VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

GATE - COMPUTER SCIENCE
MOCK TEST PAPER

- There are a total of 65 questions carrying 100 marks.

- Questions (1-25) will carry 1-mark each and questions (26-55) will carry 2-marks each.

- Questions (56-65) belongs to general aptitude (GA). Questions (56-60) will carry 1-mark each, and question (61-65) will carry 2-marks each

- For Q.1-25 and Q.56-60 1/3 mark will be deducted for each wrong answer. For Q.26-51 and Q. 61-65 2/3 mark will be deducted for each wrong answer. The question pairs (Q.52, Q.53) and (Q.54, Q.55) are linked questions. For Q.52 &54 2/3 mark will be deducted. There is no negative marking for Q.53 &Q.55.

- Q.48-51 are common data questions. If first question is attempted wrongly then answer of second question will not be evaluated.

- Pattern of questions : MCQs & Numerical

- Total marks   : 100

- Duration of test   : 3 Hours

VPM CLASSES

For IIT-JAM, JNU, GATE, NET, NIMCET and Other Entrance Exams

1-C-8, Sheela Chowdhary Road, Talwandi, Kota (Raj.) Tel No. 0744-2429614

Web Site www.vpmclasses.com E-mail-vpmclasses@yahoo.com

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
**Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005**

Page 1

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

Q 1-25 (1 MARK EACH)

1.   The minimum number of edges in a connected graph having 11 vertices is _____

2.   The minimum no. of d-flip-flop needed to design a mod-6 counter is?
        (A) 4
        (B) 2
        (C) 3
        (D) 1

3.   A process is usually defined as a "heavy weight process because -
        (A) It is equal to task with one thread
        (B) Thread with one or more task
        (C) Both A & B
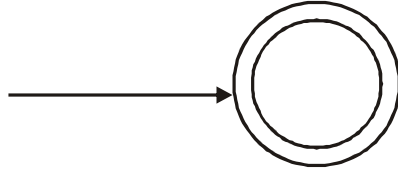   (D) None of these

4.   Consider a graph
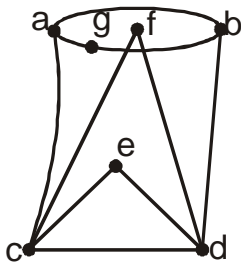
         State whether there exits a eulerian path or a eulerian circuit.
        (A) There exits a eulerian circuit but not eulerian path.
        (B) There exits a eulerian path
        (C) There exits a eulerian circuit.
        (D) none of these

5.   Using Trapezoidal rule the value of $\int\limits_{4}^{5.2} \ell n\, x\, dx$ using the table given below will be _____

x:	4.0	4.2	4.4	4.6	4.8	5.0	5.2
ℓnx:	1.386	1.435	1.482	1.526	1.569	1.609	1.649

6.   Consider the FSM. The string accepted by the FSM is
        (A) All strings
        (B) no string
        (C) $\in$ -alone
        (D) None of these

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 2

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

7. If a continuous random variable X follows rectangular distribution in the range (2, 7), then the probability $p(2.5 \leq X \leq 4)$ is _____

8. Which data structure are used to implement a priority queue ?
   (A) binomial heap
   (B) heap
   (C) Fibonacci heap
   (D) All of these

9. Consider the language $L = \{a^n b^n ; n > 0 \}$, which grammar is generatedby language L ?

   (A) $S \rightarrow ab$
   $\quad\;\; S \rightarrow asb$

   (B) $S \rightarrow ab|a|sas$
   $\quad\;\; S \rightarrow asb$
   $\quad\;\; S \rightarrow ab$

   (C) $S \rightarrow asb$
   $\quad\;\; S \rightarrow a$

   (D) $S \rightarrow abs$
   $\quad\;\; S \rightarrow bas$

10. Type checking is normally done during
    (A) Lexical analysis
    (B) Syntax analysis
    (C) Semantic analysis
    (D) Code optimization

11. CGI is used in _____.
    (A) Creating static documents
    (B) Creating dynamic documents
    (C) Communication with http server
    (D) All of these

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 3

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

12. A fair die is tossed what is the probability of an event that an even number appears in the toss of a fair die ?

(A) $\frac{1}{4}$

(B) $\frac{1}{2}$

(C) $\frac{1}{3}$

(D) $\frac{1}{6}$

13. An SNMP agent can send _____messages.
(A) GetRequest
(B) SetRequest
(C) GetNextRequest
(D) Trap

14. Let for an organic type software, the size estimated is 36KLOC. Average salary of an engineer is Rs. 20000/- per month. What is the effort and time for the development? Given a = 2.4, b=1.05
(A) 105 PM
(B) 103 PM
(C) 109 PM
(D) 104 PM

15. Thread is a light weight process. It consists -
(A) Program counter
(B) Stack space
(C) Register Set
(D) All of these

16. A company needs to develop signal processing software for one of its newest inventions. The s/w is expected to have 20000 lines of code. The multiplicative factor for this model is given as 2.8 for the software development on embedded system, while expectation factor is given as 1.20. What is the estimated effort in PM. (person-month)
(A) 234.25
(B) 122.40
(C) 101.95
(D) 101.05

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 4

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

17. The following grammar contain _____ number of variables when converted to CNF?

$E \to E + T$

$E \to T$

$T \to (E)$

$T \to i$

18. Which type of testing is used when specification are described by grammar ?
(A) white box testing
(B) functional testing
(C) syntax-driven testing
(D) none of these

