price = 1.25P
Let C' be new consumption, E is constant
 $E = 1.25P \times C'$
 $\therefore P \times C = 1.25P \times C'$
 $\Rightarrow C' = \frac{1}{1.25} = .8 = 80\%$
 $\therefore$ Reduction in consumption = 20%.

87. C Let age of Chetan in 2002 = x
So, $\frac{2002 - x}{90} = x$
 $\Rightarrow x = 22$
So, Chetan's age in 2006 = $22 + 4 = 26$ yrs.

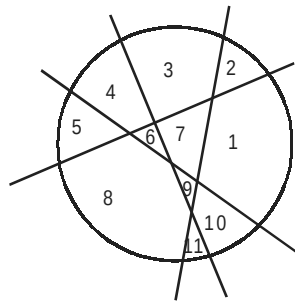
88. A $x^2 - 2x + y^2 - 4y + 5 = 0$
Comparing it with standard equation of a circle.
 $x^2 + y^2 + 2gx + 2fy + c = 0$
where radius = $\sqrt{g^2 + f^2 - c}$
 $g = -1, f = -2, c = 5$
radius = $\sqrt{(-1)^2 + (-2)^2 - 5} = 0$
As radius is 0, so $x^2 - 2x + y^2 - 4y + 5 = 0$ represents a point.

89. D Cost of fuel is proportional to square of the speed.
 $E = KS^2$
 $\Rightarrow 64 = K(16)^2$
 $\therefore K = \frac{1}{4}$
Total cost = $\frac{1}{4}S^2t + 400t$
Most economical speed, checking options we get most economical speed at 40 km/hr.
Total cost at 40 km/hr = $\frac{1}{4}(40)^2 + 400\left(\frac{400}{40}\right)$
 $= 10 \times 400 + 4000 = \text{Rs.}8000.$

90. B Total cost at most economical speed = Rs.8000

91. C Contribution of each loom to sales = $\frac{5,00,000}{50}$
 $= 10,000$
Monthly manufacturing expenses of one loom
 $= \frac{1,50,000}{50}$
 $= 3000.$
So decrease in profit = $10,000 - 3,000$
 $= 7,000.$
Looms contribute equally to sales and manufacturing expenses, however establishment charges remain constant irrespective of the number of looms.

92. D Checking by options in a maximum of 11 parts we can divide a circular disk.



93. C In 1990, $1 X_s = 0.6 y_s$
Price levels in 2006 change by 150 and 400 for X and Y respectively with 1990 as base 100.
In 2006, $150 \times 1X_s = 400 \times 0.6 y_s$
 $\therefore X_s = \frac{240}{150} y_s$
 $\therefore X_s = 1.6 y_s$
94. A Let the age of husband wife and daughter be denoted by h, w and d respectively
 $\therefore h + 2w + 3d = 85 \quad \dots \text{Eq. (i)}$
 $2h + 4w + 6d = 170 \quad \dots \text{Eq. (ii)}$
 $5h + 10w + 15d = 450 \quad \dots \text{Eq. (iii)}$
Multiplying the first equation by 5 we get
 $5h + 10w + 15d = 425$
but Eq (iii) gives $5h + 10w + 15d = 450$
 $\therefore$ No solution possible.

95. A $R_1 \rightarrow R_1 + R_2 + R_3 + R_4$

$$D = 1 + x_1 + x_2 + x_3 + x_4 \begin{vmatrix} 1 & 1 & 1 & 1 \\ x_2 & 1+x_2 & x_2 & x_2 \\ x_3 & x_3 & 1+x_3 & x_3 \\ x_4 & x_4 & x_4 & 1+x_4 \end{vmatrix}$$

$$C_4 \rightarrow C_4 - C_1$$

$$C_3 \rightarrow C_3 - C_1$$

$$C_2 \rightarrow C_2 - C_1$$

$$\Rightarrow D = 1 + x_1 + x_2 + x_3 + x_4 \begin{vmatrix} 1 & 0 & 0 & 0 \\ x_2 & 1 & 0 & 0 \\ x_3 & 0 & 1 & 0 \\ x_4 & 0 & 0 & 1 \end{vmatrix}$$

$$D = (1 + x_1 + x_2 + x_3 + x_4) \times 1$$

$$= 1 + x_1 + x_2 + x_3 + x_4$$

96. C In the given time Ramesh can read 80 pages of Engineering maths and 100 pages of Engineering drawing.

Or

He can read 50 pages of Engineering Maths and 250 pages of Engineering drawing.

