

# JMET 2006 – SET A

## Answers and Explanations

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

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| <p>1. b Given clearly in lines 1-3 ' We define the entrepreneur.....in order to exploit these opportunities for personal gain'</p> <p>2. d This statement is nowhere given in the passage, thus is definitely not true as per the passage.</p> <p>3. b Lines 9-11 mention the entrepreneurial functions as given in option b ... coordinating resources, recognizing opportunities, judgmental decision....</p> <p>4. a Given very clearly in the last para ' If there are more than....in the world of business?', option 'c' implies the same thing but the question of concern remains as in 'a'.</p> <p>5. a The underlined sentence in the first para is a quote by Winston Churchill indicating that in a situation of 'human conflict' so many people owed so much to such few people. Thus, it follows that 'a large nation was indebted to a small army'</p> <p>6. a According to the author - a majority of Indians are indebted to their 1.2 million compatriots as they have catapulted India's progress. (given in para 1)</p> <p>7. c Flimsy: Sturdy (Antonyms) Thus, Flippant (casual) : Earnest is the correct answer</p> <p>8. b Gregarious : Outgoing (Synonyms) Thus, Grouchy : Irritable is the correct answer</p> <p>9. d Guest : Invitation A guest is given an invitation and similarly a witness is summoned in the court through a Subpoena</p> <p>10. – It seems to be an incorrect question as the collective noun for fish is school, but the collective noun for monkeys is tribe/barrel/troup and for deer is herd/leash/parcel. At the most group of deer may be acceptable as 'group' is a generic collective noun</p> <p>11. b Options (a) and (c) are close but the first stresses on the Indian context whereas the third indicates the reasons for wasting time which are not stressed on</p> <p>12. c The odd one out is this statement as is it false and the remaining are true.</p> <p>13. a The remaining are mentioned at different places in the passage e.g. US workers' survey and 'creative waste' mentioned in first para</p> | <p>14. b The passage says in the very next line - not all wasted time is bad.</p> <p>15. a Can be inferred from the data – 10,044 respondents – 33% wasted time because of one reason &amp; 25% because of another – adding up to more than 50% of 10,044</p> <p>16. c Mentioned clearly that the most formally-sanctioned way of wasting time in the 'Indian' organization is the office-meting</p> <p>17. b Both imply 'unchanging'</p> <p>18. c Dyspeptic means ill- natured, 'crotchety' is a synonym of the word dyspeptic, option (c) is thus correct.</p> <p>19. b Invalidate means to nullify/annul/quash</p> <p>20. c Misbegotten means – having an improper origin/ illegitimate. The closest option is ( c) purloined which implies to steal.</p> <p>21. a The closest option is (a) Bamboozled though its more popular meaning is to cheat.</p> <p>22. d It always involves sorting out your own priorities.<br/>Option a – Several type of complaints has (should be – have) been lodged with the plant and the environmental authority<br/>Option b – Great stories portrays (should be - portray) protagonist's (should be – protagonists) who defeated enemy (the enemy/enemies) of there (their) community<br/>Option c- The good manager ('knows' is missing) how to be both a hedgehog and a fox</p> <p>23. a Business students rank communication skills as among the most important they have to master.<br/>Option b- As my replacement is being late to come (should be – is late) I cannot leave my desk<br/>Option c-This is why celebrity endorsement are (should be – is) still the hot issue's (should be – issue)<br/>Option d- MD's and CEO's of top companies are expected will attend the summit (should be – to attend)</p> <p>24. c I decided to 'throw my hat in the ring' is the correct option . The correct idiom in 'a' should be heart-to-heart, in 'b' it should be 'fly-by-the-night' and in (d) it should be 'a bolt out of the blue'.</p> |
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25. b He preferred to spend his last few days in relative anonymity  
Option (a) - I hailed (hailed) a taxi to take me to the station  
Option c – The officious communication about my announcement reached to me (should be – reached me) today  
Option d- You can't never (should be – ever) get the pronunciation correct
26. c Since it is a general truth, it should not be in the past tense as in option 'a'  
'b' unnecessarily uses the apostrophe and 'd' contains a subject – verb agreement error.  
The sentence should read 'Seating arrangements influence...'
27. a Any should follow with the singular 'organization' and the subject – verb agreement rules determine that the correct verb is 'trades'
28. b The singular 'Jargon' is the correct usage which should be used with the word 'much' not 'many' and the correct term is 'to obfuscate (obscure) the main issue. Obdurate means inflexible and Obliterate means to abolish
29. d 'Coarse' is the incorrect homophone. So is 'there' and option (c) unnecessarily uses the apostrophe.
30. b The right word is the noun 'advice' not the verb 'advise' and the subject –verb agreement rules determine that it should follow with the singular 'does'
31. a Pejorative means belittling
32. a Propitiate means to appease
33. b Ubiquitous means omnipresent
34. d Turpitude means 'vices'
35. c Episodic means occasional
36. d However, the advantages of teamwork can be minimized and the benefits increased if members (particularly those who lead them) is (should be – are aware) aware of the methods for improving performance and making decisions
37. d When assertion is used with the win-win approach, and with others who also uses (should be –use) the win-win approach....
38. a It is always (should be – has always) been hard to change....
39. c In a conflict, speak in a pleasant way, send appropriate non-verbal messages to the other person and match yours (should be – your) non-verbal behavior to the spoken message
40. c To live, to love, to serve and also admiration (should be – to admire) are what I aspire for
41. a From statement (I), Speed is directly proportion to distance. So the distance covered by both in the ratio is 2: 1. Hence statement (I) is sufficient.  
From statement (II), we don't have their speed ratio. So we cannot find their distance ratio.
42. b From Statement (I), m is even, so 1 is the remainder when  $(3m + 1)$  is divided by 6.  
Hence statement (I) is sufficient.  
From Statement (II), m is odd, so 4 is the remainder when  $(3m + 1)$  is divided by 6.  
Hence statement (II) is also sufficient.
43. d Combine both statements, we cannot find the water level rise in the tumbler because height of cylindrical tumbler is not given.
44. d Combine both statements, we cannot find the exact time because two cases are possible.  
First case when both minute hand and hour hand are overlap between 3 and 4.  
Second case when minute hand is between 9 and 10 and hour hand is between 3 and 4.
45. c Combine both statements, Assume both work with equal efficiency then they will take individual 10 hours. Here P works faster than Q. Then Q will take more than 10 hours and P will take less than 10 hours.
46. b From individual both statements, we can get the subordinate salary.
47. d Combine both statements, we cannot find first and last ranks because we don't know how many are taking the written test.