19. The occurrence of interrupt handler with execution of program is
(A) Synchronous
(B) Asynchronous
(C) Un-synchronous
(D) none of these

20. Given R(A, B, C, D, E) with the functional dependencies F{AB $\to$ CD, A $\to$ E, C $\to$ D}, the decomposition of R into R_1 (A, B, C), R_2(B,C,D) and R_3 (C,D,E) is
(A) Lossy
(B) Lossless
(C) Both A & B
(D) None of these

21. If p = 100, q = 80 , r = 20, s = 10 and t = 20 then the minimum number of scalar multiplication needed is -
(A) 120,000
(B) 116,000
(C) 110,000
(D) none of these

22. _____ number of gate inputs are required to realize the following expression?
$F_1 = ABC + A\bar{B}CD + E\bar{F} + AD$

23. Eigen value of $\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$ is

(A) 0

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 5

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

(B) 2
(C) 3
(D) None of these

24. A 5-stage pipeline system is in operation with clock cycle of n ns. If the clock per instruction (CPI) for non-pipeline system is 5 and instructions per clock for pipeline is 0.20 and pipeline efficiency is 70%, then what is the speedup factor ?
(A) 13.5
(B) 14.5
(C) 15.5
(D) 17.5

25. The language $L(m) = \{ V V^R : VE(a,b)^* \}$ is accepted by

(A) Deterministic PDA
(B) Non-Deterministic PDA
(C) Deterministic context free
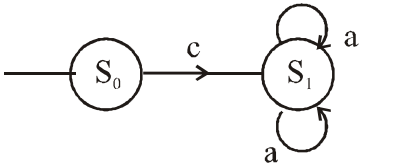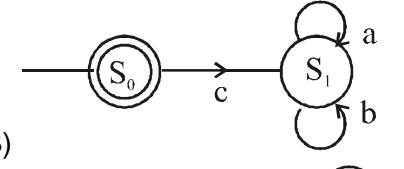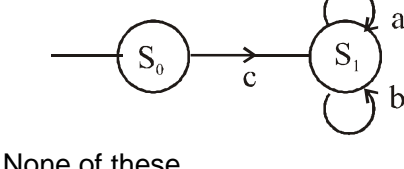(D) none of these

Q 26-55 (2 MARKS EACH)

26. The output of the following 'C' program is _____.
```
main()
{
        Int x = 10, y = 10, z = 5, i;
        i = x < y < z;
        printf("\n%d", i);
```

27. Given A disk with 512 bytes / sector ,300 sectors/track (on average),20,000 tracks / surface, 2 surfaces/platter ,5 platters/disk
What is the capacity of disk ?
(A) 29.72
(B) 30.72 GB
(C) 29.8 GB
(D) 30.8 GB

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 6

28. Which NDFA accepts $c \bullet (a \cup b)^*$?

(A)

(B)

(C)

(D) None of these

29. Consider a query
select posting _no, Day shift
FROM DUTY _ ALLOCATION , EMPLOYEE
where DUTY _ALLOCATION EMPLOYEE no = Employee .Employee
no. and Name = 'Ron'
The o/p of this query is
(A) select the shift details for all employee.
(B) retrieve the shift details for employee 'Ron
(C) retrieve the Employee details for employee Ron
(D) none of these

30. Consider an expression
$(a < b)$ and $(b < c)$ and $(c < d)$
evaluating in preorder form is
(A) $a < b$ and $b < c$ and $c < d$
(B) and $< ab < bc < cd$
(C) $ab < bc$ and $cd <$ and
(D) $ab < bc < cd <$ and

31. Consider the language $L = \{a^n , b^n : n > O\}$
which is generated by grammar –
(A) regular grammar

Toll Free: 1800-2000-092 **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714 **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 7

(B) context free grammar

(C) context sensitive grammar

(D) None of these

32. A pipelined system affected by branch instruction is a 3 clock cycles. If 35% instructions are branch instructions and pipeline is operating with a clock cycle of 10 ns providing the speed up factor as 8 then what will be the number of stages in pipeline system ?

(A) n = 10

(B) n = 12

(C) n = 16

(D) n = 15

33. The following Boolean expression :

$E = ((xy)' z)' ((x' + z) (y' + z'))'$

What is minimal expression for this ?

(A) $\bar{x}y + z\bar{x}$

(B) $x\bar{z} + y\bar{z}$

(C) $xyz + xz'$

(D) $xy\bar{z} + y\bar{x}$

34. $\int\limits_{-5}^{5} |x + 2| dx =$

(A) 20

(B) 41

(C) 30

(D) 29

35. Given following statements

p : gilda is tall

q : gilda is beautiful

Write the following statement in symbolic form.

"it is false that gilda is short and beautiful "

(A) P V (~ p ∧ q)

(B) ~ (~ p v q) ≡ p ∧ ~ q

(C) P ~ (~ p v q)

(D) ~ p V (~ p v ~ q)

36. In an MxN matrix such that all non-zero entries are covered in a rows and b columns. Then the maximum number of non-zero entries, such that no two are on the same row or column, is

(A) £ a + b

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 8

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

(B) £ max {a, b}
(C) £ min {M-a, N-b}
(D) £ min {a, b}

37. Consider the page sequence 4,3,2,1,4,3,5,4,3,2,1,5.
If FIFO page replacement algorithm is used and frame size is 3, then the percentage of page fault is _____.

