MCA 2007 – EXAMINATION PAPER

1. Arrange the following fractions in decreasing (descending) order

1) $\frac{5}{6}, \frac{3}{4}, \frac{5}{8}, \frac{6}{7}$ 2) $\frac{1}{2}, \frac{3}{5}, \frac{3}{10}, \frac{21}{10}$

3) $\frac{7}{12}, \frac{5}{16}, \frac{17}{36}, \frac{1}{3}$ 4) $\frac{2}{9}, \frac{5}{177}, \frac{22}{1091}, \frac{13}{558}$

2. A vessel full of water weighs 16.5 kg. When the vessel is $\frac{1}{4}$ full, it weighs 5.25kg. Find the weight of empty vessel.

1) 1.5 kg 2) 2.0 kg
3) 1.3 kg 4) 2.5 kg

3. 36 is 6% of what number?

1) 800 2) 600
3) 1200 4) 400

4. The ratio of salary of a worker in july to that in June was $2\frac{1}{2} : 2\frac{1}{4}$. By what % was the salary of July more than the salary of June?

1) $11\frac{1}{9}$
2) 12
3) 13
4) None of the above

5. A reduction of Rs. 2 per kg enables a man to purchase 4 kg more sugar for Rs. 16. Find the original price of sugar.

1) Rs. 3
2) Rs. 5
3) Rs. 4
4) None of the above

6. 30 pens and 75 pencils were purchased for Rs. 510. If the average price of a pencil was Rs. 2, find the average price of the pen

1) Rs. 12
2) Rs. 14
3) Rs. 20
4) None of the above

7. The average monthly expenditure of a family was Rs. 2,200 during the first 3 months, Rs. 2,250 during the next 4 months and Rs. 3,210 during the last 5 months of the year. If total savings during the year was Rs. 1,260. Find the average monthly income.

1) Rs. 1,500 2) Rs. 2,800
3) Rs. 2,000 4) Rs. 2,805

8. The average temperature of June, July and August was 31 degree centigrade. The average temperature of July, August and September was 30 degree centigrade. If the temperature of June was 29 degree centigrade. Find the temperature of September

1) 24
2) 28
3) 26
4) None of the above

9. The average age of 40 students in a class is 15 years. When 10 new students are admitted, the average is increased by 0.2 year. Find the average age of the new students.

1) 14 2) 18
3) 16 4) 20

10. What must be subtracted from each term of the ratio 3:7 so that the ratio becomes 2:5

1) 1
2) 4
3) 2
4) None of the above

11. The ratio of the number of ladies to gents at a party was 1:2, but when 2 ladies and 2 gents left, the ratio became 1:3. How many people were originally present in the party?

1) 12
2) 14
3) 20
4) None of the above

12. The sum of the present age of A, B and C is 90 years. Six years age, their ages were in the ratio 1:2:3. What is the present age of C?

1) 36 years 2) 44 years
3) 42 years 4) 48 years

13. Two sums of money are in the ratio of 2:5 if the second sum is Rs. 95, find the first sum.

1) 38
2) 36
3) 40
4) None of the above

14. In a Business A,B and C invested Rs. 380, Rs. 400 and Rs. 420 respectively. Divide a net profit of Rs. 180 among the partners

1) 57 60 63
2) 60 60 60
3) 62 28 50
4) None of the above

15. In what proportion should one variety of oil at Rs. 9.50 per kg be mixed with another at Rs. 10 per kg to get a mixture worth Rs. 9.60 per kg?

1) 4 1
2) 6 1
3) 3 1
4) None of the above

16. One litre of water is added to 5 litres of 20% solution of alcohol and water. What is the final strength of alcohol?

1) 16%
2) $16\frac{2}{3}$
3) 18%
4) None of the above

17. Six kilograms of tea at Rs. 6 per kg an d4 kg of tea at Rs. 7 per kg are mixed together and the mixture is sold at 10% profit. What is the selling price per kg of the mixture?

1) Rs. 7.04
2) Rs. 7
3) Rs. 8
4) None of the above

18. If 120 men can do a job in 100 days, in how many days will 150 men do it?

1) 60 days
2) 80 days
3) 120 days
4) None of the above

19. One thousand men in a fortress have provisions for 12 days. How long will the provisions last if 200 more men join them?

1) 14 days 2) 12 days
3) 10 days 4) 16 days

20. A and B can do a job alone in 20 days and 30 days respectively. In how many days the job will be finished if A and B work together?

1) 10 2) 14
3) 12 4) 18

21. There is a leak in the bottom of a cistern. Before the leak, it could be filled in 4.5 hours. It now takes $\frac{1}{2}$ hour longer. If the cistern is full, how long would the leakage empty the full cistern?

1) 40 hours
2) 45 hours
3) 42 hours
4) None of the above

22. A per son purchases 36 orange per rupee and suffers a loss of 4%. Find how many oranges per rupee he is required to purchase to have a gain of 8%?