$\Rightarrow 30$ pages of Engineering Maths ≈ 150 pages of Engineering Drawing.

$\Rightarrow 10$ pages of Engineering Maths ≈ 50 pages of Engineering Drawing.

So in the given time Ramesh can read $80 + \left(\frac{100}{50} \times 10\right)$

$= 80 + 20 = 100$ pages of Engineering Maths.

97. A $S = \frac{1}{1} + \frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \dots$

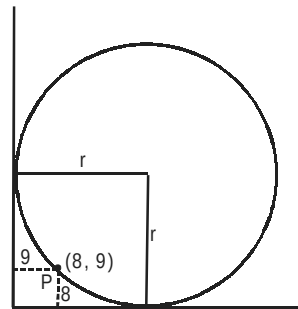
$$\therefore \frac{S}{2} = \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \dots \infty$$

$$\Rightarrow \frac{S}{2} = \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \frac{1}{4.5} + \dots \infty$$

$$\Rightarrow \frac{S}{2} = \left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{5}\right) + \dots \infty$$

$$\therefore S = 2.1 = 2$$

98. A



Let, the radius of circle is r

$\therefore$ equation of circle will be

$$\Rightarrow (x - r)^2 + (y - r)^2 = r^2$$

Since point facing the corner P (8, 9) is on the circle, it should satisfy the equation.

$$\Rightarrow (8 - r)^2 + (9 - r)^2 = r^2$$

$$\Rightarrow r^2 - 34r + 145 = 0$$

$$\text{or } (r - 29)(r - 5) = 0$$

$$\therefore r = 29 \text{ or } r = 5$$

$\therefore$ option (D) is correct choice.

99. B
$$\frac{4^{101} + 6^{101}}{25}$$

$$= \frac{4^{101}}{25} + \frac{6^{101}}{25} = \frac{4(1024)^{20}}{25} + \frac{6(6^4)^{25}}{25}$$

$$= \frac{4}{25} + \frac{6 \times (1296)^{25}}{25}$$

$$= 4 + \frac{6(-4)^{25}}{25}$$

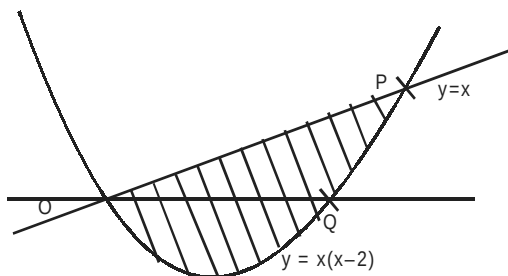
$$= 4 + (-6)(-1) = 10.$$

100. A $\frac{1}{x} + \frac{1}{z} + \frac{1}{x-y} + \frac{1}{z-y} = 0$

By option(A): $\frac{y}{2} = \frac{x+z}{2} \Rightarrow y = x+z$

$$\therefore \frac{1}{x} + \frac{1}{z} + \frac{1}{x-(x+z)} + \frac{1}{x-(x+z)} = 0$$

101. B



Co-ordinates of P(3, 3) co-ordinates of Q(2,0)
Area bounded by the line $y = x$ and $y = x(x - 2) = S$

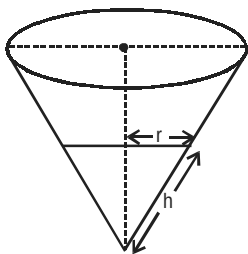
$$S = \left| \int_0^2 x(x-2) dx \right| + \int_0^3 x dx - \left| \int_2^3 x(x-2) dx \right|$$

$$= \left| \frac{x^3}{3} - x^2 \right|_0^2 + \frac{x^2}{2} \Big|_0^3 - \left| \left(\frac{x^3}{3} - x^2 \right) \right|_2^3$$

$$= \left| \frac{8}{3} - 4 \right| + \frac{9}{2} - \left| \frac{27}{3} - \frac{8}{3} - (9 - 4) \right|$$

$$= \frac{4}{3} + \frac{9}{2} - \frac{4}{3} = \frac{9}{2} \text{ sq. units.}$$

102. A Suppose 'h' is the height of level of water at any particular instant and 'r' be the radius



By similar triangle $\Rightarrow \frac{r}{h} = \frac{20}{40} = \frac{1}{2} \Rightarrow r = \frac{h}{2}$