38. Consider the boolean expression E = xy´+xyz´+ x´yz´ What is the prime implicant for the expression E ?
(A) x
(B) z´
(C) xz´
(D) x´z

39. Preemptive SJF Scheduling is given - what is average waiting time ?

Process	Arrival time	Burst time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

(A) 5.5 ms
(B) 5.9 ms
(C) 6.5 ms
(D) 7.5 ms

40. What is the return value of the function floor ( ) when it is called floor (8.2) –
(A) 9
(B) 8
(C) 8.2
(D) 0.2

41. What is the return value of the function ceil (8.1) is
(A) 8.0
(B) 9.0
(C) – 9.0
(D) –8.0

42. Consider the grammar {{S, A, B}, {a, b}, P,S}. Set of productions are as follows:
S → bA |aB

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 9

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

$A \rightarrow bAA \,|aS|a$

$B \rightarrow aBB \,|bS| \,b$

Then the equivalent grammar in CNF is

(A)
$S \rightarrow C_b A \,| \,C_a B$

$A \rightarrow C_a S \,|C_b D_1 \,| \,a$

$B \rightarrow C_b \,S| \,C_a D_2 \,|b$

$D_1 \rightarrow AA \quad D_2 \rightarrow BB$

$C_a \rightarrow a \quad C_b \rightarrow b$

(B)
$S \rightarrow C_b A \,| \,C_a B \,| \,a \,| \,b$

$A \rightarrow C_a S \,|C_b D_1 \,| \,AB$

$B \rightarrow C_b \,S| \,C_a D_2 \,|a$

$D_1 \rightarrow a \,| \,b \,| \,AA| \,BB$

(C)
$S \rightarrow C_b \,A \,| \,C_a B$

$S \rightarrow AA \,| \,BB$

$D \rightarrow a|b$

$A \rightarrow C_a \,S|C_b S$

$B \rightarrow C_b S \,| \,a$

(D) None of these

43. The reduced state table is given in Table. Then each state is assigned a binary value -

Present state	Next state X = 0	Next state X = 1	Next state X = 0	Next state X = 1
a	c	b	0	0
b	f	c	0	0
c	e	f	1	1
e	f	a	0	1
f	e	f	1	0

(A) a = 000 , b = 001 , c = 010 , d = 010, e = 011, f = 100

(B) a = 000 , b = 100, c = 010 , d = 010, e = 110, f = 001

(C) a = 001, b = 010 , c = 011 , d = 100, e = 101 ,f = 101

(D) None of these

44. Let G be a graph with n vertices, which of the following is true?

(A) G is a tree

(B) G is connected graph

(C) Both A & B

(D) none of these

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 10

45. A graph G is complete graph K_n, has spanning tree

(A) n^{n-1}

(B) n^{n-2}

(C) n^1

(D) n^n

46. Cyclometric complexity of the following is _____.
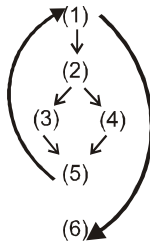
47. What is distance vector routing Algorithm ?
(A) periodically share its knowledge with its neighbors
(B) Routing only to neighbour
(C) Information sharing is not regular
(D) both A & B

COMMON DATA Q48-49
Consider three IP networks A, B and C. Host HA in network A sends messages each containing 180 bytes of application data to a host Hc in network C. The TCP layer prefixes a 20 byte header to the message. This passed through an intermediate network B. The maximum packet size, including 20 byte IP header, in each network is

         A :   1000 bytes

         B :   100 bytes

         C :   1000 bytes

The network A and B are connected through a 1Mbps link, while B and C are connected by a 512 Kbps link (bps = bits per second)

48. Assuming that the packets are correctly delivered, how many bytes, including headers, are delivered to the IP layer at the destination for one application message, in the best case ? Consider only data packets.
(A) 200
(B) 220
(C) 240

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 11

(D) 260

49. What is the rate at which application data is transferred to host H_C? Ignore errors, acknowledgments, and other overhead.
(A) 325.5 Kbps
(B) 354.5 Kbps
(C) 409.6 Kbps
(D) 512.0 Kbps

COMMON DATA Q . 50-51
The following program fragment is written in a programming language that allows variables and does not allow nested declarations of functions.

```
global int i = 100, i = 5;
void P (x) {
    int i = 10;
    print (x + 10);
    i = 200;
    j = 20;
    print (x);
}
main ( ) {P (i  j);}
```

50. If the programming language uses static scoping and call by need parameter passing mechanism, the values printed by the above program are
(A) 115, 220
(B) 25, 220
(C) 25, 15
(D) 115, 105

51. If the programming language uses dynamic scoping and call by name parameter passing mechanism, the values printed by the above prgram are
(A) 115, 220
(B) 25, 220
(C) 25, 15
(D) 115, 105

Linked Answer Questions 52 and 53
The s and t be two vertices in a undirected graph G + (V,E) having distinct positive edge weights. Let [X,Y] be a partition of V such that s $\in$ X and t $\in$ Y. Consider the edge e having the minimum weight amongst all those edges that have one vertex in Y

52. The edge e must definitely belong to:
(A) the minimum weighted spanning tree of G

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 12

(B) the weighted shortest path from s to t

(C) each path from s to t

(D) the weighed longest path from s to t

53. Let the weight of an edge e denote the congestion on that edge. The congestion on a path is defined to be the maximum of the congestion on the edges of the path. We wish to find the path from s to t having minimum congestion. Which one of the following path is always such a path minimum congestion?

