

NTA UGC NET

COMPUTER SCIENCE & APPLICATIONS

SOLVED SAMPLE PAPER

(English Medium)



- * DETAILED SOLUTIONS
- * NEW SYLLABUS
- * NEW PATTERN



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9. Consider the grammar given below

$E \rightarrow E + E \mid E * E \mid E - E \mid E / E \mid E ^ E \mid (E) \mid id$

Assume that + and . have the same but least precedence, * and / have the next higher precedence but the same precedence and finally ^ has the highest precedence. Assume + and . associate to the left like * and / and that ^ associates to the right. Choose the correct statement with respect to relations for the ordered pairs (\wedge, \wedge), ($-,-$), ($+,+$), ($*,*$) in the operator precedence table constructed for the grammar

(1) all < (2) all > (3) <,>,< (4) <,>,>,>

10. P, Q, R are three languages. If P and R are regular and if $PQ=R$, then

(1) Q has to be regular (2) Q cannot be regular
(3) Q need not be regular (4) Q has to be a CFL

11. Which of the following conversion is not possible (algorithmically)?

(1) regular grammar to context-free grammar
(2) nondeterministic FSA to deterministic FSA
(3) nondeterministic PDA to deterministic PDA
(4) nondeterministic TM to deterministic TM

12. The following are the set of processes with their respective CPU burst time (in milliseconds).

Processes	CPU	Burst time
P1		10
P2		5
P3		5

What will be the average waiting time if the process arrived in the order: P1, P2 & P3?

(1) 6.82 unit (2) 7.56 unit
(3) 8.33 unit (4) 9.97 unit

13. Match the following:

Column I

Column II

p) time sharing

(1) Program first executed when a computer is turned on

q) process

(2) Part of an operating system that communicates with the user

r) bootstrap

(3) Technique that allows multiprocessing on a computer with a single CPU

s) shell

(4) Activity of executing a program

(p) (q) (r) (s)

(1) p-(4), q-(1), r-(2), s-(3)

(2) p-(3), q-(4), r-(1), s-(2)

(3) p-(2), q-(3), r-(4), s-(1)

(4) p-(1), q-(4), r-(2), s-(3)

14. In Priority Scheduling a priority number is associated with each process. The CPU is allocated to the process with the highest priority. The problem of starvation is resolved by which of the following?

(1) Terminating the process. (2) Aging

(3) Mutual Exclusion (4) Semaphore

15. Which of the following does not support for Page-Stealer process?

(1) It is a kernel process that makes room for the incoming pages

(2) It is created by the Kernel at the system initialization and invokes it throughout the lifetime of the system.

(3) Kernel locks a region when a process faults on a page in the region, so that page stealer cannot steal the page, which is being faulted in.

(4) All are correct.

16. If you type 'cat prog.c' at a UNIX command prompt, which of the following sequences of system calls would be invoked?

(1) The shell calls fork(); the child process calls exec() and the parent calls wait()

(2) The shell calls fork(); the child calls wait() and the parent calls exec()

(3) The shell calls exec() and then wait() and then fork()

(4) The shell calls wait() then fork(), creating a child which calls exec()

17. Which of these describe the activity of a contract review?
- (1) Evaluation of the target market
 - (2) Evaluation of the development risks
 - (3) Evaluation of the weather during the software development.
 - (4) Evaluation of the staff's personal background
18. Insufficient identification is a
- (1) Technology-related problem
 - (2) Process-related problem
 - (3) People-related problem
 - (4) Product-related problem
19. Five nines of reliability refers to
- (1) Five software engineering practices that must be in place and assessed at level 9 in order to ensure reliability
 - (2) A product that is operational 99.999% of the time
 - (3) A product that fails one time in 10,000 days
 - (4) A product which fails only five times in 99,999 days
20. Which of the following is not a static testing tool?
- | | |
|------------------------|-----------------------|
| (1) Static analyzers | (2) Code inspectors |
| (3) Output comparators | (4) Standard enforces |
21. Match the following-
- | | |
|----------------------|--------------------------|
| Column I | Column II |
| p) Disparate data | (i) Archive data |
| q) Non volatile data | (ii) Level of detail |
| r) Data granularity | (iii) Query and analysis |
| | (iv) Production data |
- (p) (q) (r)**
- (1) p-(i), q-(iv), r-(ii)
 - (2) p-(iii), q-(ii), r-(iv)
 - (3) p-(ii), q-(i), r-(iii)
 - (4) p-(iv), q-(iii), r-(ii)

(4) Select two columns from the COURSES table, of which the second one has a constant value, i.e. " = PRICE". Sort the data according to the second column, in ascending order.

- 27.** A modification to the database expressed in terms of a view must be translated to the –
- (1) Actual relation in the conceptual model of the database
 - (2) Queries in the actual database
 - (3) Relations of all the views of that database
 - (4) Need not be translated and the view of a database accommodates the modification
- 28.** If D_1, D_2, \dots, D_n are domains in relational model then the relation is a table which is a subset of ---
- (1) $\{ D_1, D_2, \dots, D_n \}$
 - (2) $D_1 \times D_2 \times \dots \times D_n$
 - (3) $D_1 \cup D_2 \cup \dots \cup D_n$
 - (4) Maximum $\{ D_1, D_2, \dots, D_n \}$
- 29.** If the in order and pre order traversal of a binary tree are DBFEGHAC and ABDEFGHC respectively then, the post order traversal of that tree is
- (1) DFGABCHE
 - (2) FHDGEBCA
 - (3) DFHGEBCA
 - (4) CGHFEDBA
- 30.** "n" elements of a queue are to be reversed using another queue. The number of "ADD" and "REMOVE" required to do so is,
- (1) $2*n$
 - (2) $4*n$
 - (3) n
 - (4) the task cannot be done
- 31.** Prim's algorithm is a method available for finding out the minimum cost of a spanning tree. Its time complexity is given by:
- (1) $O(n*n)$
 - (2) $O(n \log n)$
 - (3) $O(n)$
 - (4) $O(1)$
- 32.** Maximum number of children in a node in a B-tree of order "m" is:
- (1) m
 - (2) $m/2-1$
 - (3) $m/2+1$
 - (4) $m/2$
- 33.** A has one share in a lottery in which there is 1 prize & 2 blanks; B has three shares in a lottery in which there are 3 prizes & 6 blanks: compare the probability of A's success to that of B's success as
- (1) 7 : 16
 - (2) 16 : 7
 - (3) 6 : 14
 - (4) 14 : 6

34. The following 'C' code :-

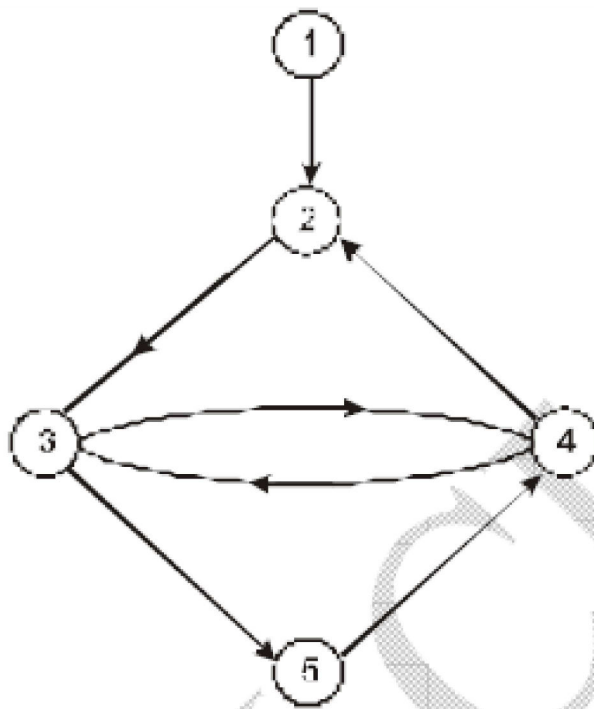
```
# include < stdio.h >  
main ( )  
{ file * FP ;  
  FP = fopen ( " trial " , " r " );  
  }
```