**Solutions for questions 48 to 52:**

First presentation by Rita.

Deshpande supervised Promila.

Sridhar's project was in HRM.

Student	Professor	Project	Order
Rita			I
Promila	Deshpande		
Sridhar		HRM	
Quadir			

Bose followed Chandrashekharan. Hence, Bose cannot be I. And Bose works in Finance. Hence, there is only one place for "Bose – Finance" couplet.

Student	Professor	Project	Order
Rita			I
Promila	Deshpande		
Sridhar		HRM	
Quadir	Bose	Finance	

Last presentation in Systems. Hence, "Systems – IV" is to be fit into the table. There is only one place.

Student	Professor	Project	Order
Rita			I
Promila	Deshpande	Systems	IV
Sridhar		HRM	
Quadir	Bose	Finance	

And thus, Rita is for Marketing. Now, since Bose followed Chandrashekharan, Chandrashekharan can be I and Bose can be II or III

OR

Chandrashekharan can be II and Bose can be III

Student	Professor	Project	Order
Rita	A / C	Marketing	I
Promila	Deshpande	Systems	IV
Sridhar	C / A	HRM	II / III
Quadir	Bose	Finance	III / II

48. a

49. c

50. d

51. a

52. b

53. a If the monsoon comes in time it rains aplenty in the peninsula. (i)  
If it rains aplenty in the peninsula there is no crop failure (ii)  
If the fertilizers are not available in the market then there is a crop failure. (iii)  
So, If the fertilizers are available in the market then there is a no crop failure.  
Again...  
If fertilizers are available in the market shipping line is working smoothly. (iv)  
So, if the monsoon comes in time, the shipping line is working properly.  
If the shipping line is working properly, monsoon does not come in time. (vi)
54. d Since all mammals have hairs (I)  
And anything which has hair does not have feathers (VI)  
And anything which does not have feathers can not fly (II)  
So, mammals can not fly.  
Thus, X is a mammal (VII) and X can fly (VIII)
55. c Ram always drinks orange juice while watching cricket (I)  
Ram does not drink juice on weekdays (III)  
Ram drinks orange juice only at home (V)  
So, Ram watches cricket only at weekends and Ram is at home then.  
Again...  
During, weekends, Ram is always with his friends (IV)  
If Ram is with his friends he is not at home (II)  
So, during weekends, Ram is not at home
56. b No soup, that is cold, has Croutons in it (i)  
So, hot soup has Croutons in it.  
No soup that does not have Croutons in it is fit for drinking (iii)  
So, hot soup is fit for drinking.  
The soup in the cup is fit for drinking (iv)  
So, the soup in the cup is hot (ii)
57. c My paper did not get a prize in the conference (v)  
All the papers presented in the conference that fail to get a prize, are rejected for journal publication (i)  
All the papers, which are rejected for journal publication, are to appear in the proceedings (ii)  
None of the papers, appearing in the proceedings has any real data set (iii)  
All the papers without any real data set have an extensive simulation study (iv)  
My paper has an extensive simulation study (v)
58. a Everybody carries an umbrella when it is raining (ii)  
When people carry umbrellas the day never turns out fine. (iii)  
My lucky days always turn out fine. (vi)  
I call no day unlucky when I do not have fight with my wife. (v)  
The only days I have fight with my wife are cloudy days. (iv)  
Rainy days are always cloudy. (i)

61. b The author is in favour of using forceful measures rather than voluntary population control programmes. Option 'b' further says that in another instance such measures have been successful.
62. d This is clearly implied from the last line which talks about bacterial & viral infections.
63. d This elaborates on the author's belief that there must be another reason for being overweight, besides less sleep.
64. d The paragraph discusses the thrust on training in in-house establishments by the defence organization making 'd' the correct answer.
65. b The author has drawn a comparison between people's behaviour in the stock market and in shopping malls etc. this means he believes that there is a similarity between the two.

#### Solutions for questions 66 to 70:

O supports Finance

Q coordinates Operations

N supports Operations

P supports Operations

Professor	Coordinate	Support
L		
M		
N		Operations
O		Finance
P		Operations
Q	Operations	

P and Q have Marketing as one of their subjects.

Professor	Coordinate	Support
L		
M		
N		Operations
O		Finance
P	Marketing	Operations
Q	Operations	Marketing

Finance and IT are subjects of L as well as O.

Professor	Coordinate	Support
L		
M		
N		Operations
O	IT	Finance
P	Marketing	Operations
Q	Operations	Marketing

3 people coordinate Finance.

Professor	Coordinate	Support
L	Finance	
M	Finance	
N	Finance	Operations
O	IT	Finance
P	Marketing	Operations
Q	Operations	Marketing

IT is L's subject.

Strategy is supported by one of the professors.

Professor	Coordinate	Support
L	Finance	IT
M	Finance	Strategy
N	Finance	Operations
O	IT	Finance
P	Marketing	Operations
Q	Operations	Marketing

66. d

67. b

68. c

69. a

70. a

71. b (iii) is a generic statement which opens the statement.  
(i) (ii) and (ii) (iv) are the mandatory pairs.