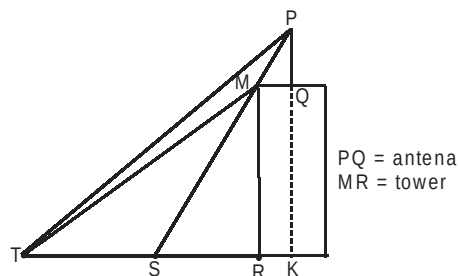
$$V = \text{Volume of water} = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \frac{h^3}{4} = \frac{\pi h^3}{12}$$

$$\frac{dv}{dt} = -22.5 = \frac{1}{12} \pi 3h^2 \frac{dh}{dt}$$

$$\Rightarrow \frac{-dh}{dt} = \frac{12 \times 22.5}{3\pi \times (30)^2} = \frac{1}{10\pi}$$

$\left[\frac{dh}{dt} \text{ is negative because 'h' is decreasing with time} \right]$

103. B



Let the height of the antenna be 'y' meters and the height of the tower be 'x' metres.

RS = ST = 100 metres and let RK = Z metres

ΔPMQ is similar to ΔMRS

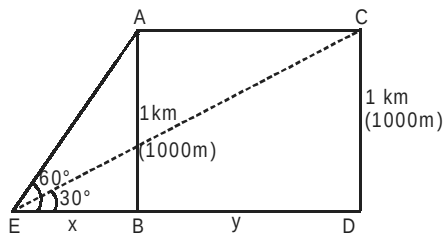
$$\therefore \frac{PQ}{QM} = \frac{MR}{RS} \Rightarrow \frac{y}{z} = \frac{x}{100} \Rightarrow z = \frac{100y}{x}$$

$$\frac{1}{2} = \frac{x}{200} \Rightarrow x = 100 \therefore z = y$$

$$\frac{5}{9} = \frac{x+y}{200+z} \Rightarrow \frac{100+y}{200+y} = \frac{5}{9} \Rightarrow 4y = 100$$

$$\Rightarrow y = 25 \text{ mts [height of the antenna]}$$

104. B



Let initially the plane be at A

After 10 sec its at C

Let EB = x and BD = y

In ΔABE :

$$\tan 60^\circ = \frac{1000}{x}$$

$$\sqrt{3} = \frac{1000}{x} \Rightarrow x = \frac{1000}{\sqrt{3}} \text{ m.}$$

In ΔCDE :

$$\tan 30^\circ = \frac{1000}{x+y}$$

$$\therefore \frac{1}{\sqrt{3}} = \frac{1000}{x+y}$$

$$\Rightarrow x + y = 1000\sqrt{3}$$

$$\therefore y = 1000\sqrt{3} - \frac{1000}{\sqrt{3}} = \frac{2000}{\sqrt{3}}$$

$$\text{Speed of plane} = \frac{2000}{\frac{\sqrt{3}}{10}} = \frac{200}{\sqrt{3}} \text{ m/s.}$$

$$\frac{200}{\sqrt{3}} \text{ m/s} = \frac{200}{\sqrt{3}} \times \frac{18}{5} = \frac{720}{\sqrt{3}} \text{ km/hr.}$$

105. C Let the first sum invested be Rs.x and second sum invested is Rs.2x.

$$\therefore \frac{x \times 5 \times 1}{100} + \frac{2x \times 5.5 \times 1}{100} = 1000$$

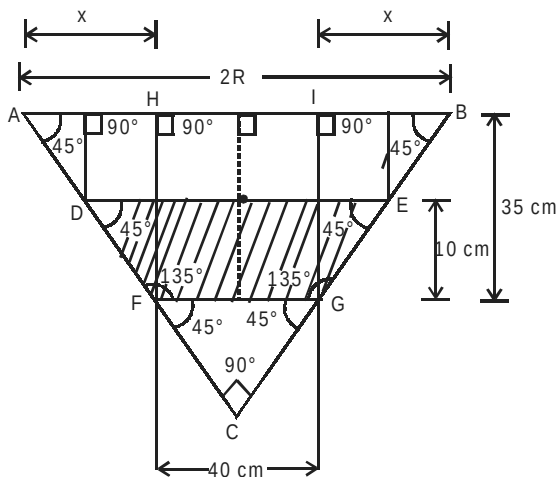
$$\Rightarrow \frac{5x}{100} + \frac{11x}{100} = 1000$$

$$\Rightarrow \frac{16x}{100} = 1000$$

$$\Rightarrow x = 100 \times 62.5 = \text{Rs.}6250$$

Hence second sum invested will be Rs.12500.