FP points to :-

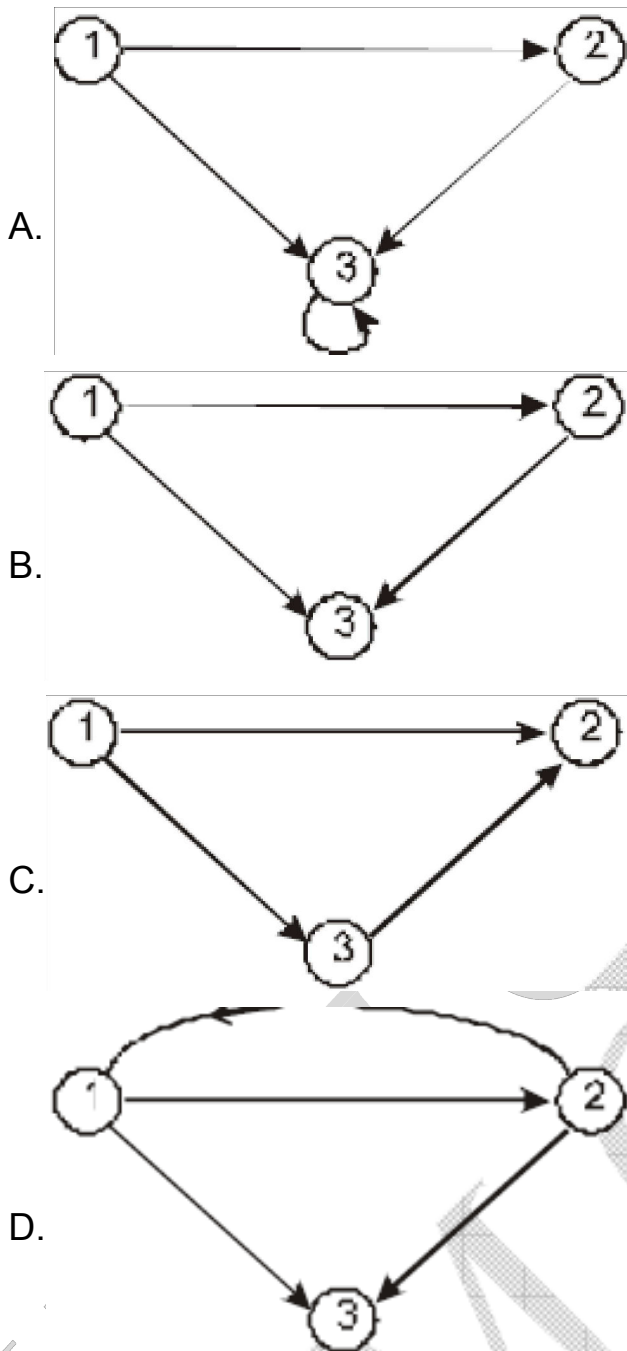
- (1) First character in the file
- (2) A structure which contains a ' char ' pointer to the first character in the file.
- (3) Name of the file.
- (4) None.

35. The eccentricity of node labeled 5 in the graph shown below is:

- (1) 6
- (2) 7
- (3) 8
- (4) 5



36. Let M be a 3×3 , adjacent matrix corresponding to a given graph of 3 nodes labeled 1, 2, 3. If entry (1, 3) in M^3 is 2, then the graph could be



37. How many characters per second (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is synchronous (1 start and 1 stop bit)?
 (1) 300 (2) 240 (3) 250 (4) 275
38. Which of the following statements are true?
 (i) Constructors may be declared in private, public or protected section.
 (ii) An object with a constructor or destructor can not be used as a member of a

44. Assume that there are 32 input-output storing units, 32 functions to select and 16 data routes to select. Assume control memory of 16384. How many encoded bits are required assuming that there is a next address field at the microinstructions? Two MUX are used one at input and one at output for a set of 8 registers.

- (1) 26 (2) 27 (3) 28 (4) 29

45. Match the following categories with respect to 8085 instructions:

Column I

- p) Data transfer instruction
- q) Arithmetic Instruction
- r) Logical Instruction
- s) Branch Instruction

Column II

- (i) CALL
- (ii) CMP
- (iii) STA
- (iv) DCR

p) (q) (r) (s)

- (1) p-(ii), q-(iii), r-(iv), s-(i)
- (2) p-(iii), q-(ii), r-(i), s-(iv)
- (3) p-(i), q-(iii), r-(ii), s-(iv)
- (4) p-(iii), q-(iv), r-(ii), s-(i)

46. Find odd one out:

- (1) ANAR (2) PCHL
- (3) ORAR (4) CMA

47. The PCI bus is the important bus found in all the new Pentium systems because

- I. It has plug and play characteristics
- II. It has ability to function with a 64 bit data bus
- III. Any Microprocessor can be interfaced to it with PCI controller or bridge

- (1) Only I and II (2) Only II and III
- (3) Only I and III (4) All of the above

48. A single register to clear the lower four bits of the accumulator in 8085 assembly language is?

- (1) XRI 0FH (2) ANI F0H (3) XRI F0H (4) ANI 0FH

49. The part of a database management system which ensures that the data remains in a consistent state is,

- (1) Authorization and integrity manager
- (2) Buffer manager

(3) Transaction manager

(4) File manager

50. Which of the following are factors in deciding on database distribution strategies?

I.Organizational forces

II.Frequency of data access

III.Reliability needs

(1) Only I and II

(2) Only II and III

(3) Only I and III

(4) All of the above

51. One way to generate, store and forward messages for completed transactions to be broadcast across a network is through the use of

(1)Stored procedures

(2) Triggers

(3) Functions

(4) SQL statements

52. Evaluate these two SQL statements and determine what is true about them?

I.SELECT last_name, salary , hire_date

FROM EMPLOYEES

ORDER BY salary DESC;

II.SELECT last_name, salary, hire_date

FROM EMPLOYEES

ORDER BY 2 DESC;

(1) The two statements produce identical results.

(2) The second statement returns a syntax error.

(3) There is no need to specify DESC because the results are sorted in descending order by default.

(4) The two statements can be made to produce identical results by adding a column alias for the salary column in the second SQL statement.

53. Which syntax turns an existing constraint on?

(1)ALTER TABLE table_name

ENABLE constraint_name;

(2)ALTER TABLE table_name

STATUS = ENABLE CONSTRAINT constraint_name;

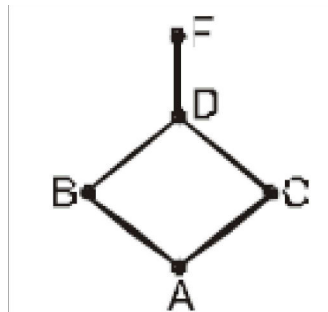
(3) ALTER TABLE table_name
ENABLE CONSTRAINT constraint_name;

(4) ALTER TABLE table_name
STATUS ENABLE CONSTRAINT constraint_name;

54. What is the type of Oracle backup in which all uncommitted changes have been removed from the data files?

- (1) Full backup (2) Consistent backup
(3) Inconsistent backup (4) Differential backup

55. Consider the diagram



A Euler circuit is,

- (1) FDCABF (2) FDBACDF
(3) FDCACF (4) None of these

56. When a C/SDK program in message handling begins, it immediately registers at least one window class using.

- (1) Register class () API function and a RGSCCLASS data structure
(2) Register class () API function and a WNDCLASS data structure
(3) Window Register class () API function and a RGSCCLASS data structure
(4) Window Register class () API function and a WNDCLASS data structure

57. For window message components, which one is not correct.?

- (1) Window message has an unsigned integer containing the actual message.
(2) LPARAM is a 4-byte parameter
(3) WPARAM is a 32-Bits parameter in win 32.
(4) WPARAM contains additional data, required to handle the message

58. What is/are false about UNIX operating system?

- (i) Unix consider all files to be a continuous sequence of characters.
(ii) Unix treat physical devices as if they are files & hence programs can access devices with same syntax as files.

(iii) Unix is multi user, multi-programmed but not time scheduled operating system.

(iv) Programs written using UNIX can not be run on a variety of architecture.

(1) (i), (ii), (iv)

(2) (ii), (iii), (iv)

(3) (iii), (iv)

(4) (ii), (iv)

59. Given

$$\text{LPP max } z = 6x_1 + 4x_2$$

$$\text{Subject to } x_1 + 2x_2 \leq 720$$

$$2x_1 + x_2 \leq 780$$

$$x_1 \leq 320$$

$$x_1, x_2, x_3 > 0$$

The optional value of objective function will be

(1) 2550

(2) 2560

(3) 2540

(4) None of these

60. The set $\{(x, y) : y < x^2 + 2x + 1\}$ is

(1) Convex set

(2) Non convex set

(3) Convex polyhedron

(4) None of these

61. A DMS X has four symbols $x_1, x_2, x_3,$ and x_4 with $P(x_1) = \frac{1}{2}, P(x_2) = \frac{1}{4}$

and $P(x_3) =$

$$P(x_4) = \frac{1}{8}$$

What is the entropy for Shannon – fano coding?