72. b (ii) and (iii) is the mandatory pair and (iv) seems to be the concluding sentence. Now we are left with options (A) and (B). Between (i) and (ii), (ii) is likely to start the paragraph because (ii) is making a statement and (i), like (iii), is substantiating the statement by presenting facts.

73. d (i) appears to be the opening sentence. There are two options B and D starting with (i). (iii) (ii) and (iii) (iv) are the mandatory pairs.

74. d (i) and (ii) is the mandatory pair which is suggested by the conjunction 'however' in (ii). Only in D we have (i) (ii) sequence.

75. b The opening sentence is (iv). So, C and D can be eliminated. (iv)(v) and (v)(vi) are mandatory pairs.

76. b From Statement I,  $G = S$   
From statement II,  $G + R + S = 88$   
From statement III,  $R = G + S$   
Combine II and III, we get  $R = 44$  years.

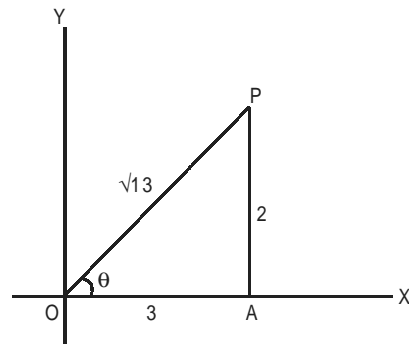
77. b In the given information South-East becomes West and North-East becomes South.  
That means, it is moving 135 degrees clock-wise direction. So West will become North-East.

78. b At least one thing has to happen out of two things.  
(i) The stock price of XYZ Corporation will appreciate.  
(ii) The employee union will not call a strike.  
Option (a): Statement (I) has happened. So statement (II) may or may not happen.  
Option (b): Statement (II) has not happened. So statement (I) has to happen. So it is deducted.  
Option(c): Statement (I) and (II) have not happened. So it is not deducted because at least one thing has to happen.  
Option (d): Statement (II) has happened. So statement (I) may or may not happen.

79. c Two things are given:  
First: If P defaults then the entire supply chain breaks down.  
Second: If the supply chain breaks down then production stops.  
Here the supply chain has broken down then production has to stop. But P might or might not have defaulted.

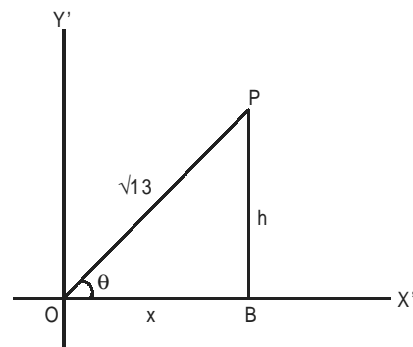
80. b In the English alphabet, the letters A = 1, B = 2 and so on are coded in the numerical numbers. If vowels are moved at the end then all other letters put in a sequence of numerical numbers start from 1. So M will represent for Q, E for G, T for Y and A for B. Hence META is coded as QGYB.

81. a



$$\text{Here } \sin \theta = \frac{2}{\sqrt{13}} \text{ and } \cos \theta = \frac{3}{\sqrt{13}}$$

In the change of reference, the new position of point 'P' is



$$\text{Here } \sin(\theta + 30) = \frac{h}{\sqrt{13}}$$

$$\Rightarrow \sin \theta \cdot \cos 30 + \cos \theta \cdot \sin 30 = \frac{h}{\sqrt{13}}$$

$$\Rightarrow \frac{2}{\sqrt{13}} \times \frac{\sqrt{3}}{2} + \frac{3}{\sqrt{13}} \times \frac{1}{2} = \frac{h}{\sqrt{13}}$$

$$\Rightarrow \sqrt{3} + \frac{3}{2} = h \Rightarrow h = \left( \frac{3}{2} + \sqrt{3} \right)$$

$$\text{Now } \cos(\theta + 30) = \frac{x}{\sqrt{13}}$$

$$\Rightarrow \cos \theta \cdot \cos 30 - \sin \theta \cdot \sin 30$$

$$\Rightarrow \frac{3}{\sqrt{13}} \times \frac{\sqrt{3}}{2} - \frac{2}{\sqrt{13}} \times \frac{1}{2} = \frac{x}{\sqrt{13}}$$

$$\Rightarrow \frac{3\sqrt{3}}{2} - 1 = x$$

Hence, the new coordinates of 'P' is

$$\left( \frac{3\sqrt{3}}{2} - 1, \frac{3}{2} + \sqrt{3} \right)$$

**Shortcut:**

new	x	y	→	old
↓	↓	↓		
X	cos θ	- sin θ		
Y	+ sin θ	cos θ		

	3	2
X	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$

Y	$+\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
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$$X = 3 \times \frac{\sqrt{3}}{2} + 2 \times \left( -\frac{1}{2} \right) = \frac{3\sqrt{3}}{2} - 1$$

$$Y = 3 \times \left( \frac{1}{2} \right) + 2 \times \left( \frac{\sqrt{3}}{2} \right) = \frac{3}{2} + \sqrt{3}$$