For questions 106 and 107:



Right triangles AHF and BIG are isosceles.

$$\Rightarrow x = 35 \text{ cm}$$

$$\Rightarrow 2R = 2x + 40 = 110 \text{ cm}$$

$$\Rightarrow R = 55 \text{ cm}$$

106. C Volume of the water
= Volume of cone (DEC) – Volume of cone (FGC)

$$= \frac{\pi}{3} \times (30)^3 - \frac{\pi}{3} \times (20)^3$$

$$= 19000 \frac{\pi}{3} \text{ cc}$$

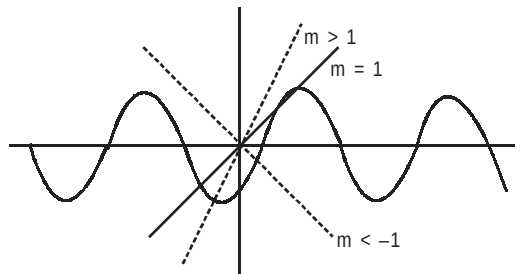
Using similarities of triangle, we get the sides of all triangles.

107.

108. D $f(x)$ will have an inverse if and only if the function is one-one onto.

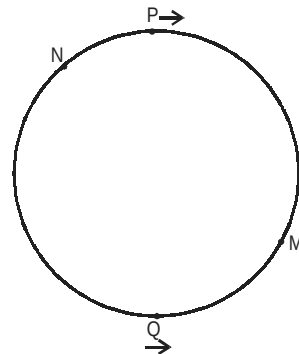
graph of $f(x) = mx + \sin x$ = sum of two graphs.

$y = mx$ and $y = \sin x$



If $m > 1$ or $m < -1$, then only the sum of two graphs will give a one-one onto function. Therefore option D $|m| < 1$.

109. C



Let the length of track be '2x' metres and they first meet at a point M and then at point N

$$\therefore \text{Ratio of speeds of P and Q} = \frac{75}{x - 75}$$

Also, Ratio of speeds of P and Q = $\frac{2x-100}{100}$

$$\therefore \frac{75}{x-75} = \frac{2x-100}{100}$$

$$\Rightarrow \therefore x = 125 \text{ Or, } 2x = 250 \text{ mt.}$$

110. B Step 1: $\frac{a}{-a} + \frac{b}{-b} + \frac{c}{-c} + \frac{abc}{-abc} + \frac{abc}{-abc} = -4$

Step 2: $\frac{a}{a} + \frac{b}{-b} + \frac{c}{-c} + \frac{abc}{abc} = 1 - 1 - 1 + 1 = 0$

Step 3: $\frac{a}{a} + \frac{b}{b} + \frac{c}{-c} + \frac{abc}{-abc} = 1 + 1 - 1 - 1 = 0$

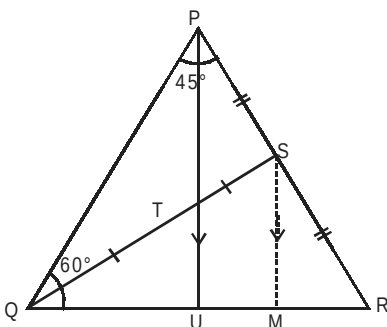
Step 3: $\frac{a}{a} + \frac{b}{b} + \frac{c}{c} + \frac{abc}{abc} = 4$

So, the possible set of values of the given quantity is $\{-4, 0, 4\}$

111. D Units digit of 102^{51} will be same as the unit's digit of 2^{51} .
Cyclicity of 2 is 4. Remainder when 51 is divided by 4 is 3.

$\therefore$ Units digit will be same as the unit's digit of $2^3 = 8$.