(1) 2.75

(2) 1.75

(3) 0.75

(4) 1.05

62. A push down automation has

(1) Infinite set of pushdown symbols

(2) Only one special pushdown symbol

(3) Finite set of input symbols

(4) all of these

63. In TM, the tape has k-tuple of tape symbol, where k is,

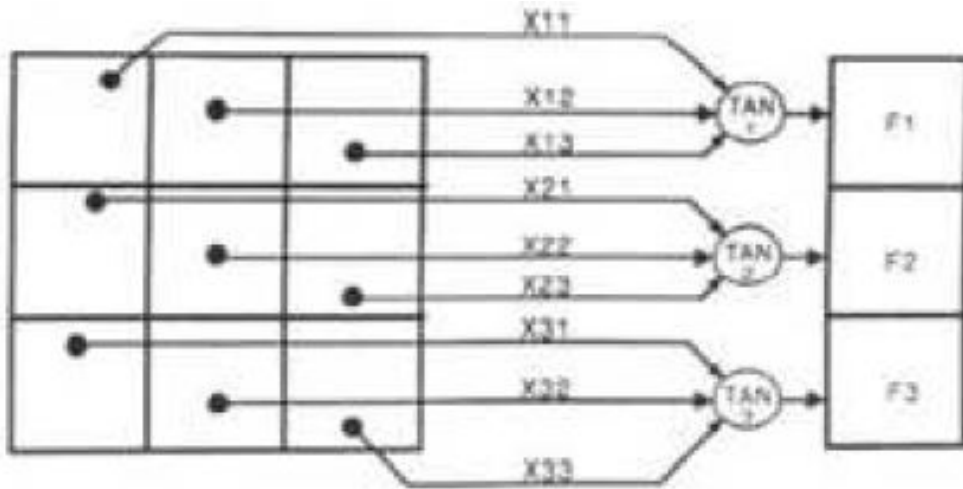
(1) Number of tracks

(2) Number of alphabets

(3) Set of tape symbols

(4) None of these

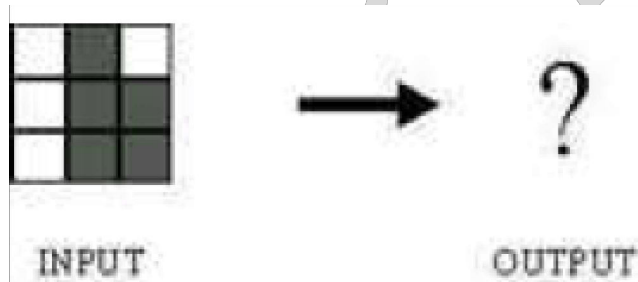
64. The given language
 $L = \{ a^m b^m : m \text{ positive} \}$ is,
(1) Regular (2) Not regular
(3) unpredictable (4) None of these
65. The Breadth - first search Tree are used in,
(1) Banking (2) Defense
(3) Law (4) All of these
66. Which of the following parser is more powerful and expensive?
(1) Simple LR (2) Look ahead LR
(3) Canonical LR (4) None of these
67. Which of the following is not the required condition for binary search algorithm?
(1) The list must be sorted
(2) there should be the direct access to the middle element in any sublist
(3) There must be mechanism to delete and/or insert elements in list
(4) none of above
68. A BCNF is
(1) Loss less join and dependency preserving
(2) Loss less join and not dependency preserving
(3) Not loss less join and dependency preserving
(4) None of these
69. Functional dependencies are generalization of
(1) Key dependencies
(2) Relational dependencies
(3) Database dependencies
(4) Functional dependencies
70. The network of the given figure is:
(1) a single layer feed-forward neural network
(2) an autoassociative neural network
(3) a multiple layer neural network
(4) a multiple layer feed-forward neural network



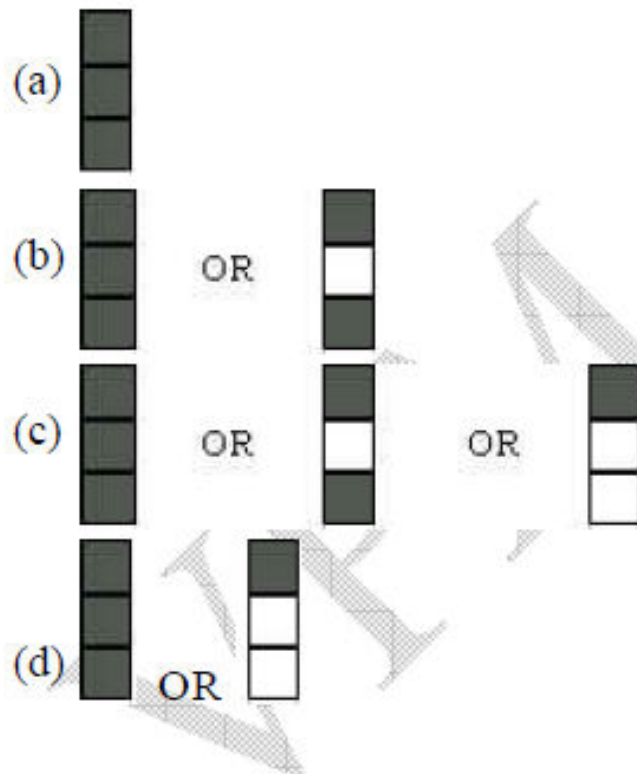
71. The network shown in the following Figure is trained to recognize the characters H and T as shown below:



If the following pattern was given



What would be the output of the network?



72. _____ protocol is typically used for error reporting.
 (1) DNS (2) ICMP (3) POP-3 (4) IMCP
73. When processing on output in XML, “new line” symbols are
 (1) Copied into output “as is”, i.e. “CR + LF” for window, CR for macintosh, LF for Unix.
 (2) Converted to single CR symbol
 (3) Converted to single LF symbol
 (4) Discarded
74. How can you open a link in a new browser window?
 (1) `< a href = “url” new >`
 (2) `< a href = “url” target = “-blank” >`
 (3) ``
 (4) None of these
75. Using which tag we insert a Java script in HTML page?
 (1) `< save script type = “text/javascript” > </javascript>`
 (2) `< script type = “text/javascript”></script>`

(3) <Jscript type = "text/javascript"> </jscript>

(4) <HTML script type = "text/javascript"> </HTML script>

76. Which of the following aggregate methods does not work if hiring and lay off are possible?

(1) The linear rule

(2) Simulation

(3) The management coefficients model (4) The transportation method.

77. (i) DPSH with eight phases will enable the bit rate to be tripled over the corresponding two phase modulation.

(ii) The diameter of a single mode fiber is generally greater than the diameter of a multi mode fiber.

Which of the following option is correct w.r.t the above statement?

(1) (i) – T (ii) – F

(2) (i) – F (ii) –F

(3) (i)–F (ii) – T

(4) (i) – T (ii) – T

78. If the Bit in X.25 standard is set to 1, it means that there is more than one packet.

(1) Q

(2) D

(3) M

(4) P

79. Match the following

(1) Time domain reflectometry

(i) transmission

(2) Frequency hopping and spread spectrum techniques are involved in

(ii) A technique that detects cable breaks bad taps or loose connectors

(3) 10 base 2

(iii) Multiplexing

(4) Sharing of communication channel.

(iv) thin ethernet

Which of the following option is correct for the given match-ups?

(1) (1) – (ii) (2) – (i) (3) – (iv) (4) – (iii)

(2) (1) – (i) (2) – (ii) (3) – (iv) (4) – (iii)

(3) (1) – (iii) (2) – (ii) (3) – (i) (4) – (iv)

(4) (1) – (iv) (2) – (i) (3) – (iii) (4) – (ii)

80. What is the maximum burst length on a 155.52 Mbps ATM ABR connection whose PCR value 200,000 and whose L value is 25 msec?

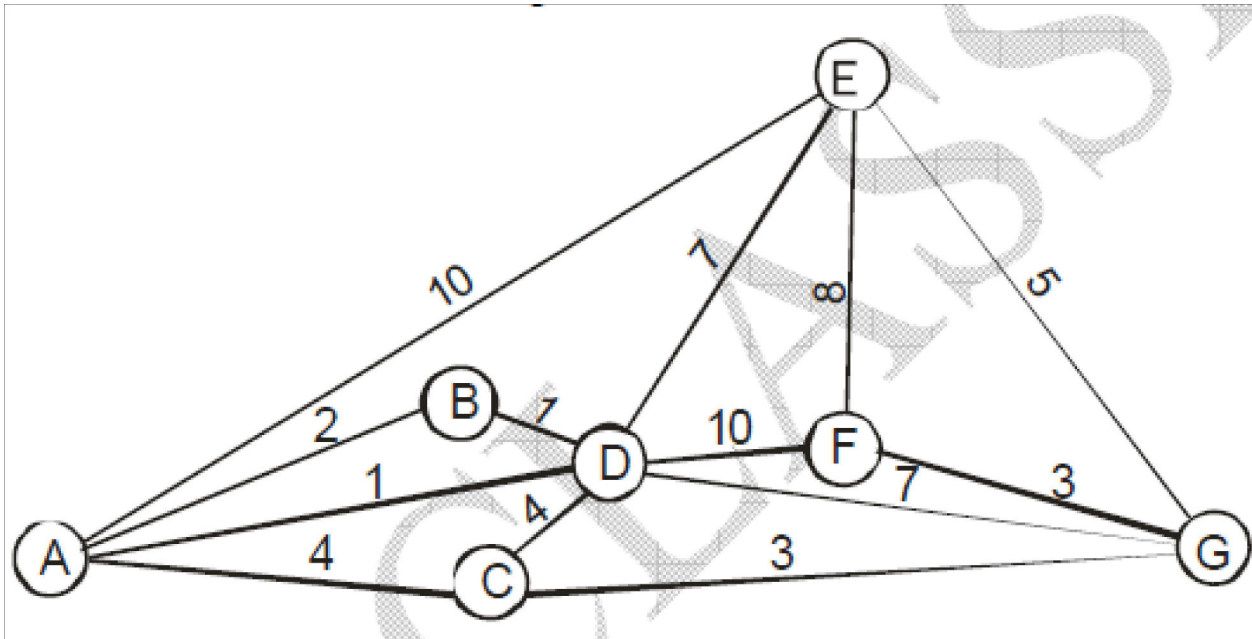
(1) 13

(2) 12

(3) 14

(4) 15

81. Solve the minimum-span problem for the network given in Fig. The numbers on the branches represent the costs of including the branches in the final network.