1) 32
2) 30
3) 28
4) None of the above

23. On what sum of money lent out at 9% per annum simple interest for 6 years does the simple interest amount to Rs. 810?

1) Rs. 1,200
2) Rs. 1,400

3) Rs. 4,500
4) None of the above

24. What sum of money lent out at a compound interest will amount to Rs. 968 in 2 years at 10% per annum interest being charged annually?
1) Rs. 800
2) Rs. 600
3) Rs. 1,200
4) None of the above

25. Find the distance covered by a man walking for 12 minutes at a speed of 3.5 km/hour.
1) 700 metres
2) 800 metres
3) 1200 metres
4) None of the above

Directions for Q. (26-29):

Use the following passage for Questions 26-29:

An employee has been assigned the tasks of allotting officers to six of the staff members. The offices are numbered 1-6. The offices are arranged in a row and they are separated from each other by six foot high dividers. Hence voices sounds and cigarette smoke flow easily from one office to another.

Miss. Robert's needs to use the telephone quite often throughout the day. Mr. Mike and Mr. Brown needed adjacent offices as they need to consult each other often while working. Miss. Hardy is a senior employee and has to be allotted office number 5, having the biggest window.

Mr.Donald requires silence in the offices next to his. Mr. Tim. Mr. Mike and Mr. Donald are all smokers. Miss. Hardy finds tobacco smoke allergic and consecutively the offices next to hers to be occupied by non-smokers.

Unless specifically stated all the employees maintain an atmosphere of silence during office hours.

26. The ideal candidate to occupy the office farthest from Mr. Brown would be
1) Miss. Hardy 2) Mr. Mike
3) Mr. Tim 4) Mr. Donald

27. The three employees who are smokers should be seated in the offices?
1) 1,2 and 4 2) 1,2 and 3
3) 1,2 and 6 4) 2,3 and 6

28. The ideal office for Mr. Mike would be
1) 2 2) 6
3) 3 4) 1

29. In the event of what occurrence, within a period of one month since the assignment of the offices would one or more employees put a request for a change in office forth?
1) Mr. Donald quitting smoking
2) Mr. Tim taking over the duties formerly taken care of by Miss. Robert.
3) Mr. Brown suffering from laryngitis
4) The installation of a noisy teletype machine by Miss. Hardy in her office

Directions for Q. (30-33):

Nine individuals – Z,Y,X,W,V,U,T,S and R are the only candidates, who can serve on three committees – A, B and C, and each candidate should serve on exactly one of the committees.

Committees A should consist of exactly one member more than committee B. It is possible that there are no members of committee C. Among Z, Y and X none can serve on committee A, Among W, V and U none can serve on committee G. Among T, S and R none can serve on committee C.

30. In case T and Z are the individuals serving on committee B, how many of the

nine individuals should serve on committee C?

1) 3 2) 4
3) 5 4) 6

31. Of the nine individuals, the largest number that can serve together on committee C is

1) 9 2) 8
3) 7 4) 6

32. In case any of the nine individuals serves on committee C, Which among the following should be the candidate to serve on committee A?

1) Z 2) Y
3) W 4) S

33. Among the following combinations which could constitute the membership of committee C?

1) X and U 2) Y and T
3) Y, X and W 4) Z,X,U and R

Directions for Q. (34 & 35):
(M,N, O and P are all different individuals)

I. M is the daughter of N.
II. N is the son of O.
III. O is the father of P.

34. Among the following statements, which is true?

1) If B is the daughter of N then M and B are sisters.
2) O is the uncle of M.
3) If C is the granddaughter of O, then C and M are sisters.
4) P and N are brothers

35. Which among the following statements is contradictory to the above premises?

1) O has three children
2) M has one brother
3) P is the father of M
4) Another party C, could be the mother of M

Directions for Q (36-38) :

A bus has exactly six stops on its route. The bus first stops & stop one and then at stops two, three, four, five and six respectively. After the bus leaves stop six the bus turn and return to stop one and repeats the cycle. The stops are at six building that are in alphabetical order L,M,N,O,P and Q.
P is the third stop
M is the sixth stop
The stop O is the stop immediately before Q.
N is the stop immediately before L.

36. In case N is the fourth stop, which among the following must be the stop immediately before P?

1) O 2) N
3) L 4) Q

37. In case L is the second stop, which among the following must be the stop immediately before M?

1) L 2) P
3) Q 4) O

38. In case a passenger gets on the bus at O, rides past one of the stops, and gets off at P, which of the following must be true?

1) O is stop one 2) Q is stop three
3) P is stop four 4) N is stop five

39. What is the greatest integer that divides p^4-1 for every prime number p greater than 5?

1) 240 2) 30
3) 120 4) 48

40. The co-efficient of x^3 in the expansion of $(1+x)^3 (2+x^2)10$ is

1) 31 2) 2^{14}
3) $3C_3+10C_1$ 4) 2^9*10C_1

41. How many continuous real-valued functions f are there with domain (-1, 1) such that $[f(x)]^2 = x^2$ for each x in (-1, 1)?