(A) a path from s to t in the minimum weighted spanning tree

(B) a weighted shortest path from s to t

(C) an Euler walk from s to t

(D) a Hamiltonian path from s to t

Statement for Linked Answer Questions: 54 & 55

Consider an 8085-microprocessor system.

The following program starts at location 0100H.

```
LXI SP, 00FF
LXI H, 0701
MVI A, 20H
SUB M
```

54. The content of accumulator when the program counter reaches 0109H is _____.

55. If in addition following code exists from 0109H onwards.

```
OR 40H
ADD M
```

The result in the accumulator after the last instruction is executed will be _____.

GENERAL APTITUDE

Q 56-60 (1 MARK EACH)

56. REASON : SFBTPO :: THINK : ?

(A) SGHMJ

(B) UIJOL

(C) UHNKI

(D) UJKPM

57. MORTAL opposite word –

(A) Divine

(B) Immortal

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com / info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 13

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

(C) Spiritual

(D) Eternal

58. ALERT similar word –

(A) Energetic

(B) Observant

(C) Intelligent

(D) Watchful

59. A shopkeeper expects a gain of 22.5% on his cost price. If in a week, his sale was of Rs. 392, what was his profit?

(A) Rs. 18.20

(B) Rs. 70

(C) Rs. 72

(D) Rs. 88.25

60. IF '+' stands for '-' , '-' stands for 'x', 'x' stands for '÷'and '÷'stands for '+'then what is the value of 56x7÷13-11+15-8÷2-7?

(A) 30

(B) 45

(C) 60

(D) 90

Q 61-65 (2 MARKS EACH)

61. 'Captain' is related to 'Soldier' in the same way as 'Leader' is related to

(A) Chair

(B) Followers

(C) Party

(D) Minister

62. PORK:PIG

(A) rooster:chicken

(B) mutton:sheep

(C) steer:beef

(D) lobster:crustacean

63. My uncle decided to take ...... and my sister to the market.

(A) I

(B) mine

(C) me

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 14

(D) myself

64.   Answer the question based on the given line graph.
       Ratio of Exports to Imports (in terms of money in Rs. crores) of Two Companies Over the Years
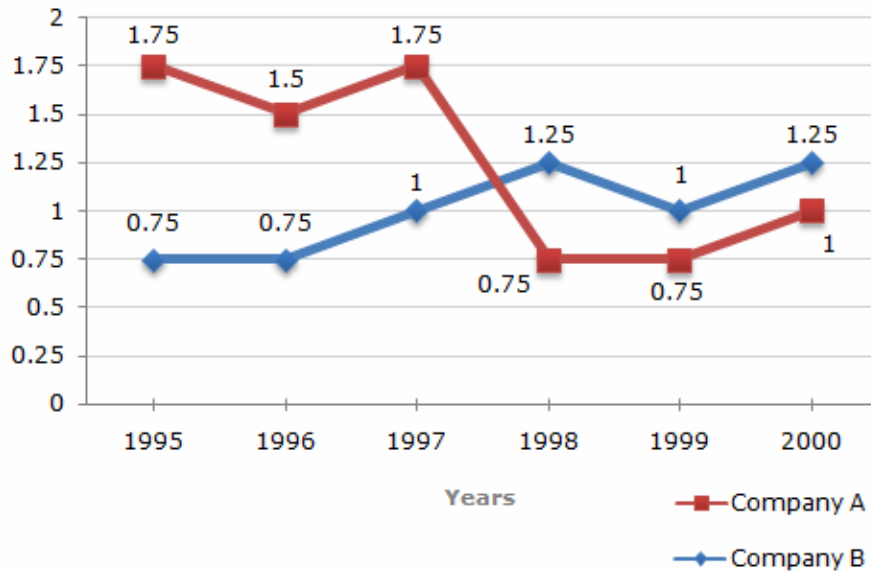
       In how many of the given years were the exports more than the imports for Company A?
       (A) 2
       (B) 3
       (C) 4
       (D) 5

65.   Look at this series: 58, 52, 46, 40, 34, ... What number should come next?
       (A) 26
       (B) 28
       (C) 30
       (D) 32

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 15

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

Answer key

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Answer	10	C	A	B	1.8277	C	0.3	D	A	C	B	B	D	B	D	C	7	C	B	A
Question	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Answer	B	15	D	D	B	1	B	C	B	B	B	C	C	D	B	A	75%	C	C	B
Question	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	B	A	A	C	B	3	D	C	B	D	A	A	B	20H	20H	B	B	D	C	B
Question	61	62	63	64	65															
Answer	B	B	C	B	B															

HINTS AND SOLUTIONS

1.   10

The minimum number of edges in a connected graph having 11 vertices is 10 because in a connected graph the minimum number of edges in a connected graph is n-1 where n is no. of vertices.
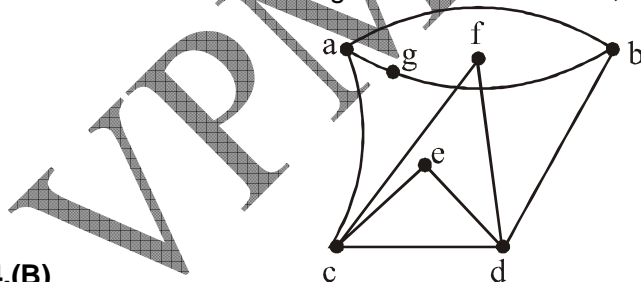
So   n = 11

No. of edges = n – 1

= 11 – 1

= 10

2.(C) $2^n \geq 6 \Rightarrow 2^3 \geq 6$ so $\boxed{n = 3}$

3.(A)   Heavy weight process. It is equal to a task with one thread.
A task does nothing if no threads are in it, and a thread must be in exactly one task.