Find the minimum cost for connecting the network.

(1) 16

(2) 15

(3) 17

(4) 18

82. Consider the following CFG

$S \rightarrow OB$

$S \rightarrow bA$

$B \rightarrow b$

$A \rightarrow a$

$B \rightarrow bS$

$A \rightarrow aS$

$B \rightarrow aBB$

$A \rightarrow bAA$

Consider the following derivation

$S \Rightarrow aB$

$\Rightarrow aaBB$

$\Rightarrow aaBb$

$\Rightarrow aabSb$

$\Rightarrow aabbAb$

$\Rightarrow aabbab$

This derivation is

- (1) A leftmost derivation
- (2) A rightmost derivation
- (3) Both leftmost and rightmost derivation
- (4) Neither leftmost nor rightmost derivation

83. Which of the following regular expression identity is true

- (1) $r^* = r^*$
- (2) $(r^* s^*)^* = (r + s)^*$
- (3) $(r + s)^* = r^* + s^*$
- (4) $r^* s^* = r^* + s^*$

84. Consider following grammar

$S \rightarrow gA$

$A \rightarrow aA/eB/g$

$B \rightarrow gA$

Equivalent left linear grammar will be

(1). $S \rightarrow Ag$

$A \rightarrow Aa / Bg / g$

$B \rightarrow Ag$

(2). $S \rightarrow gA$

$A \rightarrow aA / gB / g$

$B \rightarrow gA$

(3). $S \rightarrow AB$

$A \rightarrow aA / gB / g$

$B \rightarrow gA$

(4) None of above

85. A self relocating program is one which

- (1) Cannot be made to execute in any area of storage other than the one designated for it at the time of its coding or translation.
- (2) Consists of a program and relevant information for its relocation.
- (3) Can itself perform the relocation of its address-sensitive portions
- (4) All of the above

86. Arrange the following steps of structured design methodology in the correct order
- (i) First level factoring
 - (ii) Restate the problem as a data flow diagram
 - (iii) Identify the input and output data elements
 - (iv) Factoring of input, output and transform branches.
- (1) (ii)-(iii)-(iv)-(i) (2) (ii)-(iii)-(i)-(iv)
 (3) (ii)-(iv)-(iii)-(i) (4) (i)-(ii)-(iii)-(iv)
87. Which of the following options is true for the given statement?
- (i) On line data capture is preferable to batch data entry because it reduces human effort in entering data.
 - (ii) Prototyping motivates the end user and required his active participation.
- (1) (i) T (ii) F (2) (i) F (ii) T
 (3) (i) F (ii) F (4) (i) T (ii) T
88. Software metrics cannot be applied in
- (1) Cost and size estimation techniques.
 - (2) Controlling software development projects
 - (3) Prediction of quality levels
 - (4) None of these
89. Representation of list in PROLOG is
- (1) {2, 4, 8, 10, 12}
 - (2) [2, 4, 8, 10, 12], ["jack", "jill", "jane 1"]
 - (3) [2, 4, 8, 10, 12]
 - (4) {"jack", "jill", "jane 1"}
90. Which of the following is a control structure in PROLOG?
- (1) p:-a, b, c;
p:-d, e, f;
 - (2) p:-a; b; c;
p:-d; e; f;

- (3) p:-a, b, c;
p:-d, e, f;
(4) None of these

- 91.** _____ is the number of arguments in a predicate form.
 (1) Atom (2) Arity
 (3) Parameter (4) Clause
- 92.** Which of the following is not a graphic standard?
 (1) MHEG (2) PREMO
 (3) OAD (4) Acrobat
- 93.** Arrange the following steps of animation in the correct sequence.
 (i) Object definitions
 (ii) Generation of in-between frames
 (iii) Storyboard layout
 (iv) Keyframe specifications
 (1) (iii), (i), (iv), (ii) (2) (iii), (iv), (ii), (i)
 (3) (i), (ii), (iii), (iv) (4) (iv), (ii), (i), (iii)
- 94.** _____ allow object motion characteristics to be specified as part of the object definitions
 (1) Key frame systems (2) Parameterized systems
 (3) Scripting systems (4) None of these
- 95.** Which of the following statement is true?
 (1) Macro definition can not appear within other macro definition in assembly language programs
 (2) Overlaying is used to run a program which is longer than the address space of computer.
 (3) Mutual memory can be used to accommodate a program which is longer than the address space of computer.
 (4) It is not possible to write interrupt service routines in a high level language.
- 96.** In anomaly detection, to detect anomalous login time for a user we use,
 (1) Monitoring system calls commands
 (2) Linux based commands

- (3) Monitoring shell commands
- (4) Monitoring kernel commands

```
97. main( )
{
int x = 4, y = 0, z;
while(x >= 0)
{
if (x == y)
break;
else
printf("\n %d%d", x, y);
x- -;
y++;
}
}
```

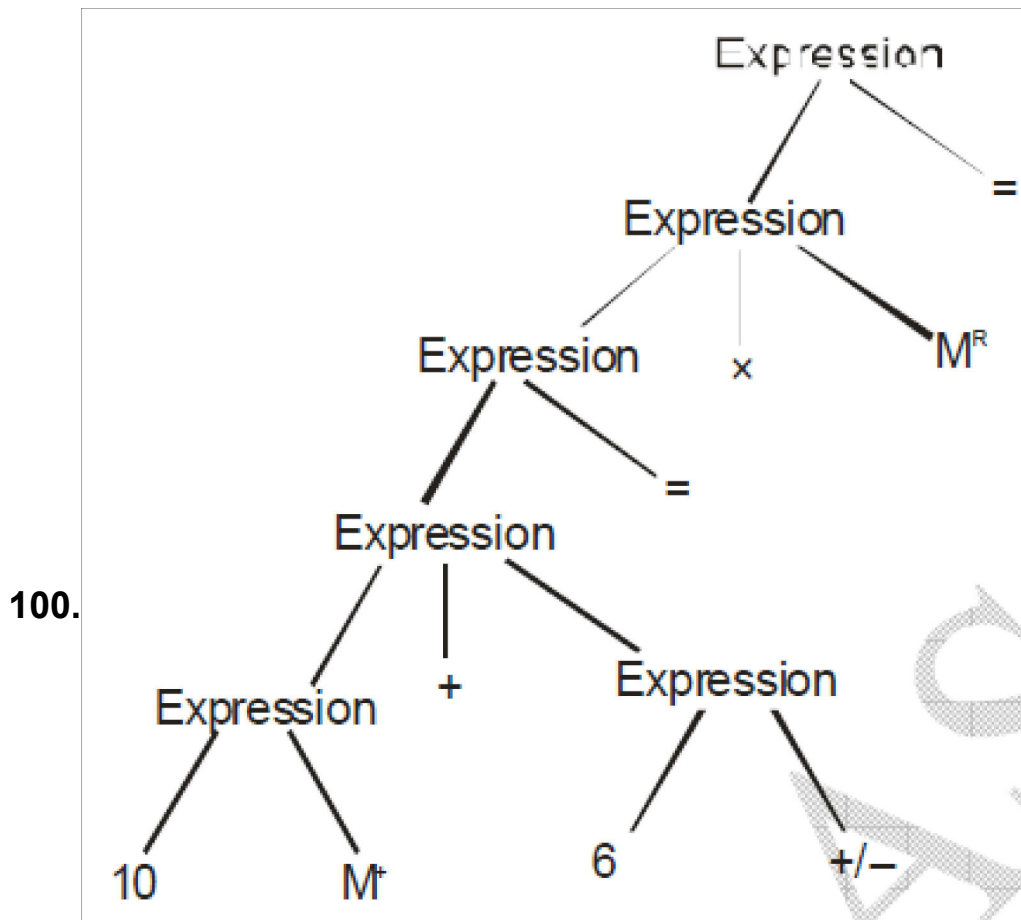
What will be the output of the given program

- (1) 3 1
4 0
- (2) 4 0
3 1
- (3) 1 3
0 4
- (4) 3 3
4 0

98. _____ and _____ are the two advantages of high level programming language

- (1) Readability, Robustness
- (2) Portability, Robustness
- (3) Readability, Portability
- (4) None of these