82. c  $5 \log_{27}(y) + 2 \log_9(81y)$

$$= \frac{5}{3} \log_3(y) + \frac{2}{2} \log_3(81y)$$

$$= \log_3(81) + \log_3(y^8)$$

$$= 4 + \frac{8}{3} \log_3(y) = 20$$

$$\Rightarrow \log_3(y) = 6$$

$$\Rightarrow y = 3^6 = 729$$

83. d His EPF and 50% of employer's share from 1-4-2004 to 31-3-2005

$$= \frac{9000 \times 10}{100} + \frac{9000 \times 10}{100} \times \frac{1}{2}$$

$$= 10800 + 5400 = \text{Rs. } 16200$$

His amount from 1-4-2005 to 31-3-2006

$$= \frac{9500 \times 10}{100} + \frac{9500 \times 10}{100} \times \frac{1}{2}$$

$$= 11400 + 5700$$

$$= \text{Rs. } 17100$$

His amount from 1-4-2006 to 31-3-2007

$$= \frac{10250 \times 10}{100} + \frac{10250 \times 10}{100} \times \frac{1}{2}$$

$$= 12300 + 6150 = \text{Rs. } 18450$$

$$\text{Total amount} = 16200 + 17100 + 18450 = \text{Rs. } 51750$$

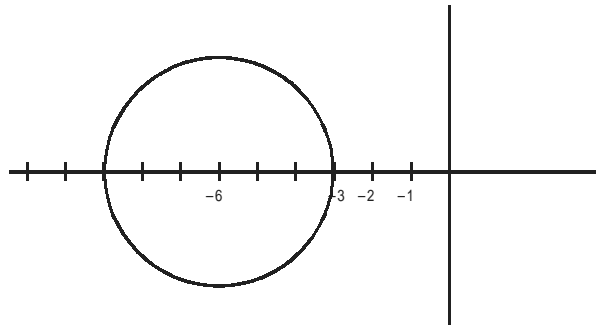
84. b  $\lim_{n \rightarrow \infty} (2^n + 7^n)^{\frac{1}{n}}$

$$= 7 \times \lim_{n \rightarrow \infty} \left( 1 + \left( \frac{2}{7} \right)^n \right)^{\frac{1}{n}}$$

$$= 7 \times (1 + 0)^0$$

$$= 7$$

85. a



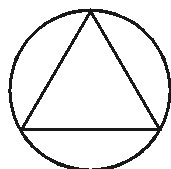
$|z + 6| = 3$  represents circle with centre  $(-6, 0)$  and radius 3.

$z$  lies as the boundary of circle.

$|z + 3|$  is maximum when it is at  $(-9, 0)$  and  $\max |z + 3| = 6$

$$\begin{aligned}
 86. a \quad & \sum_{k=1}^{l-1} \left( \sin \frac{2k\pi}{l} - i \cos \frac{2k\pi}{l} \right) \\
 &= -i \sum_{k=1}^{l-1} \left( \cos \frac{2k\pi}{l} + i \sin \frac{2k\pi}{l} \right) \\
 &= -i \left( \sum_{k=0}^{l-1} \left( \cos \frac{2k\pi}{l} + i \sin \frac{2k\pi}{l} \right) - 1 \right) \\
 &= -i(0-1) = i
 \end{aligned}$$

87. b The required probability is the ratio of area of triangle to the area of the circle.



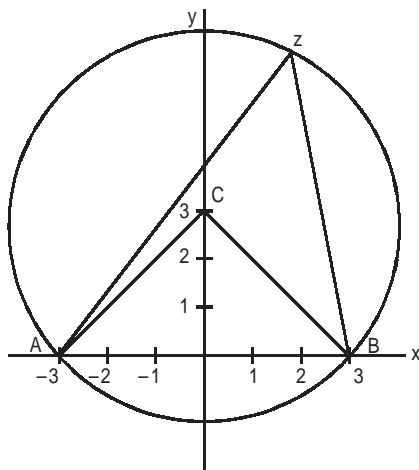
$$\begin{aligned}
 &= \frac{\frac{1}{2} \times r\sqrt{3} \times \frac{3}{2}r}{\pi r^2} \\
 &= \frac{3\sqrt{3}}{4\pi}
 \end{aligned}$$

88. c  $A = \{1, 2\}$   
 $\therefore n = 2$   
Let  $m = 2$   
 $x_1 = \phi, x_2 = \{1, 2\}$   
 $x_1 = \{1, 2\}, x_2 = \phi$   
 $x_1 = \{1\}, x_2 = \{1, 2\}$   
 $x_1 = \{1, 2\}, x_2 = \{1\}$   
 $x_1 = \{2\}, x_2 = \{1, 2\}$   
 $x_1 = \{1, 2\}, x_2 = \{2\}$   
 $x_1 = \{1\}, x_2 = \{2\}$   
 $x_1 = \{2\}, x_2 = \{1\}$   
 $x_1 = \{1, 2\}, x_2 = \{1, 2\}$   
9 possibilities  
 $= (2^2 - 1)^2 = (2^m - 1)^n$   
Now  $A = \{1, 2\}$   
 $\therefore n = 2$   
Let  $m = 1$   
 $x_1 = \{1, 2\}$   
Only 1 possibility  
i.e.  $(2^1 - 1)^2 = (2^m - 1)^n$

$$\begin{aligned}
 89. c \quad & 2e^{iB} = e^{iA} + e^{iC} \\
 & \Rightarrow 2\cos B = \cos A + \cos C \\
 & 2\cos B = 2\cos \frac{A+C}{2} \cos \frac{A-C}{2} \\
 & \cos B = \sin \frac{B}{2} \cos \frac{A-C}{2} \\
 & 2\sin B = \sin A + \sin C \\
 & \sin B = \sin \frac{A+C}{2} \cos \frac{A-C}{2} \\
 & 2\sin \frac{B}{2} \cos \frac{B}{2} = \cos \frac{B}{2} \cos \frac{A-C}{2} \\
 & 2\sin \frac{B}{2} = \cos \frac{A-C}{2} \\
 & 2\cos B = \cos^2 \frac{A-C}{2} \\
 & \text{Let } A = B = C = 60^\circ \\
 & \therefore e^{iA} - e^{iC} = \frac{1}{2} + i\frac{\sqrt{3}}{2} \text{ form a} \\
 & \text{constant AP}
 \end{aligned}$$

$$\begin{aligned}
 90. b \quad & \text{gof} = \sin[(x)]\pi \\
 & 0 \leq (x) < 1 \\
 & [(x)] = 0 \\
 & \text{gof}(x) = \sin 0\pi = 0
 \end{aligned}$$

