POST GRADUATE COMMON ENTRANCE TEST-2016

DATE and TIME	COURSE	SUBJECT
03-07-2016 2.30 p.m. to 4.30 p.m.	ME/M.Tech/M.Arch/ courses offered by VTU/UVCE/UBDTCE	COMPUTER SCIENCE ENGINEERING

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
100	150 Minutes	120 Minutes

MENTION YOUR PGCET NO.	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	D - 1	207996

DOs :
1. Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. Ensure whether the circles corresponding to course and the specific branch have been shaded on the OMR answer sheet.
3. This Question Booklet is issued to you by the invigilator after the 2ⁿᵈ Bell i.e., after 2.25 p.m.
4. The Serial Number of this question booklet should be entered and the respective circles should also be shaded completely on the OMR answer sheet.
5. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely on the OMR answer sheet.
6. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :
1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The 3ʳᵈ Bell rings at 2.30 p.m., till then;
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the 3ʳᵈ Bell is rung at 2.30 p.m., remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose only one response for each item.
   - Completely darken / shade the relevant circle with a **BLUE OR BLACK INK BALL POINT PEN** against the question number on the OMR answer sheet.

Correct Method of shading the circle on the OMR answer sheet is as shown below :

Ⓐ ● Ⓒ Ⓓ

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 4.30 pm,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Handover the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**
9. Only **Non-programmable** calculators are allowed.

Marks Distribution		
PART-1	:	50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)
PART-2	:	25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)

CSE-D1

COMPUTER SCIENCE ENGINEERING

PART – 1

**Each question carries one mark.** (50 × 1 = 50)

1. The value of k in LR (k) cannot be
   - (A) 3
   - (B) 4
   - (C) 5
   - (D) None of the above

2. Backtracking is the problem associated with
   - (A) Bottom up parsing
   - (B) Top down parsing
   - (C) Both (A) and (B)
   - (D) None of the above

3. YACC stands for
   - (A) Yet another compiler-constructor
   - (B) Yet another Compiler-compiler
   - (C) Both (A) and (B)
   - (D) None of the above

4. Three persons enter a Railway compartment. If there are 5 seats vacant, in how many ways can they take these seats ?
   - (A) 60
   - (B) 20
   - (C) 15
   - (D) 125

5. In the group, G = {2, 4, 6, 8} under multiplication modulo 10, the identity element is
   - (A) 6
   - (B) 8
   - (C) 4
   - (D) 2

6. Let S = {{Ø}, 1, {2, 3}}. The cardinality of Power set of S is
   - (A) 2
   - (B) 4
   - (C) 8
   - (D) None of these

7. The field that contains a segment index or an internal index is called
   - (A) Target datum
   - (B) Target offset
   - (C) Segment field
   - (D) Fix data

8. The "turn-around" time of a user job is the
   - (A) Time since its submission to the time its results become available.
   - (B) Time duration for which the CPU is allotted to the job.
   - (C) Total time taken to execute the job.
   - (D) Time taken for the job to move from assembly phase to completion phase.

Space For Rough Work

9. The given expression   y = ((AB' + ABC)' + A(B +AB')) ' can be reduced to

   (A) A

   (B) 0

   (C) 1 + AB' + B

   (D) (AB)'

10. The output of the logic gate in the figure is given by
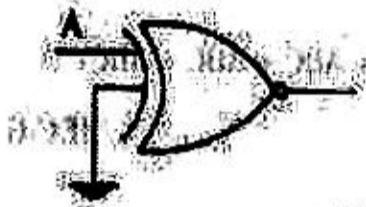
   (A) 0

   (B) 1

   (C) A

   (D) A'

11. How many full adders are required to construct an m-bit parallel adder ?

   (A) m

   (B) m − 1

   (C) m/2

   (D) m + 1

12. A 4-bit carry look ahead adder, which adds two 4-bit numbers, is designed using AND, OR, NOT, NAND, NOR gates only. Assuming that all the inputs are available in both complemented and uncomplemented forms and the delay of each gate is one time unit, what is the overall propagation delay of the adder ? Assume that the carry network has been implemented using two-level AND-OR logic.