112. A



Draw a line SM parallel to PU.

$$\frac{QR}{\sin 45^\circ} = \frac{PR}{\sin 60^\circ} \Rightarrow QR = 15 \sqrt{\frac{3}{2}} \frac{\sin 45^\circ}{\sin 60^\circ} = 15 \text{ cm}$$

In $\triangle PUR$:

$SM \parallel PU$

$$\therefore UM : MR = PS : SR = 1 : 1$$

Let $UM = MR = x$

In $\triangle QSM$: $TU \parallel SM$

$$\therefore QU : UM = QT : TS = 1 : 1$$

$$\therefore QU = x \text{ and } UR = UM + MR = 2x$$

Now, $QU = x$ and $UR = UM + MR = 2x$

$$\therefore QU = \left(\frac{x}{x+2x} \right) \times QR = \frac{15}{3} = 5 \text{ cm.}$$

113. * It $4x - x^2$ is a positive fraction less than 1, $\frac{8}{4x - x^2}$ will be a positive integer and this is possible for infinite real values of x .

Also $4x - x^2$ could be 1, 2, 4 or 8 which gives five real values of x .

Therefore there are infinite values of x and none of the options is correct.

114. B $f(x, y) = \sqrt{x^2 + 1} + \sqrt{(x - y)^2 + 4} + \sqrt{(12 - y)^2 + 4}$

$$\frac{\partial f}{\partial x} = \frac{1}{2\sqrt{x^2 + 1}}(2x) + \frac{1(2x - 2y)}{2\sqrt{(x - y)^2 + 4}}$$

$$\frac{\partial f}{\partial x} = \frac{x}{\sqrt{x^2 + 1}} + \frac{(x - y)}{\sqrt{(x - y)^2 + 4}}$$

$$\frac{\partial f}{\partial y} = \frac{-1(x - y)}{2\sqrt{(x - y)^2 + 4}} + \frac{2(12 - y)(-1)}{2\sqrt{(12 - y)^2 + 4}}$$

For maxima or minima:

$$\frac{\partial f}{\partial x} = 0 \quad \text{and} \quad \frac{\partial f}{\partial y} = 0.$$

For, $\frac{\partial f}{\partial x} = 0$, we get $\frac{x}{\sqrt{x^2 + 1}} + \frac{x - y}{\sqrt{(x - y)^2 + 4}} = 0$

$$\Rightarrow 4x^2 = (x - y)^2 \quad \dots(i)$$

For, $\frac{\partial f}{\partial y} = 0$, we get $\frac{-(x - y)}{\sqrt{(x - y)^2 + 4}} = \frac{12 - y}{\sqrt{(12 - y)^2 + 4}}$

$$\therefore (x - y)^2 (12 - y)^2 + 4(x - y)^2 = (12 - y)^2 (x - y)^2 + (12 - y)^2 4$$

$$\Rightarrow (x - y)^2 = (12 - y)^2 \quad \dots(ii)$$

From (i) and (ii) we get

$$\therefore 4x^2 = (12 - y)^2$$

$$\Rightarrow (2x - y + 12)(2x + y - 12) = 0$$

$$\therefore 2x - y = 12 \quad \text{or} \quad 2x + y = 12$$

Case I:

$$2x - y = -12$$

$$\text{Now, } 4x^2 = (x - y)^2$$

$$\Rightarrow 4x^2 = (x - 2x - 12)^2$$

$$\Rightarrow 4x^2 = (x + 12)^2 \Rightarrow 3x^2 - 24x - 144 = 0$$

$$\therefore x^2 - 8x - 48 = 0$$

$$\therefore x = 12 \text{ or } x = -4$$

When $x = 12$, $y = 36$ and when $x = -4$, $y = 4$

Case 2:

$$2x + y = 12$$

$$\text{Now, } 4x^2 = (x - y)^2$$

$$\Rightarrow 4x^2 = (3x - 12)^2$$

$$\Rightarrow 5x^2 - 72x + 144 = 0$$

$$\therefore x = 12 \text{ or } x = \frac{12}{5}$$

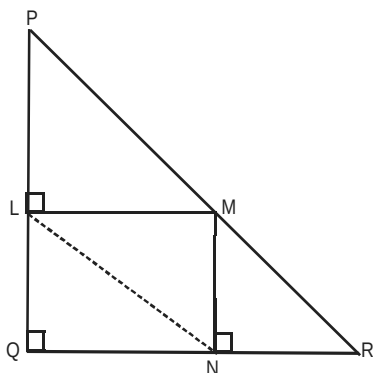
$$\text{when } x = 12, y = -12 \text{ and when } x = \frac{12}{5}, y = \frac{36}{5}$$