91. a



$$\begin{aligned}
 & \arg \left( \frac{z-3}{z-(-3)} \right) = \frac{1}{2} \angle ACB \\
 &= \frac{1}{2} \times 90^\circ = \frac{\pi}{4}
 \end{aligned}$$



92. c  $\int_0^{\pi} |\sin x + \cos x| dx$

$$= \int_0^{\pi} \sqrt{2} \sin\left(x + \frac{\pi}{4}\right) dx$$

$$= \sqrt{2} \int_0^{\pi} \sin\left(x + \frac{\pi}{4}\right) dx$$

$$x + \frac{\pi}{4} = y$$

$$dx = dy$$

$$= \sqrt{2} \int_{\pi/4}^{5\pi/4} |\sin y| dy$$

$$= \sqrt{2} \int_{\pi/4}^{\pi} \sin y dy - \sqrt{2} \int_{\pi}^{5\pi/4} \sin y dy$$

$$= \sqrt{2} [-\cos y]_{\pi/4}^{\pi} - \sqrt{2} [-\cos y]_{\pi}^{5\pi/4}$$

$$= \sqrt{2} \left(1 + \frac{1}{\sqrt{2}}\right) - \sqrt{2} \left(\frac{1}{\sqrt{2}} - 1\right)$$

$$= \sqrt{2} + 1 - 1 + \sqrt{2} = 2\sqrt{2}$$

93. Here  $\alpha = \sum_{n=0}^{\infty} \sin^{2n} \phi$  and  $\beta = \sum_{n=0}^{\infty} \cos^{2n} \phi$

$$\text{So, } \alpha = 1 + \sin^2 \phi + \sin^4 \phi + \dots = \frac{1}{1 - \sin^2 \phi}$$

$$\text{and } \beta = 1 + \cos^2 \phi + \cos^4 \phi + \dots = \frac{1}{1 - \cos^2 \phi}$$

$$\text{Now, } \alpha^{-1} + \beta^{-1} = 1 - \sin^2 \phi + 1 - \cos^2 \phi = 2 - 1 = 1$$

94. d  $\phi(x) = \prod_{i=1}^n (x - x_i) = (x - x_1)(x - x_2) \dots (x - x_n)$

$$\phi'(x) = (x - x_2) \dots (x - x_n) + (x - x_1)(x - x_3) \dots (x - x_n) + \dots + (x - x_1) \dots (x - x_{n-1})$$

$$\frac{\phi'(x)}{\phi(x)} = \frac{1}{x - x_1} + \frac{1}{x - x_2} + \dots + \frac{1}{x - x_n}$$

$$\frac{x\phi'(x)}{\phi(x)} = \frac{x - x_1 + x_1}{x - x_1} + \frac{x - x_2 + x_2}{x - x_2} + \dots + \frac{x - x_n + x_n}{x - x_n}$$

$$= 1 + \frac{x_1}{x - x_1} + 1 + \frac{x_2}{x - x_2} + \dots + 1 + \frac{x_n}{x - x_n}$$

$$= n + \sum_{i=1}^n \frac{x_i}{x - x_i}$$

$$\sum_{i=1}^n \frac{x_i}{x - x_i} = \frac{x\phi'(x)}{\phi(x)} - n$$

$$= \frac{x\phi'(x) - n\phi(x)}{\phi(x)}$$

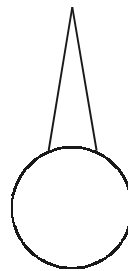
95. a  $\lim_{n \rightarrow \infty} \frac{1}{n} \begin{pmatrix} 1 & \frac{a}{n} \\ -\frac{a}{n} & 1 \end{pmatrix}^n$

$$= \lim_{n \rightarrow \infty} \frac{1}{n} \begin{pmatrix} 1 & \frac{a}{n} \\ -\frac{a}{n} & 1 \end{pmatrix} \times \begin{pmatrix} 1 & \frac{a}{n} \\ -\frac{a}{n} & 1 \end{pmatrix} \dots n \text{ times}$$

$$= \lim_{n \rightarrow \infty} \frac{1}{n} \left( 1 - \frac{a^2}{n^2} + \dots n \text{ terms } \left( \frac{na}{n} - \dots n \text{ terms } \right) - \left( \frac{na}{n} - \dots n \text{ terms } \right) \left( 1 - \frac{a^2}{n^2} + \dots n \text{ terms } \right) \right)$$

$$= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$$

96. d



Height of the cone = 10 units

Volume of the cone =  $30\pi$  cubic units.

$\Rightarrow$  diameter of the cross section from where sphere has been sectioned = 6 units.

Height of the sectioned sphere =  $19 - 10 = 9$  units.

$$\Rightarrow r + \sqrt{r^2 - 3^2} = 9$$

$$\Rightarrow r = 5 \text{ units}$$

$\Rightarrow$  volume of the original sphere from which the

$$\text{base has been sectioned} = \frac{4}{3}\pi r^3 = \frac{500}{3}\pi$$

97. a Let there be 20L of mixture in both the vessels.

In A, milk = 16L and water = 4L

In B, milk = 15L and water = 5L

25% from A to B

$$\Rightarrow \text{milk in B} = 15 + 4 = 19\text{L}$$

$$\Rightarrow \text{water in B} = 5 + 1 = 6\text{L}$$

ratio = 19:6

Equal amount from B to A

$$\Rightarrow \text{milk in A} = 12 + \frac{19}{5} = \frac{79}{5}$$

$$\Rightarrow \text{water in A} = 3 + \frac{6}{5} = \frac{21}{5}$$

Hence, ratio = 79:21

98. b FMMMMMMMFMMMMMMM...

