

FOR EVALUATOR'S USE ONLY

Sub. Code : **09**

Optional Paper

Computer Engineering : Paper - II

Time : 3 Hours / Maximum Marks : 200 / Total Pages : 32

Evaluation Table

(For Evaluator's Use Only)

PART-A				PART-B				PART-C				Grand Total		
Q.N	E-1	E-2	AC	Q.N	E-1	E-2	AC	Q.N	E-1	E-2	AC	PART-A		
1				21				33				PART-B		
2				22				34				PART-C		
3				23				35				Total		
4				24				36				(-) Marks		
5				25				37				Final Total		
6				26				38				Marks in Words		
7				27				39						
8				28										
9				29										
10				30							Remarks of Evaluator/Chief Evaluator			
11				31										
12				32										
13														
14														
15														
16														
17														
18											Remarks of Scrutiniser			
19														
20														
Total														
Evalu ator's Sign														

08/04/11

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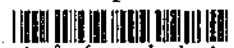


Note : Attempt all the twenty questions. Each question carries 2 marks. Answer should not exceed 15 words.

1 Differentiate kernel and shell.

2 Write four necessary conditions for deadlock.

3 What factor(s) contribute to thrashing in an operating system ?



4. A memory from address 000H to FFFH stores four jobs from address 111H to 332H, 449H to 62FH, 333H to 400H and 888H to FFFH. How many holes are there if 000H to 110H is allocated to OS?

5. Consider hashing function $h_{k+1}(x) = (h_k(x) + k) \bmod 11$ $h_1(x) = x \bmod 11$. What shall be value of $h_3(24)$.

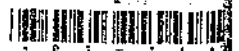
6. For a grammar

$s \rightarrow asa$

$s \rightarrow bsb$

$s \rightarrow \epsilon$

Find whether ababbaba is acceptable string or not. Justify answer.



- 7 Apply operator strength reduction and loop folding optimization in the following code and give output
- ```
DO I = 1 to 3
 A(J+I) = 0.0
END
K = L * 2
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- 8 Write pumping lemma for regular grammar.

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- 9 Enumerate three differences between CSMA/CD and CSMA/CA.

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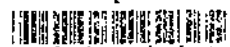
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10 What are the typical ranges of class A, class B and class C IPV4 address ?

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11 What are advantages of packet switching over circuit switching ?

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12 What are ARP and RARP ?

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13 What are the phases of waterfall model ?

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14 Describe one approach to identify object class in object oriented analysis.

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15 What is integration testing ?

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16. What is information contained in a symbol table?

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17. Differentiate between raster and random scan.

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18. What is clipping?

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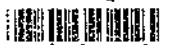
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19 What is affine transformation ?

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20 Why are homogeneous coordinates used in graphics algorithms ?

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Note : Attempt all the twelve questions. Each question carries 5 marks. Answer should not exceed 50 words.

21 Consider 3 processes P1, P2, P3 shown as under :

| Process | Arrival Time | Execution Time units Required |
|---------|--------------|-------------------------------|
| P1      | 0            | 5                             |
| P2      | 1            | 7                             |
| P3      | 3            | 4                             |

Explain the completion order of the 3 processes under First come first serve and round robin scheduling with CPU quantum of 2 time units.

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22 Consider a 2-level cache system. CPU tries to access data from L1 cache and if data is not found there, it tries to read data from L2 cache and then from RAM. Hit rate of L1 and L2 cache are 95% and 90% respectively. On an average, a CPU takes 2 cycles to read from L1, 5 cycles to read from L2 and 25 cycles to read from RAM. What is average access time ?

23 Given memory partitions of 100 k, 500 k, 200 k, 300 k and 600 k (in order). How would each of the first fit, best fit and worst fit algorithm place processes of 212 k, 417 k, 112 k, 426 k (in order as given) ? Which algorithm makes the best use of memory ?



24 For an NFA given as

$F = (\{q_0, q_1, q_2, q_3, q_4\}, \{a, b, c\}, M, q_0, \{q_4\})$  with transition table

| State | Input symbol   |                |                |
|-------|----------------|----------------|----------------|
|       | a              | b              | c              |
| $q_0$ | $\{q_0, q_1\}$ | $\{q_0, q_2\}$ | $\{q_0, q_3\}$ |
| $q_1$ | $\{q_1, q_4\}$ | $\{q_1\}$      | $\{q_1\}$      |
| $q_2$ | $\{q_2\}$      | $\{q_2, q_4\}$ | $\{q_2\}$      |
| $q_3$ | $\{q_3\}$      | $\{q_3\}$      | $\{q_3, q_4\}$ |
| $q_4$ | $\phi$         | $\phi$         | $\phi$         |

Find whether string  $aca$  is acceptable or not.

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25 Discuss in brief three techniques of code optimization.

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26 Differentiate switches, hubs and routers in terms of :  
(a) Access mechanism (b) Collision.

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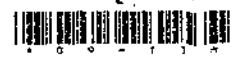
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27 Path MTU is the smallest MTU of any link on the current path (route) between two hosts. Path MTU is of size 512 bytes. Message contains 2048 bytes and 20 bytes of header. All IP headers are 20 bytes. Give the sizes and offset of the sequence of fragments delivered to network layer at the destination. Assume suitable data if necessary.

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28 Name two quality control approaches and explain quality review approach in context of software engineering.

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29 What are merits and demerits of white-box testing with respect to black-box testing ?

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30 Given two raster systems with resolution  $640 \times 480$  and  $1280 \times 1024$ . What size frame buffer is needed for each of these systems to store 12 bits per pixel ? How much storage is required for each system if 24 bits per pixel are needed to be stored ?

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Lined writing area with 20 horizontal lines.

09 - II ]

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Note : Attempt any 5 questions. Each question carries 20 marks. Answer should not exceed 200 words.

33. Develop regular expressions for a number expressed in exponential form. Both mantissa and exponent are represented in decimal representation (+2.3, -3.68). Examples of real numbers in exponential form are  $2E4$ ,  $3e5$ ,  $-7E-7$  (Here mantissa is real number before e/E and exponent is real number after e/E).

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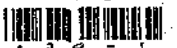
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- 34 Explain the parameters used in macro name table (MNT). For the following code generate MNT and various tables used in MNT.