1) One 2) Two
3) Three 4) Four

42. The inside of a certain water tank is a cube measuring 10 feet on each edge and

having vertical sides and no top. Let h(t) denote the water level in feet above the floor of the tank at time t seconds Starting at time t = 0, water pours into the tank at a constant rate of 1 cubic foot per second and simultaneously, water is removed from the tank at a rate of 0.25 h(t) cubic feet per second. As t -> ∞, what is the limit of the volume of the water in the tank?

1) 600 cu feet
2) 1000 cu feet
3) 400 cu feet
4) The limit does not exist

43. Let x and y be uniformly distributed, independent random variable on (0,1). The probability that the distance between x and y is less than $\frac{1}{2}$ is

1) $\frac{2}{3}$ 2) $\frac{1}{4}$
3) $\frac{3}{4}$ 4) $\frac{1}{3}$

44. For 0 < t < π, will the matrix given below has distinct complex Eigen values λ_1 and λ_2. For what value of t, 0 < t < π, is $\lambda_1 + \lambda_2 = 1$?

$$\begin{vmatrix} cost & sint \\ sint & cost \end{vmatrix}$$

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{6}$
3) $\frac{\pi}{2}$ 4) $\frac{\pi}{4}$

45. A fair coin is to be tossed 8 times. What is the probability that more of the tosses will result in heads than will result in tails?

1) $\frac{1}{4}$ 2) $\frac{93}{256}$
3) $\frac{87}{256}$ 4) $\frac{1}{3}$

46. The function $f(x, y) = x^3 - y^3$ has a relative maximum at the points.

1) (0, 0) 2) (1, 1)
3) $\left(\frac{1}{2}, \frac{1}{2}\right)$ 4) $\left(\frac{1}{3}, \frac{1}{3}\right)$

47. How many integers from 1 to 1000 are divisible by 30 but not by 16

1) 31 2) 32
3) 29 4) 38

48. When 20 children in a classroom line up for lunch, Ramu insists on being somewhere ahead of Somu. If Ramu's demand is to be satisfied, in how many ways can be children line up?

1) $\frac{20!}{2}$ 2) 20!
3) 19! 4) $\frac{19!}{2}$

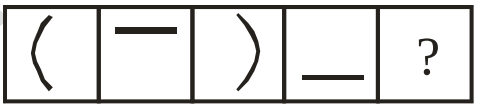
49. Which of the following will NOT be a root of the polynomial in x of the form $9x^5+ax^3+b$, where a and 6 are integers?

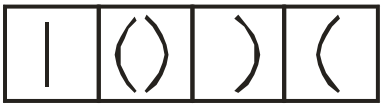
1) -9 2) -5
3) $\frac{1}{4}$ 4) $\frac{1}{3}$

50. If S is a non-empty finite set with k elements then the number of one-to-one functions from S onto S is

1) $k^!$ 2) k^2
3) 2^k 4) 2^{k+1}

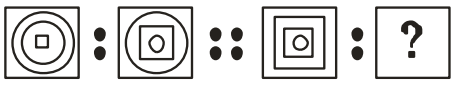
51. What comes in this series?

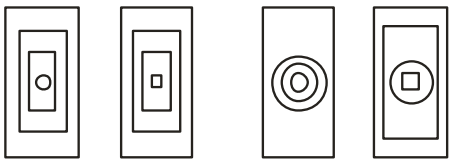




(1) (2) (3) (4)

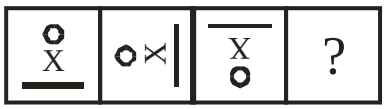
52. What comes in this series?





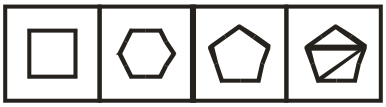
(1) (2) (3) (4)

53. What comes in this series?



(1) (2) (3) (4)

54. What comes in this series?



(1) (2) (3) (4)

55. What comes in this series?

(1) (2) (3) (4)

Directions: Question numbers 56 to 60 are based on the following information:

i) A, B, C, D, E, F and G are sitting around a circle and are facing the center.

ii) G is second to the left of C, who is immediate left of the circle.

iii) A is third to the left of E.

iv) B is between D and E

56. Which of the following is true?

1) B is second to the right of G
2) D is second to the left of E
3) A is to the immediate right of G
4) C is fourth to the left of B

57. Which of the following has the middle person sitting between the remaining two?

1) EFB
2) DEB
3) GDA
4) None of the above

58. Which of the following is false?

1) F is third to the right of D.
2) B is to the immediate left of D
3) G is to the immediate right of D
4) A is fourth to the right of E