Hence, largest possible number of females is  $\frac{5005}{6}$   
 $= 834 + 1 = 835$ .

99. d Probability that you will win at least one prize = 1 – probability that you will not win any prize.

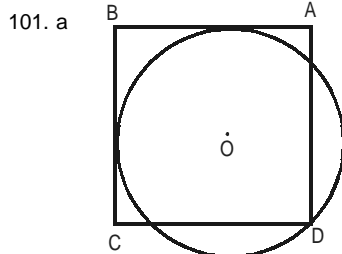
$$= 1 - \frac{{}^5C_3}{{}^{10}C_3} = \frac{11}{12}$$

$$100. A = \begin{pmatrix} \cos \theta & \sin \theta & 0 \\ -\sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$|A| = \max_j \left( \sum_{i=1}^n |a_{ij}| \right)$$

$$= \max(|\cos \theta| + |\sin \theta|, 1)$$

$$= \text{At } \theta = \frac{\pi}{4}, |\sin \theta| + |\cos \theta| \text{ attains maximum } \sqrt{2}.$$



DO = r

$$OB = \sqrt{2} r$$

$$\Rightarrow r + \sqrt{2} r = \sqrt{2} a$$

$$\Rightarrow r = a(2 - \sqrt{2})$$

102. c Here  $(t, s) = t(1, 0) + s(0, 1)$

$$\text{Therefore } T(t, s) = tT(1, 0) + sT(0, 1)$$

$$= t(0, -1) + s(1, 0) = (s, -t)$$

So, the linear transformation of A is  $T(t, s) = T(s, -t)$

The eigen values of A, i.e.  $\lambda = i$  and  $\lambda = -i$

The eigen vectors, i.e.  $(1, i)$  and  $(1, -i)$

So,  $T(1, i) = (i, -1)$  and  $T(1, -i) = (-i, -1)$

Therefore  $(i, -1) = i(1, i) + 0(1, -i)$  and  $(-i, -1) = 0(1, i) + (-i)(1, -i)$

The matrix is  $\begin{pmatrix} i & 0 \\ 0 & -i \end{pmatrix}$

$$103. a \lim_{n \rightarrow \infty} \sum_{r=1}^n \tan^{-1} \left( \frac{1}{2r^2} \right)$$

$$= \lim_{n \rightarrow \infty} \sum_{r=1}^n \tan^{-1} \left[ \frac{(1+2r) - (2r-1)}{1 - (1+2r)(2r-1)} \right]$$

$$= \lim_{n \rightarrow \infty} \sum_{r=1}^n \tan^{-1} \left[ (1+2r) - \tan^{-1}(2r-1) \right]$$

=

$$\lim_{n \rightarrow \infty} \left[ \tan^{-1}(3) - \tan^{-1}(1) + (\tan^{-1}(5) - \tan^{-1}(3)) + \dots + (\tan^{-1}(1+2n) - \tan^{-1}(2n-1)) \right]$$

$$= \lim_{n \rightarrow \infty} [\tan^{-1}(1+2n) - \tan^{-1}(1)]$$

$$= \tan^{-1}(\infty) - \tan^{-1}(1) = \frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}$$

**For questions 104 and 105:**

$$\text{Revenue} = (300 - 2x)(150 + x)$$

$$\text{Maintenance} = 120 \times 300 + 16(300 - 2x)$$

$$\Rightarrow \text{Profit} = \text{Revenue} - \text{Maintenance}$$

$$= 4200 + 32x - 2x^2$$

$$= 4328 - 2(8 - x)^2$$

$$\Rightarrow \text{Maximum profit occurs when } x = 8$$

$$104. c \text{ Optimal tariff} = 150 + 8 = \text{Rs. } 158$$

105. b Now,

$$\text{Profit} = 4200 + 32x - 2x^2 + 600 [2x/5]$$

From the options,  $x = 10$  gives us maximum profit

$$\Rightarrow \text{optimal tariff} = 150 + 10 = \text{Rs. } 160$$

106. c Here  $3X_A + 6X_B = 4$   
 $X_A + X_B = 1, 1 > x > 0$  and  $1 > y > 0$   
 Solving both equations, we get

$$X_A = \frac{2}{3} \text{ and } X_B = \frac{1}{3}$$

$$\text{So, } R_P = \frac{2}{3} \times 9 + \frac{1}{3} \times 12 = 6 + 4 = 10$$

107. a  $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{0} = \lambda$  (say)

Let  $(\lambda + 2, \lambda + 3, 4)$  be the required point then mid-point of line joining this point with given point i.e.  $(2, 3, 4)$  lies on the plane given.

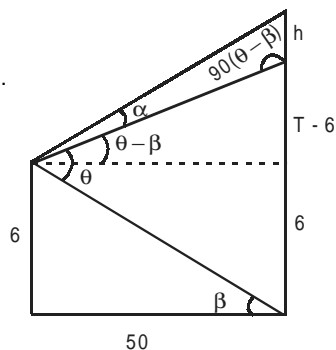
$$\text{i.e. } \frac{\lambda+2+2}{2} + \frac{\lambda+3+3}{2} = 0$$

$$\Rightarrow 2\lambda + 10 = 0$$

$$\Rightarrow \lambda = -5$$

Hence required points is given by  $(-3, -2, 4)$

108.