4.(B)

According to diagram, here a and b are the two vertices with degree odd and all other
vertices have even degree. Hence there exists a eulerian path:

{a - c - d - e- c - f - d - b - g - a b}

but no Eulerian circuit.

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 16

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

5. **1.8277**

$$\int_{4}^{5.2} \ell n \, x \, dx$$

$$n = \frac{b-a}{n} = \frac{5.2-4}{7} = 0.17$$

$$\int_{4}^{5.2} \ell n \, x \, dx = \frac{h}{2}\Big[1(y_0 + y_n) + 2(y_1 + y_2 + ...y_{n-1}) \Big]$$

$$\int_{4}^{5.2} \ell n \, x \, dx = \frac{0.2}{2}[(1.386 + 1.649) + 2(1.435 + 1.482 + 1.526 + 1.569 + 1.609)]$$

$$= \frac{0.17}{2}[3.035 + 2(7.621)]$$

$$= \frac{0.2}{2} \times 18.277$$

$$= 1.8277$$

6.(C) Here the final state and the start state are one and the same. No transition is there. There is an (implicit) ε-transition from any state to itself. So, the only string that could be accepted is ε.

7. **0.3**

Rectangular function = $\dfrac{1}{y-x}$

Rang (2, 7) {y = 7, x = 2}

$$R.F = \frac{1}{7.2} = \frac{1}{5}$$

Probability distribution

$$P(X = 2.5 \le X \le 4) = \int_{2.5}^{4} \frac{1}{5} dx$$

$$= \frac{1}{5}[4 - 2.5]$$

$$= \frac{1.5}{5} = 0.3$$

8.(D) A number of other data structures can also be used to implement a priority queue. the binomial heap, heap, Fibonacci heap, and so on.
1.   Algorithm HeapSort (a, n)
2.   // a[1 : n] contains n elements to be sorted. HeapSort
3.   // rearranges them in place into non decreasing order.

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 17

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

```
4.      {
5.          Heapify(a, n); // Transform the array into a heap.
6.          // Interchange the new maximum with the element
7.          // at the end of the array.
8.          for i : = n to 2 step – 1 do
9.          {
10.            t : = a[i]; a[i] : = a[1];  a[1] : = t;
11.             Adjust (a, 1, i – 1);
12.         }
13.    }
```

Algorithm Heap sort
Many of these data structures support the operations of deleting and searching for arbitrary elements (Red-Black tree being an example), in addition to the ones needed for a priority queue.

9.(A)   Clearly the grammar G with the following production will generate G:
$$S \rightarrow ab, \qquad S \rightarrow aSb$$
Note that G is a context-free language since each left side is a non terminal.

10.(C) Syntactic analysis usually alternate with semantic analysis. Type checking is done during semantic Analysis. Semantic Analysis checks the actual meaning of the statement.

11.(B) **common gateway interface (CGI)** A standard for communication between HTTP servers and executable programs. CGI is used in creating dynamic documents.

12.(B) The event can occur in three ways (2, 4 or 6) out of 6 cases; hence p $= \dfrac{3}{6} = \dfrac{1}{2}$.

13.(D) An SNMP agent can send Trap messages.
Trap $\rightarrow$ to report an event send by agent to manager.

14.(B) From the basic COCOMO estimation formula for organic software
Effort = a x (kloc)^b
Effort = 2.4 $\times$ (36)$^{1.05}$ = 103PM

15.(D) **Threads (Light Weight-Process)-** A basic unit of CPU utilization.
• It consists of :
$\rightarrow$ Program counter : that keeps track of which instruction to execute next.
$\rightarrow$ Register set, which hold its current working variables.
$\rightarrow$ Stack space, which contains the execution history.

16.(C) Effort (PM) = a. (KDSI)^b {KDSI = Kilo LOC }
= 2.8 $\times$ (20)$^{1.20}$

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 18

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

= 2.8 × 36.4112 = 101.95136 PM.

17.   7

Hint: After conversion

$E \to ET'$

$T' \to PT$

$P \to t$

$E \to OE'$

$O \to ($

$E' \to EC$

$C \to)$

$T \to OE'$

$T \to i$

∴   Number of variables = 7.

18.(C)   Syntax-driven testing
   • Applicable where specifications are described by a grammar.
   Example software : compilers, syntactic pattern classifier .

19.(B)   The occurrence of interrupt is asynchronous with the execution of the program. When
   interrupt happen the control of execution is transferred to the interrupt handler.

20.(A)   We initialize the Table_LOSSY as shown on the left. Now we consider the FDs $AB \to CD$,
   $A \to E$ in turn but since we find that there are no two rows with identical entries in the A
   columns, we are unable to make

	A	B	C	D	E		A	B	C	D	E
R_1	α_A	α_B	α_C	β_{ID}	β_{IE}	R_1	α_A	α_B	α_C	β_{ID}	β_{IE}
R_2	β_{2A}	α_B	α_C	α_D	β_{2E}	R_2	β_{2A}	α_B	α_C	α_D	β_{2E}
R_3	β_{3A}	β_{3B}	α_C	α_D	α_E	R_3	β_{3A}	β_{3B}	α_C	α_D	α_E

   any changes to the table. When we consider the FD $(C \to D)$. we find that all rows of the
   column C, the determinant of the FD, are identical and this allows us to change the entries
   in the column D to α_D. No further changes are possible and the final version of the table is
   the same as the table on the right. Finally we find no rows in the table and conclude that
   the decomposition is lossy.