59. Which of the following is the position of F?

1) To the immediate left of C
2) Fourth to the right of D
3) Between A and E
4) To the immediate right of A

60. Which of the following pairs has the first person sitting to the immediate left of the second person?

1) BE 2) GD
3) CA 4) DG

61. Which of the following have the same relationship between them as is there between OT:PS?

1) PN : PM
2) BE : FC
3) IL : HK
4) None of the above

62. A is the uncle of B, who is the daughter of C and C is the daughter-in-law of P. How is A related to P?

1) Son 2) Son-in-law
3) Brother 4) Data inadequate

63. If in a certain code, GLAMOUR is written as 'IJCNMWP' and 'MISRULE' is written as ;OGUSSNC' then how will 'TOPICAL' be written in that code?

1) VMRJACJ 2) VNRJABJ
3) VMRHACJ 4) VMRJECN

64. Waves are related to Air in the same way as Ripples are related to

1) World 2) Water
3) Storm 4) Smoke

65. Earth : Axis : : Wheel : ?

1) Tyre 2) Car

3) Road 4) Hub

66. Pava is bigger than Java. Java is bigger than Mava. Rava is not as big as Sava, but is bigger than Java. Mava is not as big as Java. Who is the smallest?
1) Java 2) Pava
3) Rava 4) Mava

67. If Ritu runs less faster than Gopa and Gopa runs as fast but not faster than Masha, then Masha runs
1) As fast as Ritu
2) Faster than Gopa
3) Faster than Ritu
4) Less faster than Ritu

68. Poles : Magnet : : …….. : Battery
1) Cells 2) Power
3) Terminals 4) Energy

69. ACFJ : ZXUQ : : EGJN : ?
1) VUSQ 2) VTRP
3) VRPM 4) VTQM

Directions (Q. 70 to 72) : Select the one which is different from the other three responses:

70. 1) BFIK 2) DHKM
3) MQTV 4) PRVX

71. 1) UAVBWC 2) CHIDJE
3) XLYMZN 4) PEQFRG

72. 1) Madam 2) Eye
3) Hand 4) Malayalam

73. By looking in the mirror, it appears that it is 6 : 30 in the clock. What is the real time?
1) 6 : 30 2) 5 : 30
3) 6 : 00 4) 5 : 00

74. A man walks 6 km towards the north, then turns towards his left and walks for 4 km. He again turns left and walks for 6 km. At this point, he turns to his right and walks for 6 km. How many km and in what direction is he from the starting point?
1) 10 km and West 2) 6 km and South
3) 4 km and South 4) 8 km and West

75. Find out from the set of numbers that does not belong to the group for lack of common property.
1) 22, 4, 5 2) 34, 4, 8
3) 37, 4, 9 4) 54, 4, 13

76. What does ISP stand for?
1) Internet Standard Protocol
2) Integrated Standard Processing
3) Internet Service Provider
4) International Services Provision

77. In the email ID checkthisout.server.com, checkthisout part is known as
1) URL 2) User ID
3) Network address 4) .com address

78. Which of the following are considered as the three categories of e-commerce?
1) Electronic markets, Electronic Data Interchange and Internet Commerce
2) Internet, web services and search engines
3) Web servers, corporate servers and share markets
4) E-mails, e-security and e-transactions

79. Which of the following poultry farms has deployed OSS/Linux to meet its daily computing?
1) Red hat Poultry Farms
2) Microsoft Poultry Farms
3) Reliance Poultry Farms
4) Suguna Poultry Farms

80. What is RFID?
1) Radar Frequency Intensive Devices
2) Radio Frequency Identification
3) Redundant Fault Indicating Devices
4) Rapid Fault Identifying Devices

81. The advertising company that Google purchased recently is
1) Rainbow show 2) Bridge game
3) Mouse click 4) Double click

82. What is CMM?
1) Cooperative Management Model
2) Coexisting Manual Method

3) Capability Maturity Model
4) Consistent Modeling Methodology

83. Which one among the following is not an antivirus company?
1) McAfee 2) Norman
3) Symantec 4) Microsoft

84. Intel's latest processors are
1) multi-core processors
2) embedded processors
3) DSP processors
4) Graphics processors

85. Bluetooth technology helps to transfer files between
1) Clients and web servers
2) Multiple Internet servers
3) Multiple mobile devices
4) Sensor nodes and web servers

86. What is firewall?
1) It protects the network from unwanted traffic
2) It prevents the system from generating excessive heat
3) It detects the occurrence of any fault in the functioning of the network
4) It analyses the failure rate of the system

87. The company that has proposed to make IP phones in Chennai is
1) Norton 2) CISCO
3) IBM 4) Intel

88. Which one among the following is not a Router manufacturer?
1) Jumper systems 2) CISCO
3) Susi 4) Jumper and CISCO

89. The system software that translates high level language to machine language is called
1) Interpreter 2) Compiler
3) Assembler 4) Translator