$$\tan \theta = 2 \text{ and } \tan \alpha = \frac{1}{10}$$

$$\tan(\theta - \beta) = \frac{T-6}{50}, \tan \beta = \frac{6}{50} = \frac{3}{25}$$

$$\tan \theta = \tan(\theta - \beta + \beta)$$

$$\Rightarrow 2 = \frac{\frac{T-6}{50} + \frac{3}{25}}{1 - \frac{T-6}{50} \cdot \frac{3}{25}} = \frac{25(T-6) + 150}{50 \cdot 25 - 3(T-6)}$$

$$\Rightarrow 2500 - 6(T-6) = 25T$$

$$2536 = 31T$$

$$\tan(\theta - \beta) = \frac{2350}{31 \cdot 50} = \frac{47}{31}$$

$$\text{Now } \tan((\theta - \beta) + \alpha) = \frac{h + T - 6}{50}$$

$$\Rightarrow \tan\left(\tan^{-1}\left(\frac{47}{31}\right) + \tan^{-1}\left(\frac{1}{10}\right)\right) = \frac{h + \frac{2536}{31} - 6}{50}$$

$$\Rightarrow \tan\left(\tan^{-1}\left(\frac{\frac{47}{31} + \frac{1}{10}}{1 - \frac{47}{31 \times 10}}\right)\right) = \frac{31h + 2536 - 186}{31 \times 50}$$

$$\Rightarrow \frac{470 + 31}{310 - 47} = \frac{31h + 2536 - 186}{31 \times 50}$$

$$\Rightarrow \frac{501}{263} = \frac{31h + 2350}{31 \times 50}$$

$$\Rightarrow h = 19.44$$

Hence  $h \approx 18$  ft.

109. d

A, B and C together in 15 days.

$\Rightarrow$  A alone in 90 days

B alone in 45 days

C alone in 30 days

Wages per day per unit work for A, B and C are

$$\frac{3}{1} : \frac{5}{2} : \frac{6}{3}$$

Hence, A is the least efficient and hence, must be done away with.

For B and C, the whole work can be finished in 18 days and hence, remaining  $\frac{2}{3}$  rd of the work can be finished in 12 days only.

110. Assume  $f(x) = x^n + 1$

$$\text{and } f\left(\frac{1}{x}\right) = \frac{1}{x^n} + 1$$

$$\text{So, } f(x) \cdot f\left(\frac{1}{x}\right) = (x^n + 1)\left(\frac{1}{x^n} + 1\right)$$

$$= (1 + x^n) + \left(\frac{1}{x^n} + 1\right)$$

$$= f(x) + f\left(\frac{1}{x}\right)$$

$$\text{Now } f(x) = x^n + 1 = 9$$

$$\Rightarrow x^n = 8 \Rightarrow n = 3$$

$$\therefore f(x) = x^3 + 1$$

$$\text{Hence } f(x) = 4^3 + 1 = 65$$

111. b  $f(x) = f[x] + [-x]$

$x = n \in \mathbb{Z}$

$f(x) = n + (-n) = 0$

$LHL_n = \lim_{h \rightarrow 0} ([n-h] + [-(n-h)])$

$= n - 1 + (-n) = -1$

$RHL_n = \lim_{h \rightarrow 0} ([n+h] + [-(n+h)])$

$= n + (-(n+1)) = -1$

$LHL_n = RHL_n = -1 \neq f(n)$

112. d Suppose the population is 100 people. 30 people smoke, and out of them 6 people will be having lung cancer. This 6 represents 80% of lung cancer patients (because they smoke). Hence, total percentage of population having lung cancer =

$\frac{6}{80} \times 100 = 7.5\%$

113. d In  $a, b, c, d$   $3^{148} \times 5^{76} \times 7^{139}$  can be taken out common.

If  $3^{148} \times 5^{76} \times 7^{139} = p$ , then

$a = 3^2 \times 7 p$

$b = 7^2 p$

$c = 5^4 p$

$d = 3^3 \times 5^4 \times 7^3 p$

Hence, we have  $d < c < a < b$

114. b  $289 = (2 \times 5!) + (2 \times 4!) + 1$   
 $\Rightarrow$  number will be 341256

115. d  $f(f(f(x))) = f\left(f\left[\frac{1}{1-x}\right]\right)$  at  $x \neq 1$

$= f\left[\frac{1-x}{-x}\right]$  at  $x \neq 1$  and  $0$

$= x$

So,  $f(f(f(x)))$  is discontinuous at  $x = 1$  and  $0$ .

116. a Here  $y = 0.37 + \frac{0.45}{x}$  and  $\frac{dx}{dt} = -50$

Now,  $\frac{dy}{dt} = -\frac{0.45}{x^2} \times \frac{dx}{dt} = \frac{0.45}{600 \times 600} \times 50$

$= \frac{25}{4} \times 10^{-5}$

$= \text{Rs. } 0.625 \times 10^{-4}$

117. a Assume  $x$  and  $y$  be the quantities of A and B respectively

So,  $100x + 200y \leq 600$

or  $x + 2y \leq 6 \dots (i)$

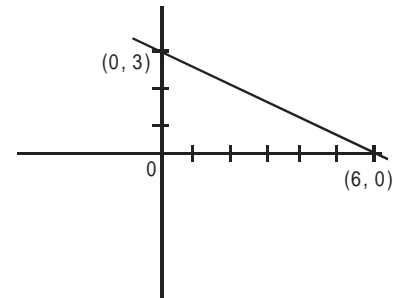
and  $10x \geq \frac{25}{100}(10x + 12y)$

or  $75x - 30y \geq 0 \dots (ii)$

$12y \geq \frac{25}{100}(10x + 12y)$

or  $90x - 25y \geq 0 \dots (iii)$

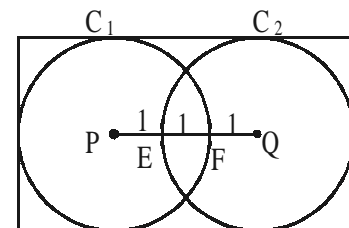
Drawing on the graph, we get



Quantity of mixture is maximum at  $(6, 0)$ .