   (A) 4 time units

   (B) 6 time units

   (C) 10 time units

   (D) 12 time units

13. A switch-tail ring counter is made by using a single D-FF. The resulting circuit is

   (A) SR flip-flop

   (B) JK flip-flop

   (C) T Flip-flop

   (D) D flip-flop

Space For Rough Work

14. $Q \times (\sum \cup \epsilon) \rightarrow Q$ is transition function of

(A) Deterministic Finite Automata

(B) Non-deterministic Finite Automata

(C) Epsilon-NFA

(D) None of the above

15. The stack is used in :

(A) Deterministic Finite Automata

(B) Pushdown Automata

(C) Turing Machine

(D) None of the above

16. The root node of derivation tree is mapped on to

(A) Intermediate vertex

(B) Set of Terminals of Grammar

(C) Start symbol of the grammar

(D) None of the above

17. The grammar to generate $L = \{a^n b^n : n \geq 0\}$ is

(A) $S \rightarrow aSb \mid ab$

(B) $S \rightarrow aSb \mid \epsilon$

(C) $S \rightarrow aSbb \mid \epsilon$

(D) None of the above

18. For every Pushdown automata, there exists an equivalent

(A) Regular Language

(B) Context sensitive language

(C) Context Free Language

(D) Recursively Enumerable Language

19. How many substrings of different lengths (non-zero) can be formed from a character string of length n ?

(A) n

(B) n^2

(C) 2^n

(D) n(n+1)/2

20. When a variable of data type double is converted into float, then

(A) Rounding takes place

(B) Truncation takes place

(C) the lower order bits are dropped

(D) none of these

Space For Rough Work

21. Consider the following function :

```
int unknown(int n)
{
int i, j, k = 0 ;
for (i = n / 2; i<= n; i ++)
    for ( j = 2; j <= n; j = j * 2)
        k = k + n / 2
return k;
}
```

(A) $\Theta(n^2 \log n)$

(B) $\Theta(n^3 \log n)$

(C) $\Theta(n^3)$

(D) $\Theta(n^2)$

22. What is the value of F(4) using the following procedure ?

```
function F(k : integer) : integer;
begin
    if (k < 3)
then F := k
else  F := F(k – 1) * F(k – 2) + F(k – 3)
end;
```

(A) 5

(B) 6

(C) 7

(D) 8

23. Assume 5 buffer pages are available to sort a file of 105 pages. The cost of sorting using m-way merge sort is :

(A) 206

(B) 618

(C) 840

(D) 926

**24.** The maximum number of edges in a regular graph of degree d and n vertices is

(A) Maximum of n, d

(B) N + d

(C) Nd

(D) Nd/2

25. Which of the following remarks about Tree Indexing is true ?

(A) It is an m-ary tree.

(B) It is a search tree of order m.

(C) Successful searches should terminate in leaf nodes.

(D) Unsuccessful searches may terminate at any level of the tree structure.

Space For Rough Work

Directions (For Question Nos. **26** & **27**) :
The following questions are based on the figure given below :
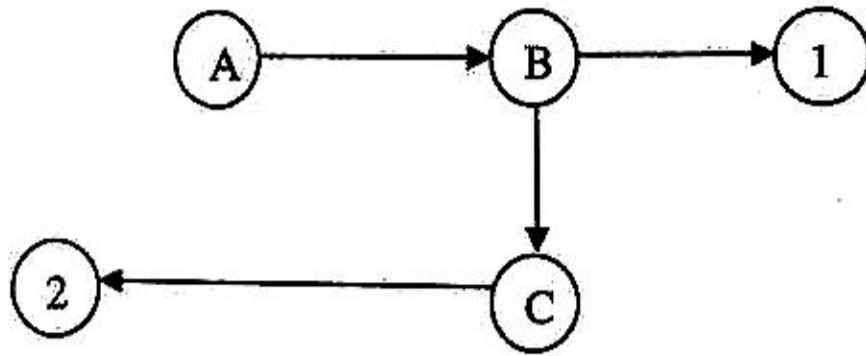
26. What should be the labels of nodes marked 1 and 2 if the breadth first traversal yields the list A B C D E ?
    (A) D and E
    (B) E and D
    (C) Unpredictable
    (D) None of the above