90. Flash memory is
1) a non-volatile memory
2) an expensive memory
3) a mass storage memory
4) used to store frequently used data

91. A database is
1) the basis of all data stored in the computer
2) structured collection of records
3) an organized collection of system data
4) a repository of information from the internet

92. Which one of the following search engines is for kids?
1) Northern Light 2) Cyber-Sleuth
3) Zoom 4) Bang

93. Natural Language Processing (NLP) is a subfield of
1) Linguistics and computing
2) Al and linguistics
3) Databases and linguistics
4) Internet and linguistics

94. Expand w3c
1) web computing, commercializing and canvassing
2) web conferences, computing and corporate
3) web computing ver.3
4) world wide web consortium

95. Which one of the following is not a programming language?
1) Ruby 2) Small talk
3) Python 4) Snake

96. What is WSDL?
1) Web Specification and Description Logic
2) Web Support and Distribution Limited
3) Web Systems and Data Labs
4) Web Services Definition Language

97. Which one of the following were used in 1st generation computers?
1) Vacuum tubes 2) Transistors
3) Integrated circuits 4) Microprocessors

98. IEEE 802.11 denotes standards for
1) Ethemet
2) Wireless LAN/WAN
3) Campus network

4) Global network

99. USB

1) Uniform System Bus
2) Utility and Support Board
3) Universal Synchronous Bus
4) Universal Serial Bus

100. iPods are

1) mobile storage devices
2) small interface devices
3) portable media players
4) tiny computing devices

MCA – 2007 ANSWERS

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

MCA 2007 – DETAILED SOLUTIONS

1. (4)

In choice (1) $\frac{5}{8} < \frac{6}{7}$

(1) is not correct

In (2) $\frac{1}{2} < \frac{21}{10}$

(2) is not correct.

In (3) $\frac{7}{12} < \frac{17}{36}$

(3) is not correct

Required answer is (4)

2. (1)

Let the weight of the vessel be x and weight of the water be w.

Then $x+W = 16.5$ …..(1)

$$x+\frac{W}{4} = 5.25$$

$$\Rightarrow 4x + W = 4*5.25 \quad \text{…..(2)}$$

Solving (1) and (2)

$3x = 4*5.25-16.5$

$= 21-16.5 = 4.5$

$$\therefore x = \frac{4.5}{3} = 1.5 \text{ kg.}$$

∴ Weight of the empty vessel = 1.5 kg.

3. (2)

$\frac{6}{100} *x = 36 \Rightarrow x = 600$

4. (1)

$$\text{Required \%} = \frac{2\frac{1}{2}-2\frac{1}{4}}{2\frac{1}{4}} * 100 = \frac{\frac{1}{4}}{\frac{9}{4}} * 100 = 11\frac{1}{9}$$

5. (3)

Let the price of the sugar per kg. be x.

Reduced price = x-2

Given $\frac{16}{x-2} - \frac{16}{x} = 4$

$$16\left[\frac{1}{x-2} - \frac{1}{x}\right] = 4$$

$$\frac{1}{x-2} - \frac{1}{x} = 4 \quad \text{….(1)}$$

Check through choices

4 satisfies equ (1)

∴ Required choice is (3)

6. (1)

Let the average price of the pen be x

Then

$(2*75)+(x*30) = 510$

$\Rightarrow 30x = 510-150 = 360$

$x = 12$

7. (2)

Total income = $3*2200+4*2250+5*3210+1260$

$= 16050+6600+9000+1260$

$= 32910$

Average $= \frac{32910}{12} = 2742.5$

8. (3)

June+July+August = 3*31 = 93 …..(1)

July+August+Sep. = 3*30 = 90 …..(2)

(1)-(2) ⇒

June-September = 3

September = June-3

= 29-3 = 26

9. (3)

Total age of 40 students = 40*15 = 600

Total age of 50 students = 50*15.2 = 760

Total age of 10 new students = 760-600 = 160

∴ Average age of new students = $\frac{160}{10} = 16$

10. (4)

$$\frac{3-x}{7-x} = \frac{2}{5}$$

$\Rightarrow 15-5x = 14-25$

$\Rightarrow x = \frac{1}{3}$

11. (1)

Let the number of ladies be x and gents be 2x.