21.(B)   Multiply as $(m_1 \times (m_2 \times m_3)) \times m_4$
   The total no of scalar multiplications
   is = q rs + pqs + pst

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 19

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

$= 80 \times 20 \times 10 + 100 \times 80 \times 10 + 100 \times 10 \times 20$

$= 16000 + 80000 + 20000$

$= 116000$

22.   15

$F_1 = ABC + A\bar{B}CD + E\bar{F} + AD$

AND input = 3 + 4 + 2 + 2 = 11

AND gates feeding the OR gate = 1 + 1 + 1 + 1 = 4

Total gate = 11 + 4 = 15

23.(D) $\begin{bmatrix} 1-\lambda & -1 \\ 1 & 1-\lambda \end{bmatrix} = 0$

$(1-\lambda)^2 + 1 = 0$

$(1-\lambda)^2 = -1$

$1 - \lambda = i$ or $-i$

$\lambda = 1 - i$ or $1 + i$

24.(D) Speed up factor = $\dfrac{I \times CPI_{np} \times T_{np\ clock}}{I \times CPI_p \times T_{P_{clock}}}$

I : number of instructions

CPI_{np} : clock per instruction in non-pipeline system = 5

CPI_p : clock per instruction in pipeline system = 0.20

$T_{np\ clock}$: clock duration in non pipeline system = n

$T_{p\ clock}$: clock duration in pipeline system, = n

$\therefore$ Speed up factor $= \dfrac{I \times 5 \times n}{I \times 0.20 \times n} = 25$
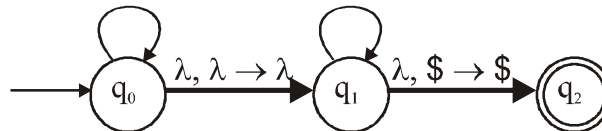
$\therefore$ In case of 70% efficiency speed up factor = 25 $\times \dfrac{70}{100} = 17.5$

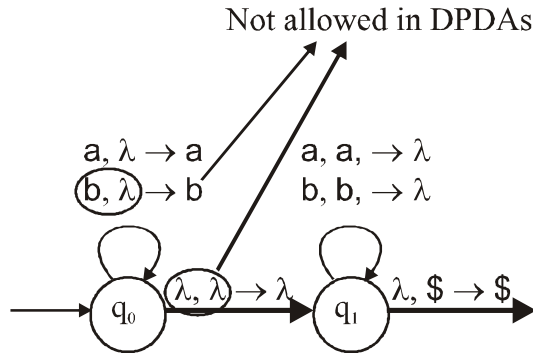**25.(B)** $a, \lambda \rightarrow a\ a, a \rightarrow \lambda$

$L(M) = \{v\ v^R : v \in \{a,b\}^* \}$ $b, \lambda \rightarrow b\ b, b \rightarrow \lambda$

is accepted by non deterministic PDA

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 20

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

Not allowed in DPDAs

$a, \lambda \to a$ $a, a, \to \lambda$
$b, \lambda \to b$ $b, b, \to \lambda$

q_0 $\lambda, \lambda \to \lambda$ q_1 $\lambda, \$ \to \$$ q_2

26.   1

$\because$ x = 10, y = 10, z = 5

i = 10 < 10 < 5

i = 0 < 5   {10 < 0 is fals so output → 0

i = 1   { 0 < 5 is true so output → 1

27.(B)   capacity of disk = 512 × 300 × 20000 × 2 × 5

= 30,720,000,000

= 30.72 GB

28.(C)   The accepted words of L (c • (a ∪b)* are c, ca, cb, cab, caa, cbb, caba, babb, cabba.

This is any string starting with c. The NDFA for c • (a ∪b)* is shown in the figure below
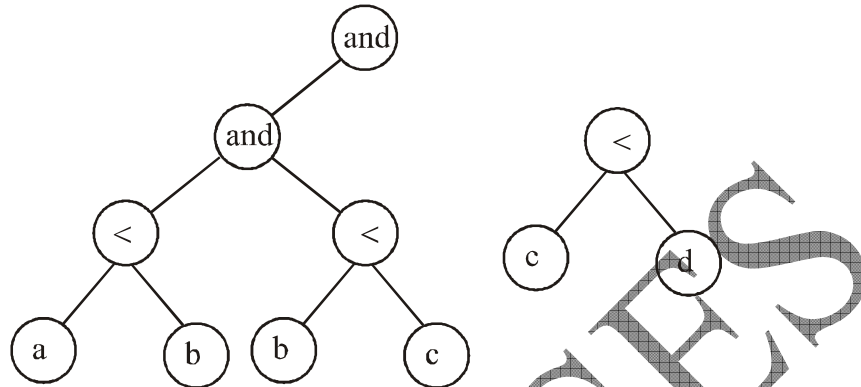
Start S_0 c S_1 a   Final state
b
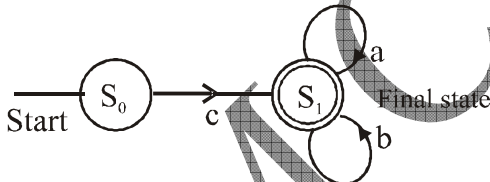
29.(B)   The following SQL query is used to retrieve the shift details for employee Ron:

select Positing_No, Day, Shift

from DUTY_ALLOCATION, EMPLOYEE

where DUTY_ALLOCATION Empl_No = EMPLOYEE. EmpL_no

and Name = 'Ron'

Note that attributes Empl_No have been qualified, since the names of these attributes are identical.