```
MACRO
CLEARMEM &X, &N, ® = AREG
LCL &M
&M SET O
MOVER ® = 'O'
.MORE MOVEM ®, &X + &M
&M SET &M+1
AIF (&M NE N), MORE
MEND
```

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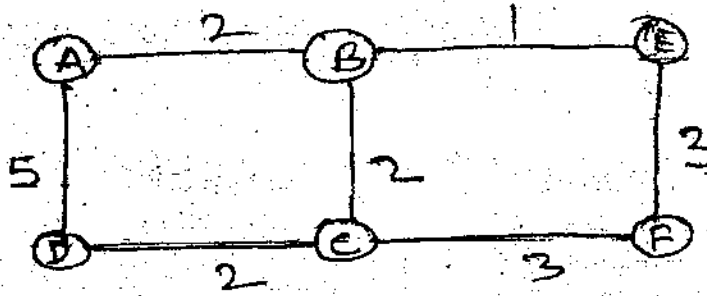
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35 For the network given in the following figure, obtain global distance - vector under the conditions.



- (a) Each node knows only the distances to its immediate neighbours.
- (b) Each node has reported the information it had in the preceding steps to its immediate neighbour
- (c) Step (b) happens a second time.

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36. Show that the following languages are context free by exhibiting context free grammar generated in the following:

(a)  $\{a^m b^n c^p d^q : m + n = p + q\}$

(b)  $\{a^m b^n : m \leq 2n\}$

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37 Consider a quadratic B-Spline curve with uniform knot spacing. Consider a segment with control point  $(1, 0)$ ,  $(1, 1)$  and  $(0, 1)$  in that order. What are the end points of the curve segment? What is the mid-point of the curve segment?

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38 Describe four types of reliability metrics in context of software Engg.

Lined area for writing the answer to question 38.

09 - H ]

[Contd...



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- 39 In compilers, what are the different ways intermediate code can be represented. Discuss how (a) switch statement and (b) for statement can be represented as control flow graph. Label basic blocks clearly.

|                                                                                                                                                                                                                                                                             |                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <pre>pre-block;<br/>switch (value) {<br/>    case value1 :<br/>        statement1;<br/>        break;<br/>    case value2 :<br/>        statement2;<br/>        break;<br/>    ....<br/>    default :<br/>        statement;<br/>        break;<br/>}<br/>post-block;</pre> | <pre>pre-block;<br/>for (initialization; condition; increment) {<br/>    statements;<br/>}<br/>post-block;</pre> |
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SPACE FOR ROUGH WORK / रफ कार्य के लिए जगह

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09 - II ]

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