27. If the depth first search of the graph yields the list A B C D E, then the labels of the nodes marked 1 and 2 will be
    (A) E and D
    (B) D and E
    (C) Unpredictable
    (D) None of the above

28. For merging two sorted lists of sizes m and n into a sorted list of size m+n, we require comparisons of
    (A) O(m)
    (B) O(n)
    (C) O(m+n)
    (D) O(log(m)+log(n))

29. A hash function randomly distributes records one by one in a space that can hold x number of records. The probability that the mth record is the first record to result in collision is :
    (A) $(x-1) (x-2)....(x-(m-2)(m-1))/x^{m-1}$
    (B) $(x-1) (x-2)....(x-(m-1)(m-1))/x^{m-1}$
    (C) $(x-1) (x-2)....(x-(m-2)(m-1))/x^{m}$
    (D) $(x-1) (x-2)....(x-(m-1)(m-1))/x^{m}$

30. Which of the following is responsible for approving standards and allocating resources in the Internet ?
    (A) Internet Architecture Board (IAB)
    (B) Internet Engineering Task Force (IETF)
    (C) Inter NIC
    (D) None of the above

31. Which of the following is true when describing a multicast address ?
    (A) Packets addressed to a unicast address are delivered to a single interface.
    (B) Packets are delivered to all interfaces identified by the address. This is also called a one-to-many address.
    (C) Identifies multiple interfaces and is only delivered to one address. This address can also be called one-to-one-of-many.
    (D) These addresses are meant for non-routing purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Space For Rough Work

32. Which of the following allows a router to respond to an ARP request that is intended for a remote host ?

    (A) Gateway DP

    (B) Reverse ARP (RARP)

    (C) Proxy ARP

    (D) Inverse ARP (IARP)

33. If you use either Telnet or FTP, which is the highest layer you are using to transmit data ?

    (A) Application

    (B) Presentation

    (C) Session

    (D) Transport

34. Which of the following protocols uses both TCP and UDP ?

    (A) FTP

    (B) SMTP

    (C) Telnet

    (D) DNS

35. What protocol is used to find the hardware address of a local device ?

    (A) RARP

    (B) ARP

    (C) IP

    (D) ICMP

36. What is the address range of a Class B network address in binary ?

    (A) 01xxxxxx

    (B) 0xxxxxxx

    (C) 10xxxxxx

    (D) 110xxxxx

37. For a pipelined CPU with a single ALU, consider the following situations :

    1. The $J+1^{th}$ instruction uses the result of the Jth instruction as an operand.

    2. The execution of a conditional jump instruction.

    3. The Jth and $J + 1^{th}$ instructions require the ALU at the same time.

    Which of the above can cause a hazard ?

    (A) 1 and 2 only

    (B) 2 and 3 only

    (C) 3 only

    (D) All the three

Space For Rough Work

38. Which of the following is incorrect ?

1. In the programmed I/O method, the CPU waits for the I/O devices.

2. In the Interrupt driven I/O device informs the CPU of its ready status via an interrupt.

3. In DMA, the CPU sends its I/O to the DMA controller which manages the entire transaction.

(A) 1 and 2

(B) 2 and 3

(C) 1, 2 and 3

(D) None of the above

39. Which of the following instructions will not be there in a memory-mapped I/O system ?

1. LDA

2. IN

3. ADD

4. OUT

(A) 1 only

(B) 2 and 4

(C) 4 only

(D) None of the above

40. Which of the following statement is incorrect about Program Counter (PC) ?

1. PC does not affect instruction sequencing.

2. During branch operation, Program Counter points to the memory from which instruction is to be fetched and executes.

(A) 1

(B) 2

(C) Both 1 and 2

(D) Neither 1 nor 2

41. A memory system of size 16 k bytes is required to be designed using memory chips which have 12 address lines and 4 data lines each. The number of such chips required to design the memory system is

(A) 2

(B) 4

(C) 8

(D) 16

42. _____ is a technique of improving the priority of process waiting in Queue for CPU allocation.