Given $\frac{x-2}{2x-2} = \frac{1}{3}$

$\Rightarrow 3x-6 = 2x-2$

$\Rightarrow x = 4$

∴ Number of ladies = x = 4
∴ Number of gents = 2x = 8
Total = 12

12. (3)

Six years ago age ratio = 1: 2: 3
Let their ages six years ago be x, 2x, 3x
Present ages = x+6, 2x+6, 3x+6
Given
x+6, 2x+6, 3x+6 = 90
6x+18 = 90
⇒ 6x = 72
⇒ x = 12
Present age of C = 3x+6 = 36+6
= 42 years

13. (1)

Given ratio 2:5
Let the sum be 2k, 5k
Given 5k = 95
k = 19
First sum = 2k
= 2*19 = 38

14. (1)

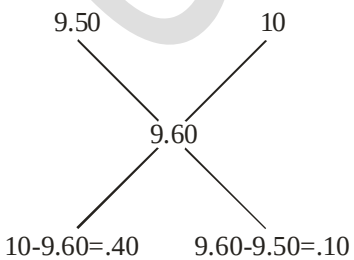
Profit ratio = 380:400:420
= 38:40:42
= 19:20:21

A's share = $\frac{19}{19+20+21}$*180 = 57

B's share = $\frac{20}{60}$ * 180 = 60

C's share = $\frac{21}{60}$ * 180 = 63

15. (1)



Required ratio = .40 : .10 = 4 : 1

16. (2)

In 5 litres alcohol = $\frac{20}{100}$*5 = 1 litre
Water = 5-1 = 4 litre
1 litre water is added to the mixture.
In new mixture water = 5 litres
Alcohol = 1 litre

Strength of Alcohol = $\frac{1}{5+1}$ * 100 = $\frac{100}{6}$

= $16\frac{4}{6} = 16\frac{2}{3}\%$

17. (1)

Cost price of 10 kg mixture
= (6*6) + (4*7)
= 36+28 = 64
Selling price = $\frac{(100+\text{Profit})}{100}$ * cost price
= $\frac{110}{100}$* 64 = $\frac{704}{10}$ = 704
∴ Selling price per kg = $\frac{704}{10}$ = Rs. 7.04

18. (2)

$M_1D_1 = M_2D_2$
120*100 = 150*D_2

$D_2 = \frac{12000}{150}$ = 80 days

19. (3)

$M_1D_1 = M_2D_2$
1000*12 = 1200*D_2
⇒ D_2 = $\frac{1000*12}{1200}$ = 10 days

20. (3)

A's 1 day work = $\frac{1}{20}$

B's 1 day work = $\frac{1}{30}$

(A+B)'s 1 day work = $\frac{1}{20}+\frac{1}{30} = \frac{3+2}{60} = \frac{5}{60} = \frac{1}{12}$
A and B together can finish the job in 12 days.

21. (2)

Let the leakage empty the full cistern be x hrs.

Then

$$\frac{1}{4.5} - \frac{1}{x} = \frac{1}{5}$$

$$\Rightarrow \frac{1}{x} = \frac{1}{4.5} - \frac{1}{5} = \frac{10-9}{45} = \frac{1}{45}$$

$$\Rightarrow x = 45$$

22. (4)

C.P = $\frac{1}{36}$; S.P = $\frac{0.96}{36}$

New C.P = $\frac{100}{108} * \frac{0.96}{36}$

$$= \frac{96}{108*36} = \frac{2}{81}$$

No. of orange per rupee

$$= \frac{1}{\left(\frac{2}{81}\right)} = \frac{81}{2}$$

23. (4)

$$P = \frac{S.I*100}{n*R}$$

$$= \frac{810*100}{6*9} = 1500$$

24. (1)

Amount = $P\left(1+\frac{R}{100}\right)^n$

$$968 = P\left(1+\frac{10}{100}\right)^2$$

$$= P\left(\frac{11}{10}\right)^2$$

$$P = \frac{968*10*10}{11*11} = 800$$

25. (1)

Speed = 3.5 km/hr.

$$= 3.5 * \frac{5}{18} \text{ m/sec.}$$

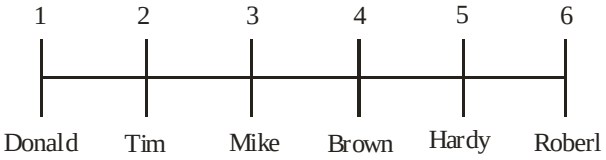
12 min = 12*60 sec.

∴ Distance covered in 12 minutes

$$= 12*60*3.5*\frac{5}{18}$$

= 700 metres

Directions for (26-29)



Hardy's room is 5. Hardy finds tobacco smoke allergic. So 4 and 6 should be occupied by non-smokers. Mike and Brown are adjacent. So Robert can be placed in 6. And Brown room should be 4. Since Mike is adjacent to Brown, his room should be 3. Since Donald requires silence, he may be placed in room 1. Refer the above figure.

Directions (30-33):

30. (2)

T and Z are in B

⇒ Two individuals are serving B

⇒ 3 individuals are in A

In C = 9-(2+3) = 4

C has 4 individuals

31. (4)

If in B, 1 individual, then in A there are 2 individual

At that time C has 6 members

33. (1)

In (1)

If X and U are in C, then Remaining 7. So 4 in A and 3 in B are possible.

Choice (2) is not possible.