99. Which of the following options is correct for the given statements?
- (i) A PROLOG program does not involve a number of facts and rules
 - (ii) PROLOG is known for its in-built depth first search engine and for its case in quick prototyping.
 - (iii) A matching in PROLOG is performed argument to argument only.
- (1) Only (i) is correct (2) Only (ii) is correct
 (3) (i) and (ii) both are correct (4) All are correct



Above abstract syntax tree is for expression

- (1) $10 M^* * / . + 6 = X = MR$
- (2) $10 M^* + 6 * / . = X MR =$
- (3) $10M^* + 6 * / . X MR = =$
- (4) $10M^* * / . + 6 X MR = =$

ANSWER KEY

PAPER-II

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

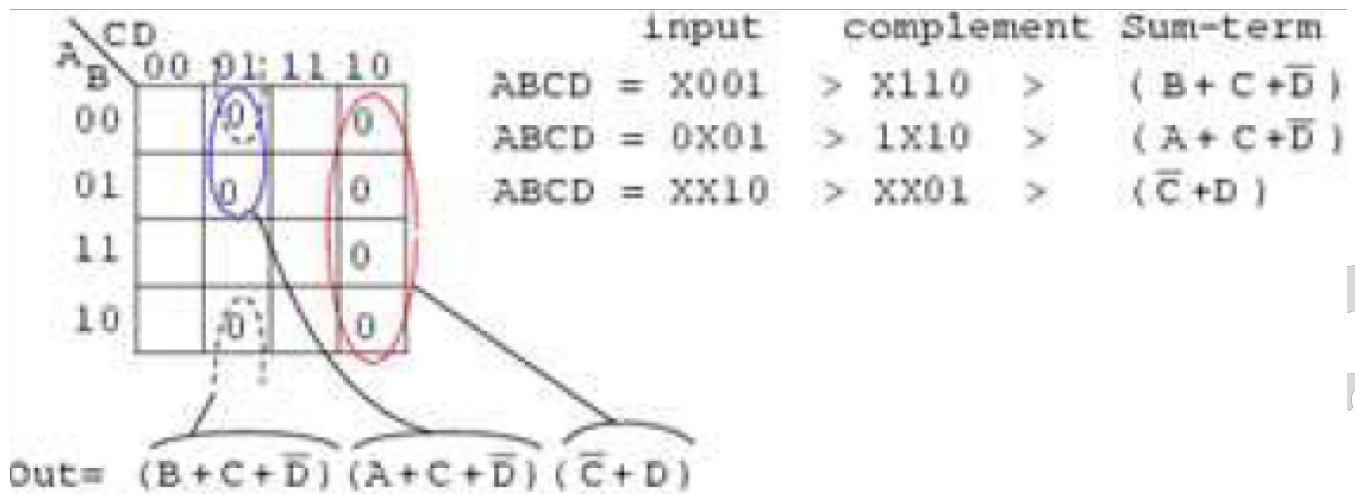
HINTS AND SOLUTIONS

1.(3) Transfer the seven maxterms to the map below as 0s.

$$\text{Out} = (A+B+C+\bar{D})(A+B+\bar{C}+D)(A+\bar{B}+C+\bar{D})(A+\bar{B}+\bar{C}+D) \\ (\bar{A}+\bar{B}+\bar{C}+D)(\bar{A}+B+C+\bar{D})(\bar{A}+B+\bar{C}+D)$$

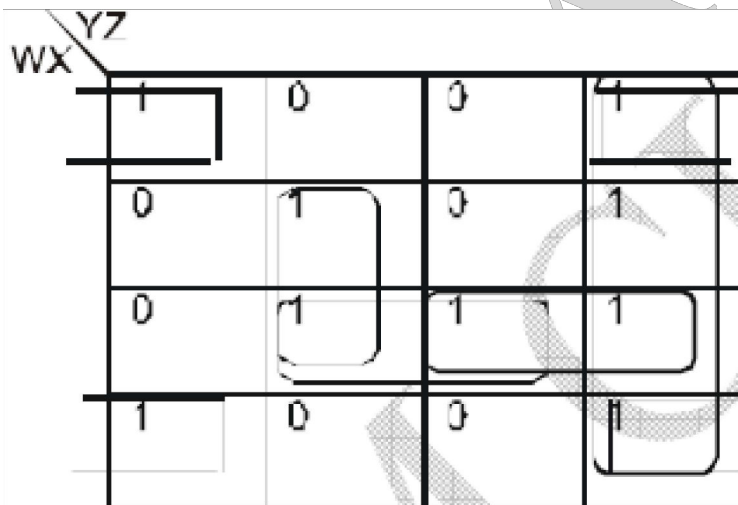
	CD				
A	B	00	01	11	10
0	0		0		0
0	1		0		0
1	1				0
1	0		0		0

Map the 0s as they appear left to right top to bottom on the map above. Now form groups of cells.



The final result is product of the three sums i.e.
 Out = (B+C+ NOT(4)) (A+C+ NOT(4)) (NOT(3)+D)

2.(2)



$$F(W,X,Y,Z) = \sum m(0,2,5,6,8,10,13,14,15)$$

3.(4) SONET rings can be classified by the routing principle and the SONET overhead used for triggering protection switching. A ring is called a unidirectional ring if bidirectional working signals follow opposite physical routes around a ring, while bidirectional working signals in a bidirectional ring follow the same route. Due to this routing principle, a unidirectional and a bidirectional ring, require one and two fibers respectively, to support their working traffic.

4.(1) Each ISDN line is made up of separate 64-Kbps "channels" for sending and receiving calls, plus a channel that is used primarily for signaling.

- 5.(2) Routing Information Protocol is a distance vector routing protocol that uses hop count as its metric. The maximum hop count is 15. 16 hops are considered unreachable. RIP updates are broadcast every 30 seconds by default. RIP has an administrative distance of 120.
- 6.(3) The sum of 87H and 79H = 100H. Therefore, the accumulator will have 00H, and the flags will be S = 0, Z = 1, CY = 1
- 7.(4) If the stack pointer is initialized with (4FEB) H, then after execution of push operation in 8085 microprocessor, stack pointer shall be 4FED.
- 8.(2) The 8085 differentiates between the input and output ports of the same address by the control signal. The input port requires the RD and the output port requires the WR signal.
- 9.(4) Relations for the ordered pairs (^, ^), (-, -), (+, +), (*, *) in the operator precedence table constructed for the grammar will be <, >, >, > as exponent is of right associative to itself and +, -, * and / are left associative
- 10.(3) Proof as follows:
1. Let P=Q=R=EMPTY SET. The equation is satisfied. So this rules out (2).
 2. Let P=R be \sum^* then any Q will satisfy the equation. The demands of (1) & (4) are invalid.
 3. So the answer is (3).
11. (3) It is not possible to convert nondeterministic PDA to deterministic PDA
12. (3) CPU burst time indicates the time for which the process needs the CPU.

Considering FCFS scheduling

Processes CPU	Burst time
P1	10
P2	5
P3	5

For processes arriving in the order: P1 , P2 , P3

The Gantt Chart for the schedule is:

P1	P2	P3
0	10	15

Waiting time for P1 = 0; P2 = 10; P3 = 15

Average waiting time: $(0 + 10 + 15)/3 = 8.33$ unit of time

13.(2) (p) time sharing-Technique that allows multiprocessing on a computer with a single CPU

(q) process-Activity of executing a program

(r) bootstrap-Program first executed when a computer is turned on

(s) shell-Part of an operating system that communicates with the user

14. (2) Aging resolves or avoids the problem of starvation.

15. (4) Option (1), (2) and (3) all are correct.

Page-Stealer process is the Kernel process that makes room for the incoming pages, by swapping the memory pages that are not the part of the working set of a process.

It is created by the Kernel at the system initialization and invokes it throughout the lifetime of the system.

Kernel locks a region when a process faults on a page in the region, so that page stealer cannot steal the page, which is being faulted in.

16.(1) The shell calls fork(); the child process calls exec() and the parent calls wait().

The shell is just another process that can take a string as standard input, look for the program referenced by the string, and then run this program. Unless the program is put in the background, the shell will wait until the program has finished.

17.(1) Evaluation of the target market is an activity of a contract review

18.(2) Insufficient identification is a process-related problem. Unidentified, partially identified, and unplanned risks pose a threat to the success of a software project. You need to intensively identify risks and evolve a risk management plan such that the project is completed successfully, on time

19.(2) Five nines of reliability refer to a product that is operational 99.999% of the time.

20. (3) Static analyzers A static analyzer operates from a pre-computed database of descriptive information derived from the source text of the program.

Code inspectors A code inspector does a simple job of enforcing standards in a uniform way for many programs. These can be single statement or multiple statement rules.

Output comparators These are used in dynamic testing-both single-module and

multiple-module varieties to check that predicted and actual outputs are equivalent.

Standard enforces This tool is like a code inspector. The main distribution is that a full-blown static analyzer looks at whole programs, whereas a standard enforcer looks at only single statements.

21.(4)

Disparate data- Production data

Non volatile data- Query and analysis

Data granularity- Level of detail

22.(3) Credit theft is impossible with smart card as key to unlock encrypted information is required and also due to the absence of external account number on the card.