30.(B)   (a < b) and (b < c) and (c < d)

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 21

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

Traversals:
Preorder:
and < ab < bc < cd
Inorder
a < b and b < c and c < d
Postorder:
ab < bc and cd < and

31.(B) Clearly the grammar G with the following productions will generate G: $S \rightarrow a$
Note that G is a context-free language since each left side is a nonterminal.

32.(C) Let the no. of stages in system = n
Non pipeline execution time = n × 10
Pipeline execution time = (1 + .35 × 3) × 10 = 20.5
∴ $8 = \dfrac{n \times 10}{20.5}$ ∴ n = 16

33.(C) Step 1 Using Demorgan's laws and involution, we obtain
$E = (xy'' + z')((x' + z)' + (y' + z')') = (xy + z')(xz' + yz)$
E now consists only of sums and products of literals
Step 2 Using the distributive laws, we obtain
$E = xyxz' + xyyz + xz'z' + yzz'$
E now is a sum of products.
Step 3 Using the commutative, idempotent laws, we obtain
$E = xyz' + xyz + xz' + 0$
Each term in E is a fundamental product or 0.
Step 4 The product ac' is contained in abc'; hence by the absorption law, xz
Thus we may delete abc' from the sum. Also, by the identity law for 0, we   may delete 0
from the sum. Accordingly.
$E = xyz + xz'$
E is now represented by a sum-of-products expression,

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 22

34.(D) Since for $-5 \le x \le -2$, $x + 2 \le 0$

$\Rightarrow \qquad |x + 2| = -(x + 2)$

and for $-2 \le x \le 5$, $x + 2 \ge 0$

$\Rightarrow \qquad |x + 2| = x + 2$,

$\displaystyle\int_{-5}^{5} |x+2|dx = \int_{-5}^{-2} |x+2|dx + \int_{-2}^{5} |x+2|\,dx$

$\displaystyle = \int_{-5}^{-2} -(x+2)dx + \int_{-2}^{5} (x+2)\,dx = \left[-\frac{x^2}{2}-2x\right]_{-5}^{-2} + \left[\frac{x^2}{2}+2x\right]_{-2}^{5}$

$\displaystyle = (-2+4) - \left(-\frac{25}{2}+10\right) + \left(\frac{25}{2}+10\right) - (2-4) = 29.$

35.(B) $\sim (\sim P \vee q) \equiv p \wedge \sim q$

36.(A) Maximum number of non-zero entries are £ a + b

37. **75%**

String

4	3	2	1	4	3	5	4	3	2	1	5
4	4	4	1	1	1	5			5	5	
	3	3	3	4	4	4			2	2	
		2	2	2	3	3			3	1	

Number of page fault = 9

so $\qquad \dfrac{\text{page fault}}{\text{total no. of page}} \times 100\% = \dfrac{9}{12} \times 100 = 75\%$

38.(C) $xz' + E = E$ but $\qquad x + E \neq E \qquad$ and $\qquad z' + E \neq E$

Thus xz' is a prime implicant of E.

39.(C) So average waiting time $=\dfrac{(10-1)+(1-1)+(17-2)+(5-3)}{4}=\dfrac{26}{4}$

= 6.5ms

40.(B) Floor (8.2): Round 8.2 to the next lower integer not greater than 8.2.

41.(B) Ceil (8.1): return the value rounded up to next higher integer not less than the 8.1.

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 23

42.(A) $S \rightarrow C_b A \mid C_a B$

$C_a \rightarrow bAA \mid aS \mid a$

$C_b \rightarrow b$

$A \rightarrow C_a S \mid C_b D_1 \mid a$

$B \rightarrow C_b S \mid C_a D_2 \mid b$

$D_1 \rightarrow AA$

$D_2 \rightarrow BB$

$C_a \rightarrow a$

$C_b \rightarrow b$

43.(A) Now each state can be assigned binary values. Since there are five states, therefore number of flip-flops required is 3 and 3-bit binary numbers are to be assigned to the states.

a = 000, b = 001, c = 010 , d=010, e = 011, and f = 100

44.(C) Let G be a graph with n vertices, then following three statements are equivalent.
I. G is tree
II. G is an acyclic graph with (n – 1) edges.
III. G is a connected graph with (n – 1) edges.

45.(B) Cayley's theorem.

The complete graph K_n has n^{n-2} different spanning trees.

Spanning trees of K_4.

Since , here , n = 4, so, there will be 4^{4-2} = 16 spanning trees.

46. **3**

$V(G) = \in -N + 2 \quad \begin{cases} E = 7 \\ N = 6 \end{cases}$

$= 7 - 6 + 2 = 3$

47.(D) **Knowledge about the whole network.** Each router shares its knowledge about the entire network.

Routing only to neighbors. Each router periodically sends its knowledge about the network only to those routers to which it has direct links. It sends whatever knowledge it has about the whole network through all of its ports. This information is received and kept by each neighboring router and used to update that router's own information about the network.

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 24

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

| Network A | --- 1 Mbps --- | Network B | --- 512 Kbps --- | Network C |

48.(C)
As 3 packets are formed.
Number of bytes delivered correctly indicating to the destination for one application
message in best case
= 180 + 20 + 20 = 240 bytes.