So, weight of the mixture  $= 6 \times 10 + 12 \times 0 = 60$  kg

118. b

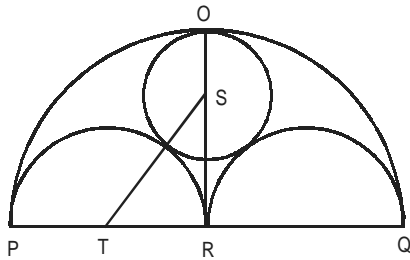


Hence, breadth of the rectangle  $= 4$  cm

And length  $= 7$  cm

Perimeter  $= 2 \times (7 + 4) = 22$  cm

119. b



If radius of C4 =  $r$ , and  $PQ = k$  then

$PR = k/2 = RQ = RO$

$\Rightarrow RS = k/2 - r$

$RT = k/4$

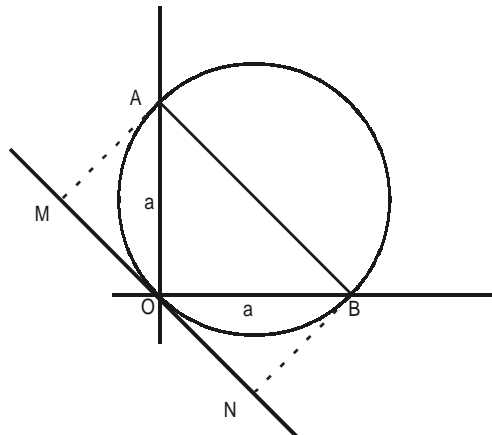
$ST = k/4 + r$

Applying Pythagoras theorem in triangle STR,

$$\left(\frac{k}{4} + r\right)^2 = \left(\frac{k}{4}\right)^2 + \left(\frac{k}{2} - r\right)^2$$

$\Rightarrow r = k/6$

120. d



$$AM + BN + OO = \frac{a}{\sqrt{2}} + \frac{a}{\sqrt{2}} + 0 = \sqrt{2} a$$

121. None of the options is correct as it is not told whether we need to scan the graph with regards to number or turnover of future contracts.

122. b This question needs us to find out the individual growth rate or decline rate for Number of future contracts (Both Stock and Index) and Turnover of future contracts (Both Stock and Index). After finding out this, we need to find out the difference in there growth/decline rates.  
Difference for Index futures in between Mar-Apr is highest. So, **(B)** If index futures is the answer.

123. b This occurs in between Mar-Apr. **(B)** Number of Index Futures Contracts

124. c This occurs in March only.

125. b Can be seen by observation.

126. d

127. a

128. d Its simply the value of (Central/State) to be found out. And North-Eastern region is more than 1.1, which is highest.

129. d Simple calculation involved. Percentage of nuclear power in total installed capacity = (Nuclear power/ Total installed capacity) =  $(2720)/(103201) = 2.63\%$

130. d Highest contribution comes from Thermal in Eastern region, Central sector.

131. d

132. b 1995-96 and 1997-98 are the two years. So, (b)

133. c Again a visual inspection question. Maximum difference occurs in between 1994-95 and 1995-96. So, (C) . (And remember it is not growth rate.)

134. d (As observed)

135. d It can be seen that the bar of FII is sometimes getting up and down. Similar is the case with the bar of Total flows.

136. b

137. a Estimated reserves =  $1146.49 \times \frac{2.53}{100} \approx 29$   
Hence (a)

138. c As found out USA has an estimated reserve = 29 billion barrels.

Daily net consumption of USA =  $8.84 - 20 = 11.16$  million barrels.

Hence number of years that the oil will lost =

$$\frac{29 \times 1000}{11.16 \times 360} \approx 8 \text{ years}$$

Hence (c)

139. d Difference between production and consumption figures for

$$\text{India} = 2.2 - 0.66 = 1.54 \text{ million barrels}$$

$$\text{Russia} = \frac{7.69}{5.13} \times 2.2 - \frac{11.27}{1.86} \times 0.66$$

$$= 3.29 - 3.99 = -0.7$$

Consumption for Saudi-Arabia and Iran is not given.

Hence (d) (Case of some options being incorrect).

140. b Number of days equivalent to one day of consumption

$$\text{of USA} = \frac{51.28}{5.13} = 10$$

Hence (b)

141. d Since any information about the total reserves, daily oil production, daily oil consumption is not given, hence we cannot infer anything.

Hence (d).

142. b Ratio of Annual production to reserves

$$\text{For USA} = \frac{0.24 \times \frac{24.90}{1.86}}{5.58 \times \frac{2.53}{0.52}} = 0.11$$

$$\text{For Iran} = \frac{0.24 \times \frac{11.27}{1.86}}{5.58 \times \frac{11.34}{0.52}} = \frac{1.44}{121.69} = 0.011$$

$$\text{For Saudi-Arabia} = \frac{0.24 \times \frac{28.17}{1.86}}{5.58 \times \frac{22.85}{0.52}} = \frac{3.63}{255} = 0.014$$

$$\text{India} = \frac{0.24}{5.58} = 0.04$$

Hence (b).

143. d Since the production 5 years hence is not given, hence we cannot say anything about the oil reserves.

Hence (d)

144. b Percentage =  $\frac{3.14}{6.02} = 52.15$

Hence (b).

145. d Looking at the Charts we see that none of the options are true.

146. a From income graph, we see that the interest earned to total income shows increasing trend.

Hence (a)

147. c From income graph, we see that interest earned and total income reported similar decline in 2003 and 2004, although, the decline as seen is very imperceptible.

Hence (c).

148. b From both the graphs we see that the difference between total income and expenditure is maximum in 2003.

Hence (b)

149. d As seen from the expenditure graph,

$$\text{Ratio for 2002} \approx \frac{1}{8.2}$$

$$2003 = \frac{8}{22} = 0.33$$

$$2004 = \frac{7}{19} = 0.36$$

$$2005 = \frac{5}{19} = 0.26$$

Hence (d).

150. c Looking at option (a) and (c), we see that (a) is not correct. Hence (c) is correct.