23.(3) FAT12 is a 12-bit version developed by Microsoft in 1977 for Microsoft Disk BASIC

FAT16 is a 16-bit version introduced in July 1988 for MS-DOS 4.0

FAT32 is a 32-bit version introduced in August 1996 for Windows 95 OSR2

24.(3) TRACE macro sends an output message to the debug window of compiler. User can also see the trace messages without the debugger running using DebugView.

25.(3) PVIEW is used to kill errant hidden processes in windows95. With PView, user can modify status of processes running on the system. As a result the entire system's processes can be stopped and potentially halt.

26.(3) Select three columns from the COURSES table, of which the third one has a constant value, i.e. " = PRICE". Sort the data according to the second column, in ascending order

27.(1) It must be translated to the actual relation in the conceptual model of the database

28.(2) Because it may have the values from all the domains.

29.(3) In order traversal is left->root->right and pre order is root->left-> right so it can be used to find the post order traversal. first check the node in preorder and then find the root in in

order, check left and right nodes and create a tree and then find the post order

30.(4) The queue can not be reversed as it is based on the concept of FIFO.

31.(1) The time complexity of Prim's Algorithm is $O(n*n)$.

32.(1) If a B-tree is created with order m then the node may have max. of m children and then it splits into two and middle child becomes the root

33.(1) A can draw a ticket in ${}^3C_1 = 3$ ways.

Number of cases in which A can get a prize is 1. Probability of A's success = $1/3$

B can draw a ticket in 9C_3 ways = $9 \cdot 8 \cdot 7 / 3 \cdot 2 \cdot 1 = 84$ ways.

Number of ways in which B gets all blanks = ${}^6C_3 = 6 \cdot 5 \cdot 4 / 3 \cdot 2 \cdot 1 = 20$

Number of ways of getting a prize = $84 - 20 = 64$

Thus the probability of B's success = $9 \frac{64}{84} = \frac{16}{21}$

So A's probability of success: B's probability of success = $\frac{1}{3} \cdot \frac{16}{21}$

34.(4) Here P represents file pointer. It points to the structure, in which char pointer exists which points to the first character of file.

35.(2) Eccentricity of a given node is the maximum of minimum path from other nodes to the given node.

Cost of minimum path from 1 to 5 is 7.

Cost of minimum path from 2 to 5 is 6

Cost of minimum path from 3 to 5 is 4

Cost of minimum path from 4 to 5 is 7

36.(1) If (1, 3) entry in M^3 is 2, it means there are 2 path of length 3, connecting nodes 1 and 3. If you see the graphs in option (1) then we have two paths

($1 \rightarrow 2 \rightarrow 3 \rightarrow 3$ & $1 \rightarrow 3 \rightarrow 3 \rightarrow 3$)

37.(1) Start and stop bits are not needed in synchronous transfer of data, so it is $2400 / 8 = 300$.

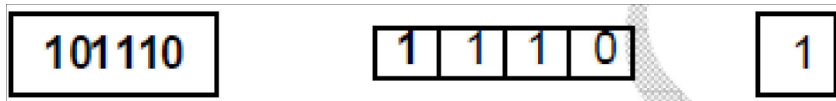
38.(4) A constructor is a special member function whose task is to initialize the objects of its class. It is special because its name is same as that of the class.

A destructor is used to destroy the objects that have been created by a constructor. Constructors should be declared in the public section. An object with a constructor or destructor cannot be used as a member of a union. Constructors can never be virtual.

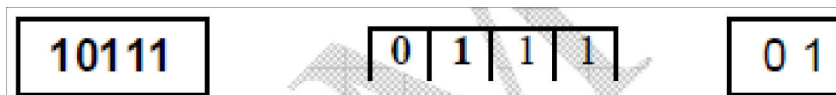
42.(3) A digital multiplexer can also be used to implement combinational logic function
-True

In a combinational circuit, the current output depends on the previous outputs also -False

43.(1) The content of the register after first shift will be -> 1110 , as



The content of the register after second shift will be -> 0111 , as



44.(4) 32 functions need 5 bit encoding in control memory microinstruction to enable selection of one of the function.

16 data routes need 4 bit encoding in control memory microinstruction to enable selection of one of the data route.

$32 - 2 - 8 = 22$ independent storing units. Number of control signals, $22 * 2 = 44$.

Two control signals are needed for two MUXs. Total number of control signals 46 signals for storing input-output register. Since $44 > 2^5$, 6 bit encoding is required in control memory microinstruction to enable selection of one of the unit.

16384 (= 214) addresses are there in control memory. 14-bits are thus required from next-address field in the control memory.

Therefore, for all the 4 fields the control memory need (5 + 4 + 6 + 14) encoding bits in each microinstruction.

45.(4) Categories of 8085 instructions that manipulate data:

- STA is a data transfer instruction
- DCR is a arithmetic Instruction
- CMP is a logical Instruction
- CALL is a branch Instruction

46 (2)• ANAR - logical group instructions for 8085- AND accumulator with register

• PCHL - unconditional branch instructions. PCHL instruction exchange the contents of the program counter with the contents of the H and L registers.

- ORAR - logical group instructions for 8085- OR accumulator with register
- CMA - logical group instructions for 8085- Complement the Accumulator

- 47.(4)** The PCI bus is found in all the new Pentium systems as it has plug and play characteristics, has the ability to function with a 64 bit data bus and any micro-processor can be interfaced to it with PCI controller or bridge.
- 48. (2)** ANI stands for “Logical AND with Accumulator Using Immediate Data”. This ANDs the accumulator with immediate. F leaves the high nibble whatever it is, 0 clears the lower nibble
- 49.(3)** A transaction manager is the part of an application that is responsible for coordinating transactions across one or more resources. Transaction managers are responsible for ensuring that resources are not left in an inconsistent state, if there is a system failure and the application crashes.
- 50.(4)** Organizational forces, frequency of data access, need for growth and expansion, technological capabilities and need for reliable service are the factors for deciding on database distribution strategies
- 51.(2)** For real-time requirements, store and forward messages for each completed transaction can be broadcast across the network informing all nodes to update data as soon as possible, without forcing a confirmation to the originating node before the database at the originating node is updated. One way to generate such messages is by using triggers. A trigger can be stored at each local database so that when a piece of replicated data is updated, the trigger executes corresponding update commands against remote database replicas.
- 52.(1)** These two statements produce identical results, because it is possible even to use numbers to indicate the column position where Oracle should order the output from a statement.
- 53.(3)** ALTER TABLE statement with ENABLE CONSTRAINT keyword is correct answer to enable an existing constraint.
- 54.(2)** A consistent backup is one in which the files being backed up contain all changes up to the same system change number. This means that the files in the backup contain all the data taken from a same point in time. Unlike an inconsistent backup, a consistent whole database backup does not require recovery after it is restored. An inconsistent backup is a backup of one or more database files that

user make while the database is open or after the database has shut down abnormally.

55.(1) Hamming code is error correcting code, to transmit 4 data bits 3 parity bits located at position 2^0 , 2^1 & 2^2 from left are added as

$P_1 P_2 D_3 D_4 D_5 D_6 D_7$

When $P \rightarrow$ Parity & $D \rightarrow$ Data bit

P_1 is set to be a or a1 where bits are 1, 3, 5, 7

P_2 is set to be a or a1 where bits are 2, 3, 6, 7

P_3 is set to be a or a1 where bits are 1, 3, 5, 7

P_4 is set to be a or a1 where bits are 4, 5, 6, 7

P_3	P_2	P_1
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

So here

Bits 1, 3, 5, 7 (P_1 1 1 1) must be even parity (1).

Bits 2, 3, 6, 7 (P_2 1 0 1) must be even parity (0)

Bits 2, 3, 6, 7 (P_3 1 0 1) must be even parity (0)

56.(2) WNDCLASS data structure include a pointer to a class() function for handling the window's message.

57.(4) WPARAM is of 32 Bits in win-32 & is not used in handling the message.

58.(3) Unix is also a time shared OS & programs using UNIX can be run on variety of architecture as it assumes to have no knowledge of architectures.

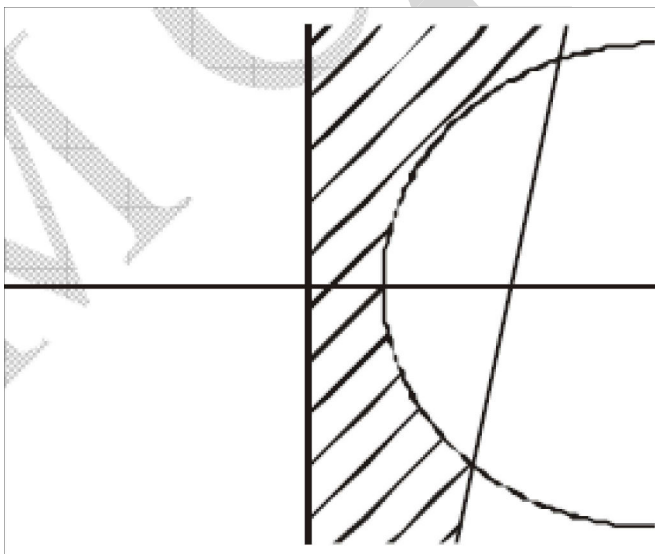
59.(2)

Basic	x_1	x_2	s_1	s_2	s_3	Solution	Ratio
z_1	0	2	1	0	-1	400	200
s_2	0	1	0	1	-2	140	140 →
s_3	1	0	0	0	1	320	
z	0	-4	0	0	6	320	

Entering variable = x_2 , Leaving variable s_2 .