Because T should not be in C

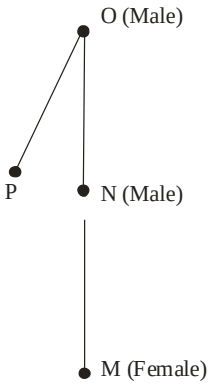
Choice (3) also not possible.

Because if Y, X, W are in C.

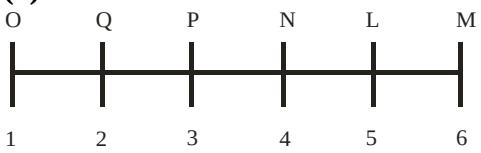
Remaining 6. We cannot divide 6 members into A and B.

(Because A should consist one member more than B).

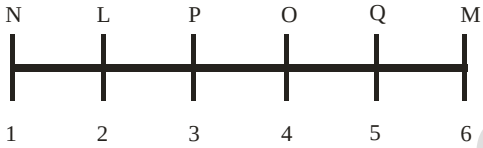
Directions (34 & 35)



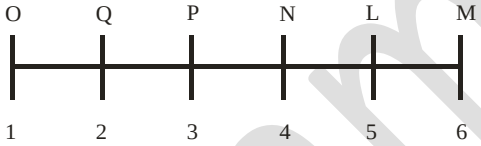
36. (4)



37. (3)



38. (3)



39. (4)

P>5 and P is prime

Take P = 7 then

$P^4 - 1 = 7^4 - 1 = (7^2)^2 - 1$

$= (7^2-1)(7^2+1)$

$= 48*50$

∴ Required number is 48.

40. (*)

$(1+x)^3 (2+x^2)^{10} = (1+3x+3x^2+x^3)x$

$= (2^{10}+{}^{10}C_1 2^9 x^2+{}^{10}C_2 2^8 x^4+\ldots..)$

∴ Coefficient of x^3 is

$2^{10}+{}^{10}C_1 2^9*3 = 2^9[2+(3*{}^{10}C_1)]$

$= 2^9[2+(3*10)]$

$= 32*2^9$

41. (2)

If f(x) = x and

f(x) = -x

then $(f(x))^2 = x^2$

42. (2)

Water pumped into the tank in the rate of h(t) and drained in 0.25 h(t)

∴ Inlet is greater than outlet.

∴ When t -> ∞, the tank would be filled.

At the time volume of the water

= volume of the tank

= 10*10*10 = 1000 cu.ft.

44. (1)

In a matrix, sum of the eigen values is equal to the sum of the main diagonal elements.

In $\begin{bmatrix} \cos t & -\sin t \\ \sin t & \cos t \end{bmatrix}$

$1 = \lambda_1+\lambda_2 = \cos t + \cos t$

$= 2 \cos t$

$\Rightarrow 2\cos t = 1$

$\Rightarrow \cos t = \frac{1}{2}$

$\Rightarrow t = \frac{\pi}{3}$

45. (2)

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

$P(X=x) = {}^nC_x P^x q^{n-x}$

$= {}^nC_x \left(\frac{1}{2}\right)^x \left(\frac{1}{2}\right)^{n-x}$

$= {}^nC_x \left(\frac{1}{2}\right)^x$

n = 8

$\therefore P(X = x) = {}^8C_x \left(\frac{1}{2}\right)^8$

Required probability

P(X = 5) + P(X = 6) + P(X = 7) + P(X = 8)

$= {}^8C_5 \left(\frac{1}{2}\right)^8 + {}^8C_6 \left(\frac{1}{2}\right)^8 + {}^8C_7 \left(\frac{1}{2}\right)^8 + {}^8C_8 \left(\frac{1}{2}\right)^8$

$= \left(\frac{1}{2}\right)^8 [{}^8C_3 + {}^8C_2 + {}^8C_1 + {}^8C_0]$

[use the formula ${}^nC_x = {}^nC_{n-x}$]

$= \frac{1}{258}\left[\frac{8*7*6}{1*2*3} + \frac{8*7}{1*2} + 8 + 1\right]$

$= \frac{1}{258}[56+28+9] = \frac{93}{256}$

46. (4)

$f(x,y) = xy-x^3-y^3$

$f(0, 0) = 0$

$f(1, 1) = 1-1-1 = -1$

$f\left(\frac{1}{2},\frac{1}{2}\right) = \frac{1}{2}.\frac{1}{2} - \frac{1}{8} - \frac{1}{8}$

$= \frac{2-1-1}{8} = 0$

$f\left(\frac{1}{3},\frac{1}{3}\right) = \frac{1}{3}.\frac{1}{3} - \frac{1}{27} - \frac{1}{27}$

$= \frac{3-1-1}{27} = \frac{1}{27}$

So when $(x, y) = \left(\frac{1}{3},\frac{1}{3}\right)$

f(x, y) is maximum.