(A) Starvation

(B) Ageing

(C) Revocation

(D) Relocation

Space For Rough Work

43. _____ is a technique of temporarily removing inactive programs from the memory of computer system.
   (A) Swapping
   (B) Spooling
   (C) Semaphore
   (D) Scheduler

44. Consider a program with a linked origin of 5000. Let the memory area allocated to it have the start address of 70000. Which amongst the following will be the value to be loaded in relocation register ?
   (A) 20000
   (B) 50000
   (C) 9000
   (D) None of the above

45. TII stands for
   (A) Table of Incomplete Instructions
   (B) Table of Information Instructions
   (C) Translation of Instructions Information
   (D) Translation of Information Instruction

46. Which scheduling policy is most suitable for a time-shared operating system ?
   (A) Shortest-job First
   (B) Elevator
   (C) Round-Robin
   (D) First-Come-First-Serve

47. A set of techniques that allow executing a program which is not entirely in memory is called
   (A) Demand paging
   (B) Virtual memory
   (C) Auxiliary memory
   (D) Secondary memory

48. XPATH used to
   (A) Address your documents by specifying a location path
   (B) Address the server
   (C) Store the IP of the server
   (D) None of these

49. What is the use of forms in HTML ?
   (A) To display contents of e-mails
   (B) To display animation effect
   (C) To collect users input
   (D) None of the above

50. RAID configurations of disks are used to provide
   (A) Fault Tolerance
   (B) High speed
   (C) High data density
   (D) None of the above

Space For Rough Work

PART – 2
Each question carries two marks.　　　　　(25 × 2 = 50)

51. The advantage of panic mode recovery is

    (A) It is simple to implement

    (B) It never gets into infinite loop

    (C) Both (A) and (B)

    (D) None of the above

52. An intermediate code form is

    (A) Post fix notation

    (B) Syntax trees

    (C) Three address code

    (D) All of the above

53. Routine is not loaded until it is called. All routines are kept on disk in a relocatable load format. The main program is loaded into memory & is executed. This type of loading is called _____

    (A) Static loading

    (B) Dynamic loading

    (C) Dynamic linking

    (D) Overlays

54. A Critical region is

    (A) One which is enclosed by a pair of P and V operations on Semaphores.

    (B) A Program Segment that has not been proved bug free.

    (C) A Program segment that often causes unexpected system crashes.

    (D) A Program segment where shared resources are accessed.

55. If the Disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O blocks requests are 98, 37, 14, 124, 65, 67.

    (A) 310

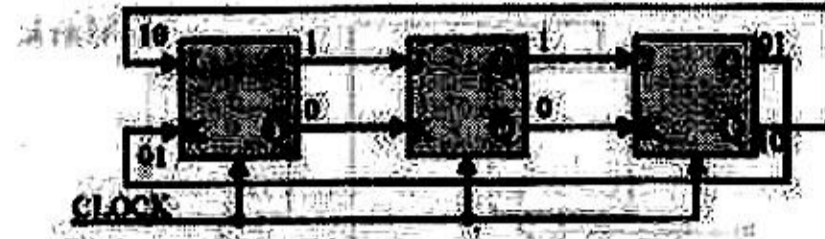   (B) 324

    (C) 315

    (D) 321

Space For Rough Work

56. Identify the logic function performed by the circuit shown:
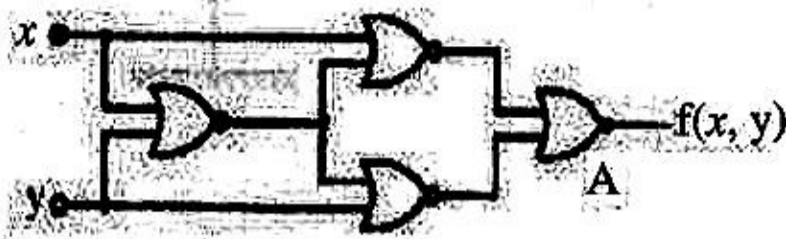
(A) Exclusive OR

(B) Exclusive NOR

(C) NAND

(D) NOR

57. $[(A+A'B)(A+A'B')][(CD+C'D') + (C \oplus D)] =$

(A) B

(B) A

(C) 0

(D) 1

58. $(34.4)_8 \times (23.4)_8$ evaluates to

(A) $(1053.6)_8$

(B) $(1053.2)_8$

(C) $(1024.2)_8$

(D) None of the above

59. For the initial state of 000, the function performed by the arrangement of J-K flip-flops in the figure.

(A) Shift register

(B) Mod-3 Counter

(C) Mod-6 Counter

(D) Mod-2 Counter

60. The C language is

(A) A context free language

(B) A context sensitive language

(C) A Regular language

(D) Parsable fully only by a Turing Machine

Space For Rough Work

12

CSE

61. Which of the following statements is TRUE ?

(A) Union of two recursive languages is recursive.