Basic	x_1	x_2	s_1	s_2	s_3	Solution	Ratio
s_3	0	0	$1/3$	$2/3$	1	40	
s_2	0	1	$2/3$	$-1/3$	0	220	
s_1	1	0	$-1/3$	$2/3$	0	280	
z	0	0	$2/3$	$8/3$	0	2560	

60.(2) $y < x^2 + 2x + 1$



Hence given set is non convex set

61.(2)

x_i	$P(x_i)$	Step 1	Step 2	Step 3	Code
x_1	$1/2$	0			0
x_2	$1/4$	1	0		10
x_3	$1/8$	1	1	0	110
x_4	$1/8$	1	1	1	111

$$I(x_1) = -\log_2 1/2 = 1 = n_1$$

$$I(x_2) = -\log_2 1/4 = 2 = n_2$$

$$I(x_3) = -\log_2 1/8 = 3 = n_3$$

$$I(x_4) = -\log_2 1/8 = 3 = n_4$$

We know that, $H(X) = \sum_{i=1}^4 P(x_i)I(x_i)$

Or
$$H(X) = \frac{1}{2}(1) + \frac{1}{4}(2) + \frac{1}{8}(3) + \frac{1}{8}(3) = 1.75$$

62.(3) A pushdown automation consists of

- i. a finite nonempty set of states denoted by Q ,
- ii. a finite nonempty set of input symbols denoted by Σ ,
- iii. a finite nonempty set of pushdown symbols denoted by Γ ,
- iv. a special state called the initial state denoted by q_0 ,
- v. a special pushdown symbol called the initial symbol on the pushdown store denoted by Z_0 .

63.(1) In a multiple track TM, a single tape is assumed to be divided into several tracks. Now the tape alphabet is required to consist of k -tuples of tape symbols, k being the number of tracks. Hence the only difference between the standard TM and the TM with multiple tracks is the set of tape symbols.

64.(2) Suppose L is regular. Then, there exists a finite state automation M which accepts L . Suppose M has K states. Let $w = a^k b^k$. Then $|w| > k$. By the pumping Lemma $w = xyz$ where y is not empty and $w_2 = xy^2z$ is also accepted by M . If y consists of only a 's or only

b's, then w_2 will not have the same number of a's as b's. If y contains both a's and b's, then w_2 will have a's following b's. In either case w_2 does not belong to L, which is a contradiction. Thus L is not regular.

- 65.(4)** Breadth first search are heuristic technique used in medicine, law, biology and chemistry etc.
- 66.(3)** 1. Simple LR (SLR for short), is the easiest to implement, but the least powerful of the three. It may fail to produce a parsing table for certain grammars on which the other methods succeed.
2. Canonical LR is the most powerful and the most expensive.
3. Look ahead LR (LALR for short), is intermediate in power and cost between the other two. The LALR method will work on most programming-language grammars and, with some effort, can be implemented efficiently
- 67.(3)** Deletion and insertion of elements is not required in binary search.
- 68.(2)** Dependency preserving is not condition for BCNF.
- 69.(1)** In key dependencies as in Functional dependencies there is the dependency of keys.
- 70.(1)** The network of the given figure is a single layer feed-forward neural network because there is only one neuron between any input and output. The network is not autoassociative i.e. doesn't have feedback because there are no loops in it.
- 71.(2)** The top square of the output is black because the top pattern differs in two squares from a T and in 3 squares from an H. The middle square is not defined because the middle row of the input differs the same amount from both T and H (differs in 1). Therefore, the output can be either black or white. The bottom square is black because it differs from a T and in 2 from an H
- 72.(2)** ICMP is the Internet control Message protocol. It is an application layer protocol. It is used by hosts, routers, & gateways to communicate network layer information to each other. The most typical use of ICMP is for error reporting.
- 73.(3)** For processing an output in XML, "new line" symbol are first converted to single LF symbol.
- 74.(2)** If you want to open a link in a new browser then it will be opened with `` syntax.

- 75.(2)** `<Script type = "text/javascript"></jscrip>` using this tag , we insert a javascript in HTTP page. In all project this can be used.
- 76.(4)** The transportation method does not work if hiring and layoff is possible. This is an aggregate method.
- 77.(1)** Eight phase digital transmission implies 23 bits/second. Hence, the bit rate can be tripled over corresponding two phase modulation.
Multi mode fiber allows more than one ray of light at a moment. It is generally greater in diameter than a single mode fiber.
- 78.(3)** If the M bit in X.25 standard is set to 1, it means that there is more than one packet. The M-bit or More Data indicates whether this particular packet is carrying the total intended message or whether there is more data to follow as part of this transmission.
- 79.(1)** Multiplexing is sharing of communication channel. Multiplexing involves multiple signals or streams of information on a carrier at the same time in the form of a single, complex signal. 10Base2 cabling is also popularly known as thin Ethernet. It supports transmission up to a maximum distance of 20mts. Such Cables are cheaper and used for smaller lowcost LAN's.
Frequency hopping and spread spectrum techniques are involved in transmission. Spread Spectrum is the wide range of frequencies during transmission. Time Domain Reflectometry is a technique that detects cable breaks, bad taps or loose connectors. The TDR measures the time it takes for the signal to travel down the cable and reflect back. The TDR then converts this time to distance and displays the information as a waveform and/or distance reading.

80.(2) Use the formula
$$N = \frac{1+L}{(T-\delta)}$$

Here $T = 5 \mu\text{secs}$

$L = 25 \mu\text{sec}$, and

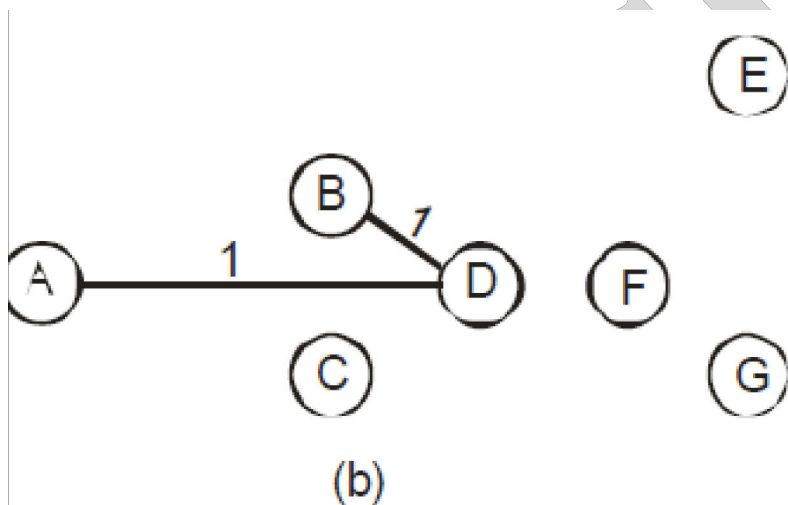
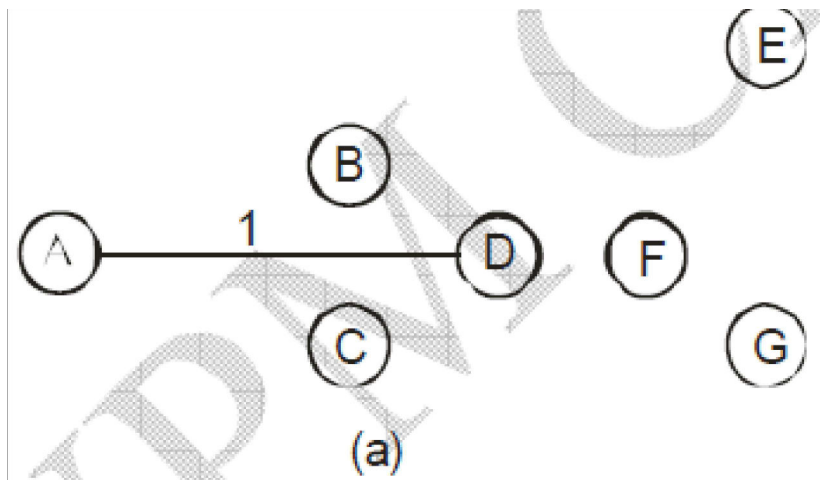
$D = 2.73 \mu\text{sec}$.