47. (3)

Number of integers from 1 to 1000 which are divisible by 30 is 33.

L.C.M. of 30 and 16 is 240

Number of integers between 1 and 100 which are divisible by 240 is 4.

∴ Required answer = 33-4 = 29.

48. (*)

Let Ram - R

Sam - S

Considering RS together.

No. of arrangements = 19!

But RS can be arranged amongst themselves in 2! = 2 ways.

∴ Total Number of ways where RS are together = 19! * 2

Number of row arrangements without any restriction = 20!

∴ Required answer = 20!-19!*2

= 19!*20-19!*2

= 19!(20-2)

= 19!*18

49. (3)

When x = -9

$9x^5+ax^3+b = 9(-9)^5+a(-9)^3+b$

$= (-9)^3(9^3+a)+b$

$= -9^3(9^3+a)+b$

Take a =1; $b = 9^3(9^3+1)$

Then $9x^5+9x^3+b = 0$

Similarly when x = -5

we can find integers a and s.t. $9x^5+ax^3+b = 0$

when $x = \frac{1}{4}$

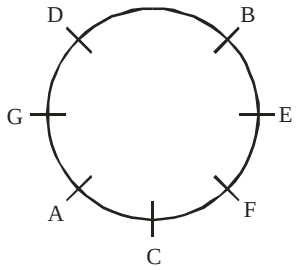
$9x^5+ax^3+b = 9(\frac{1}{4})^5+ a(\frac{1}{4})^3+b$

$= (\frac{1}{4})^3 [9*(\frac{1}{4})^2 + a]+b$

$\frac{1}{4^3}\left[\frac{9}{16} + a\right]+b$

We cannot find integers a and b such that above expression is 0.

Directions (56-60):



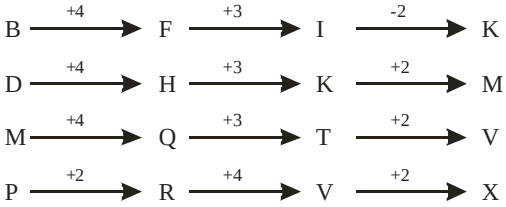
66. (4)

M<J<P

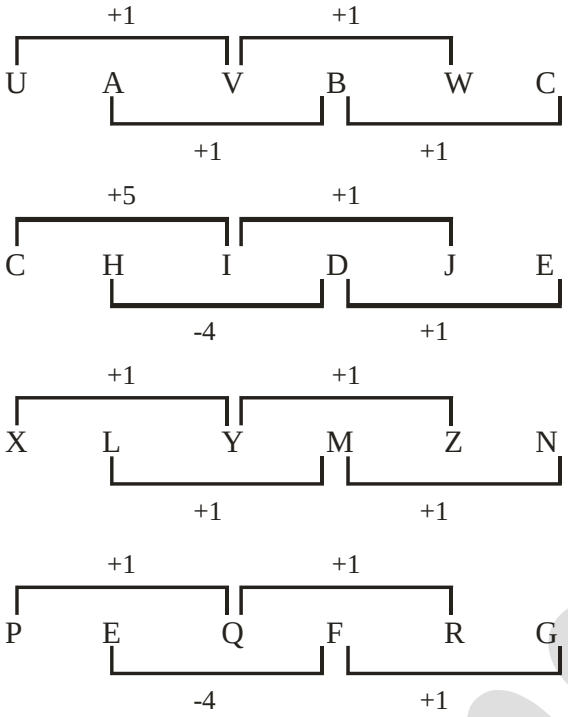
M<J<R<S

So M is the smallest.

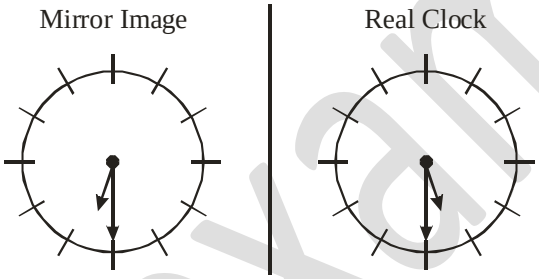
70. (4)



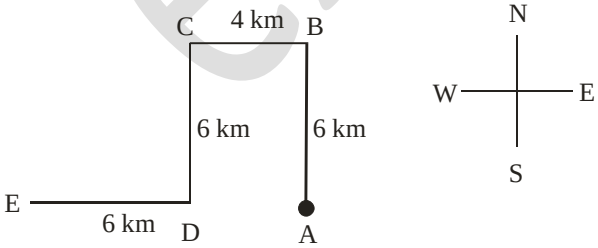
71. (2)



73. (2)



74. (1)



Distance covered = AE = AD+DE
= 4+6 = 10
Direction = West

75. (3)

22 = (4*5)+2
34 = (4*8)+2
37 = (4*9)+1
54 = (4*13)+2