49.(B) ignore errors, i.e. none so
B = 2H (Nyquist theorem)
= 354.5 kbps

50.(D) P (i + j) x = i + j = 105 (global value of i and j)
print (x + 10) = 115
print (x) = 105
because static value store previous value stored at place of x.
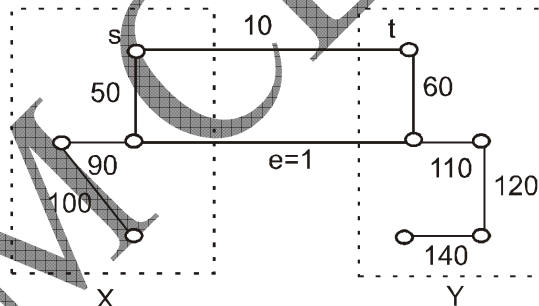
51.(A) By dynamic and coping we take local value
P (i + j), x = i + j = 105 (global value of i and j)
print (x + 10) = 115
print (x) = 200 + 20
= 220 (due to local value)

52(A) Consider an example

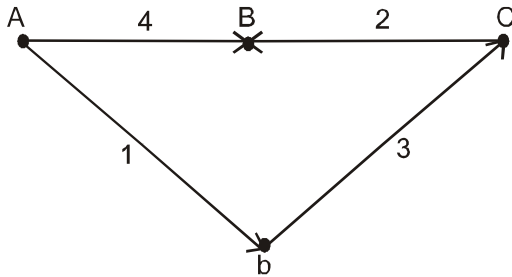Here, minimum cost of edge joining X and Y is one (1), we called as e.
Here, actually two edge that join X and Y
one cost '10'
and e cost '1'
Here, if we consider weighed shortest path between s and t, we find it as an edge of cost
10.
We can't consider e edge here while its cost is minimum.

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 25

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

A —— 4 —— B —— 2 —— C

1   3

b

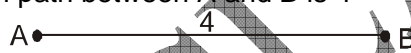**53.(B)**

Consider here a path with minimum congestion between A and B
We follow any minimum spanning algorithm
Hence, Resultant tree is

A   B —— 2 —— C

1   3

b
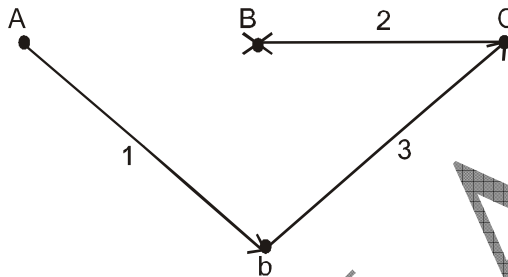
While, a minimum path between A and B is 4

A •———— 4 ————• B

54.   20H

L × I, SP, 00FF

L × I, H, 0701

00	FF

 01   07

FF	01
00	07

$S \cup B\ M \Rightarrow$ $S \cup B$ 20H00
                                   = 20H

55.   20H

Accumulator content will not changed.

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 26

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

As   Similarly

$R \xrightarrow{+1} S$ $T \xrightarrow{+1} U$

$E \xrightarrow{+1} F$ $H \xrightarrow{+1} I$

$A \xrightarrow{+1} B$ $I \xrightarrow{+1} J$

$S \xrightarrow{+1} T$ $N \xrightarrow{+1} O$

$O \xrightarrow{+1} P$ $K \xrightarrow{+1} L$

56.(B) $N \xrightarrow{+1} O$

57.(B) Mortal means causing or capable of causing death while Immortal means one who is not subject to death.

58.(D) Alert means engaged in or accustomed to close observation, ie. Watchfulness.

59.(C) C.P. = Rs. $\left(\frac{100}{122.5} \times 392 \right) = Rs\left(\frac{1000}{1225} \times 392 \right) = 320Rs$

Profit = Rs. (392 - 320) = Rs. 72.

60.(B) Changing the symbols as given in the problem the above expression is
56÷7+13x11-15x8+2x7
Solving the BODMAS rule, we get 8+143-120+14=165-120=45

61.(B) 'Captain' is supposed to lead the battalian of 'Soldiers' int he same way as 'Leader' is supposed to lead the 'Followers' **.**

62.(B) Pork is meat from a domestic hog or pig. Similarly, mutton is meat from a mature domestic sheep.

63.(C) My uncle decided to take me and my sister to the market.

64.(B) The exports are more than imports in those years for which the exports to imports ratio are more than 1. For Company A, such years are 1995, 1996 and1997.
Thus, during these 3 years, the exports are more than the imports for Company A.

Toll Free: 1800-2000-092   Mobile: 9001297111, 9829567114, 9829597114, 9001297243
Phone: 0744-2429714   Website: www.vpmclasses.com
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 27

VPM CLASSES

UGC NET, GATE, CSIR NET, IIT-JAM, IBPS, CSAT/IAS, CLAT, ISEET, SLET, CTET, TIFR, NIMCET, JEST etc.

65.(B) This is a simple subtraction series. Each number is 6 less than the previous number.

Toll Free: 1800-2000-092   **Mobile: 9001297111, 9829567114, 9829597114, 9001297243**
Phone: 0744-2429714   **Website: www.vpmclasses.com**
E-Mail: vpmclasses@yahoo.com /info@vpmclasses.com
Address: 1-C-8, Sheela Chowdhary Road, SFS, TALWANDI, KOTA, RAJASTHAN, 324005

Page 28