By substituting we get that $f(x, y)$ attains minimum

$$\text{value at } x = \frac{12}{5} \text{ and } y = \frac{36}{5} \text{ and } f(x, y)|_{x=\frac{12}{5}, y=\frac{36}{5}} =$$

13.

115. D



It is given that $PQ \neq QR$. LN will be minimum if when $PM : MR = PQ : QR$ (i.e. M must be positioned on PR in accordance with the proportion of the perpendicular sides.)

116. C

117. B Only for $x = y = 2$ and $z = 5$ the equation $xy + 1 = z$ holds true for prime x, y and z .

For questions 118 and 119:

Let 'L' be the length of train, 'x' be the speed of the first man, 'y' be the speed of the second man and 'z' be the speed of the train

$$\therefore 20 \frac{1}{z - x} \text{ and } 18 = \frac{1}{z + y}$$

$$\therefore z = 10x + 9y$$

Distance between the two men = $600(z + y)$ mt

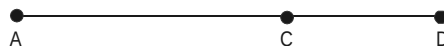
$$\text{Time} = \frac{600(z + y) - 600(x + y)}{x + y} = \frac{600(9x + 9y)}{(x + y)} = 90 \text{ minutes}$$

$\frac{x}{y}$ cannot be determined.

118. B

119. D

120. C Everyday, Laila leaves from A (the time of her departure is same everyday) to reach point D (the station) exactly at 6 'O clock where he finds Majnu waiting for him.

On Monday:

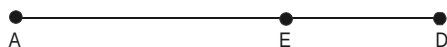
Laila leaves from A at her usual time but Majnu reaches the station(D) at 5'O clock (i.e. an hour earlier than his normal time) and he starts walking towards home (i.e. towards point A). Laila meets him on the way at C and from there both of them head towards A. A total of 20 minutes are saved this way. Where have they saved these 20 minutes' time?

These 20 minutes are saved just because of the fact that today Laila did not have to travel the distance $C \rightarrow D + D \rightarrow C$. So we can deduce that Laila must be taking a total of 20 minutes time in a to-and-fro travel between C and D daily. As Laila (and for that matter Majnu also) have a constant speed throughout the journey, we can also deduce that for Laila, the time taken in going from C to D is the same as the time taken in going from D to C. So we can say, had Majnu been at D at 6'O clock on Monday as well, then Laila must have traveled the C to D distance and she must have passed point C at exactly 10 minutes before 6 'O clock i.e. at 5 : 50 PM. This only means that on Monday when they meet at point C, the time of their meeting was exactly 5:50 pm.

Now what should this tell us about their speeds? We know that Laila takes 10 minute's time to move from C to D. And now we also know that Majnu had been walking till 5:50 PM (he reaches the station and starts walking till he reaches the point C). So Majnu takes exactly 50 minutes in traveling the same distance. If V_L and V_M be the speeds of Laila and Majnu respectively, then we must have:

$$\frac{V_M}{V_L} = \frac{1}{5}$$

On Tuesday:



Majnu reaches D at 5:30 PM and starts walking towards A. Let's assume that he walks for x minutes and reaches the point E, where he meets Laila. So that Laila has saved time in moving from E to D and from D to E.

Today, Majnu reaches at D at $5:30 + x$ PM. From Laila's point, we can say, Laila must have reached the point E at exactly $30 - x$ minutes before 6:00 PM. (for example if $5:30 + x$ had been something like 5:45 PM, then she must have reached 15 minutes before 6:00 PM). In other words, today both of them have saved a total of $2 \times (30 - x)$ minutes in reaching back to home (point A).

To find the value of x :

Majnu Moved from D to E in x minutes, and Laila (would have moved) from E to D in $30 - x$ minutes. Now,

$$\frac{x}{30 - x} = \frac{V_L}{V_M} = 5$$

Which gives $x = 25$ minutes.