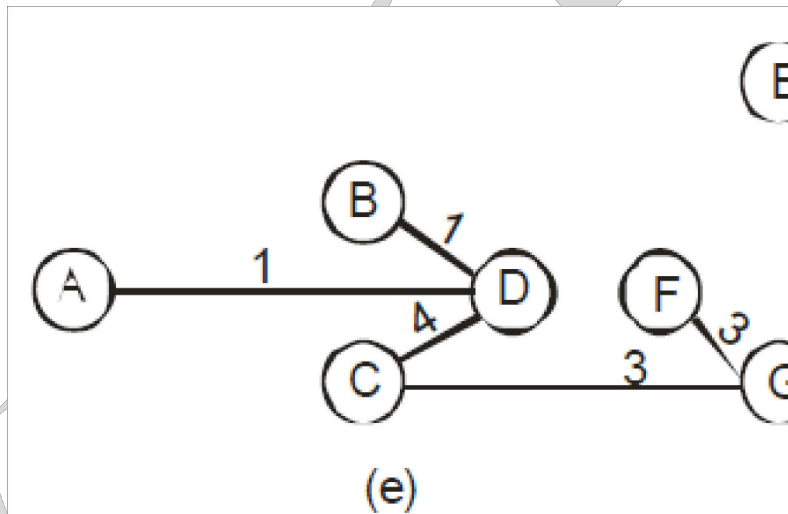
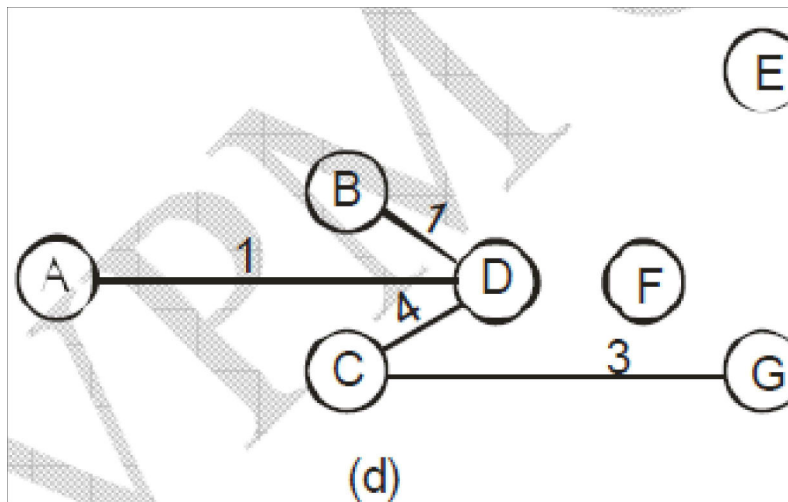
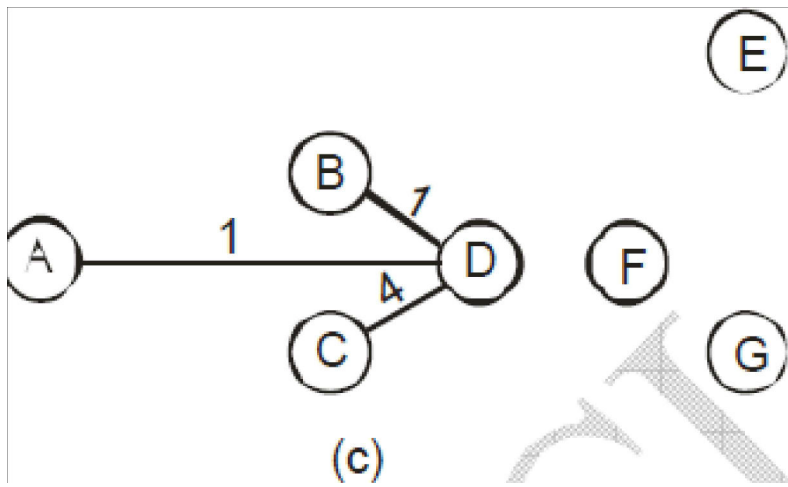
Putting the values and solving, we get

$N = 12.01$ which round down to 12 cells.

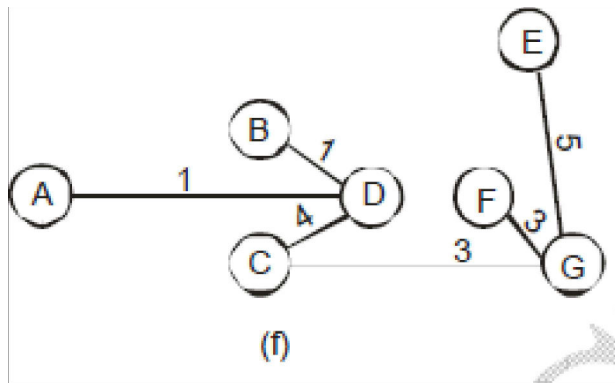
81.(3) We arbitrarily choose A as our starting node and consider all branches incident on it; they are AE, AB, AD, and AC, with costs 10, 2, 1, and 4 respectively. Since AD is the cheapest, we add this branch to the solution, as shown in Fig.(1) Nodes A and D are now connected.

We next consider all branches incident on either A or D that connect to other nodes. Such branches are AE, AB, AC, DB, DE, DF, DG, and DC, with costs 10, 2, 4, 1, 7, 10, 7, and 4, respectively. Since DB is the cheapest to include, we adjoin it to Fig-(1) and obtain Fig-(2). The connected nodes are now A, B, and D.





VPM CLASSES



We next consider all branches incident on A, B, or D that connect to other nodes. These are AE, AC, DE, DF, DG, with costs 10, 4, 7, 10, 7, and 4. The cheapest branch of interest is either AC or DC. We arbitrarily select DC and adjoin it to Fig. (2) to obtain Fig-(3).

Continuing in this manner, we obtain sequentially Fig-(4) through Fig(f). Fig(f) contains all the nodes; hence it is a minimal-span network. The minimum cost for connecting the network is

$$Z^* = 1 + 1 + 4 + 3 + 3 + 5 = 17$$

82.(4) Given derivation is neither leftmost nor rightmost derivation because this is not restricted for left-right recursion/replacement.

83.(2) $(r^*s^*)^* = (r + s)^* = (r^* + s^*)^*$ this is the one of the identity from the 12 identities of regular grammar.

84.(1) A grammar is called left most grammar if and only if all steps involved in derivation have leftmost variable replacement only. From the definition it is clear that for the given grammar option (1) is correct.

85.(3) A self relocating program is one which can itself perform the relocation of its address-sensitive portions.

86.(2) The basic principle behind the structured design methodology in problem partitioning the four major steps are

1. Restate the problem
2. Identify the input and output
3. First level factoring
4. Factoring of input, output and transform branches.

87.(3) None of the given statements are true.

88.(4) Areas of application of software metrics are :

1. Prediction of quality levels for software in terms of reliability
2. Cost and size estimation techniques
3. Controlling software development projects through measurement.

89.(2) Lists in PROLOG constitute elements separated by commas and enclosed within square brackets. The elements could comprise of any data type.

eg – [2, 4, 8, 10, 12] and ['jack', 'jill', 'jane' 1]

90.(1) p:-a, b, c

p:-d, e, f ,

This represents the control structure in PROLOG. Given representation means that p is true if either (a and b and c) is true or (d and e and f) is true the comma implies an AND.

91.(2) Arity is the number of arguments in a predicate form. It is represented by a/n placed after the predicate name. n is the number of arguments for instance the predicate relishes/2 takes two arguments.

92.(3) Some of the important standards for providing structure to multimedia applications are–

1. MHEG
2. PREMO
3. ODA
4. Acrobat
5. Hytime
6. SGML

93.(1) The steps involved in the animation are–

- (i) Storyboard layout
- (ii) Object definitions
- (iii) Keyframe specifications
- (iv) Generation of in-between frames

94.(2) Parameterized systems allow object motion characteristics to be specified as part of the object definitions. The adjustable parameters control such object characteristics as degrees of freedom, motion limitations and allowable shape changes.

95.(2) All (1), (3) and (4) are false. The difference between (2) and (3) is vital.

80386 processor has 32 bit address capacity (32 pins for address) hence it is capable of accessing $2^{32} = 2^2 \times 2^{30} = 4\text{GB} = 4096\text{ MB}$ of main memory. Present day computers have at most 32 MB RAM. The address space of 386 processor is 4GB and hence virtual memory can be at most 4 GB. If a program is of 5 GB, we have to use only overlying technique.

96.(3) Monitoring shell commands is an example of anomaly detection. Monitoring shell

commands is used to detect anomalous commands for a given user or detecting an anomalous login time for a user.

97.(2) Option (2) gives the correct O/P for the program

98.(3) Readability – Programs written in high level languages are more readable than assembly and machine language. Portability – Programs could be run on different machines with little or no change.

99.(2) A PROLOG program comprises a description of the problem using a number of facts and rules. Matching in PROLOG is performed predicate to predicate and argument to argument.

100.(2) Option B is correct. Most of the operations associate to the left because of the way keystrokes are processed from left to right.