So, today they have saved a total of $2 \times (30 - 25) = 10$ minutes

Hence (C) option is the correct one.

For Questions 121-126

121. B Sum of values of per capita net domestic product for the states/UT's in the year 2002-03
 $= 17932 + 47680 + 24851 + 19803 + 24502 + 25625 + 37696 + 20315 = 218404$
 Average $= (218404/8)$ and it lies between 25000 and 30000.
122. A The per capita net domestic product of Chandigarh in the year 2002-03 is 47680 and it is farthest from the average value.
123. A)Kerala had the highest growth rate in per capita net domestic product between 2002-03 and 2004-05 and is equal to 25.24%.
124. B There are six states namely Chandigarh, Haryana, Kerala, Maharashtra, Pondicherry and Tamilnadu.
125. B A.P., Kerala and Tamilnadu had less than half the per capita net domestic product of Chandigarh in each of the three years.

126. C Richest state/UT is Chandigarh and the per capita net domestic product is Rs. 57621 which is equal to US \$ 1440.
 Required Ratio = 27.777

For Questions 127-132

127. D Hero Honda observed minimum percentage growth rate in motorcycle sales from 2001-02 to 2003-04.
128. B In the year 2001-02 the percentage growth in total sales for motorcycles was the maximum and is 48.23%.
129. B Growth of sales of motorcycles for Bajaj from the year 2001-02 to 2002-03
 $= 715$
 Growth of sales of motorcycles for Hero Honda from the year Hero Honda from the year 2001-02 to 2002-03 = 600.
 Required ratio = 6:7.
130. C Bajaj experienced the maximum rise in the year 2002-03 as compared to the previous year and the share of three wheelers in that particular year is 26%.
131. B In the year 2002-03 the motorcycles share is Rs.2608 crore and the combined share of scooters and three-wheelers is Rs.1904 crore.
132. C Total sales of Hero Honda in the year 2004-05 = $1.2 \times 5600 = \text{Rs.}6720$ crore.
 Total sales of Bajaj in the year 2004-05 = $3882 + 2020 + 527 = \text{Rs.}6429$ crore.
 Required Ratio = 1:1.

For Questions 133-140

133. C In the year 2003 all the countries showed growth in terms of increase of GNP per capita as compared to previous year.
134. D India and USA have shown consistent growth in GNP per capita during 2000 to 2004.
135. C China achieved the maximum percentage jump in GNP per capita in the year 2003. Therefore approximate percentage increase in GNP per capita from the year 2000 to 2004 is 65%.
136. C Total GNP for India in the year 2004 = $620 \times 10 = 6200$
 Total GNP for Japan in the year 2004 = 37050
 Required Ratio = 1:6
137. B Approximate value of India's merchandise trade in US \$ billion in the year 2004
 $= 25\% \text{ of Rs.}2800000 = \text{US } \$ 140$ billion.

138. B The approximate value of India's merchandise trade in US \$ billion is 140 (From Question 137).
Exports = US \$ 60 billion.
Imports = $140 - 60 = \text{US \$ } 80$ billion
Required Ratio = 3:4.

139. D Dollar value of high tech exports of China in 2004 = $0.3 \times 500 = \text{US \$ } 150$.
Dollar value of high tech exports of India in 2004 = $0.05 \times 60 = \text{US \$ } 3$.
Difference = US \$ 147.

140. D Statement D is true.

For Questions 141-144

141. A People and Leadership are the two parameters in which there is comparatively less gap between X-2004 and Company Y.

142. D The company X should focus on Partnerships as the gap is larger between the two in the year 2005.

143. B The maximum improvement is achieved by X in 2005 as compared to 2004 was in Strategy.

144. A The parameter in which X could reach the closest to the company Y's benchmark in 2004 was in People.

For Questions 145-150

145. A Overall export growth for all commodities was the lowest during the year 2001-02.

146. A Engineering commodity reported rising growth rate of exports in the year 2002-03 and in the year 2003-04.

147. D Other commodity has shown alternating (rising and falling) pattern of growth rate of exports from 2000-01 to 2004-05.

148. D Others have shown the highest fluctuation in the growth rate of exports.

149. D Textiles and Readymade Garments have reported decline in exports for two consecutive years.

150. D Other commodity has shown maximum improvement in growth rate from 2000-2001 to 2004-2005.