(B) The language $\{0^n : n \text{ is prime }\}$ is not regular.

(C) Regular Languages are closed under infinite Union.

(D) Both (A) and (B)

62. Let G be a non-planar graph with the minimum possible number of edges. Then G has

(A) 9 edges and 5 vertices

(B) 9 edges and 6 vertices

(C) 10 edges and 5 vertices

(D) 10 edges and 6 vertices

63. The breadth first search algorithm has been implemented using the queue data structure. One possible order of visiting the nodes of the following graph is
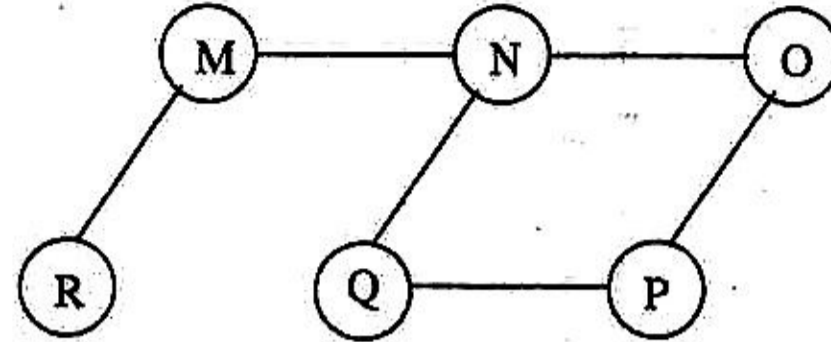
(A) MNOPQR

(B) NQMPOR

(C) QMNPRO

(D) QMNPOR

64. A Priority-Queue is implemented as a Max-Heap. Initially, it has 5 elements. The level-order traversal of the heap is given below : 10, 8, 5, 3, 2. Two new elements 1 and 7 are inserted in the heap in that order. The level-order traversal of the heap after the insertion of the elements is

(A) 10, 8, 7, 5, 3, 2, 1

(B) 10, 8, 7, 2, 3, 1, 5

(C) 10, 8, 7, 1, 2, 3, 5

(D) 10, 8, 7, 3, 2, 1, 5

Space For Rough Work

65. Which statement is true regarding classless routing protocols ?

1. The use of discontiguous networks is not allowed.

2. The use of variable length subnet masks is permitted.

3. RIPv1 is a classless routing protocol.

4. IGRP supports classless routing within the same autonomous system.

5. RIPv2 supports classless routing.

(A) 1, 3 and 5

(B) 3 and 4

(C) 2 and 5

(D) None of the above

66. Which of the following types of connections can use full duplex ?

1. Hub to hub

2. Switch to switch

3. Host to host

4. Switch to hub

5. Switch to host

(A) 1, 2 and 4

(B) 3 and 4

(C) 3 and 5

(D) 2, 3 and 5

67. The network address of 172.16.0.0/19 provides how many subnets and hosts ?

(A) 7 subnets, 30 hosts each

(B) 8 subnets, 8,190 hosts each

(C) 8 subnets, 2,046 hosts each

(D) 7 subnets, 2,046 hosts each

68. Consider the following instructions :

1. PUSH PSW

2. CALL ADDR

3. XTHL

4. RST n

The stack pointer will be affected by the

(A) 1 only

(B) 1 and 2 only

(C) 1, 2 and 4 only

(D) 1, 2 and 3 only

69. In serial data transmission, every byte of data is padded with '0' in the beginning and one or two '1's at the end of byte because

(A) Receiver is to be synchronized for byte reception

(B) Receiver recovers the lost '0's and '1's from padded bits

(C) Padded bits are useful in parity computation

(D) None of the above

Space For Rough Work

70. In Reverse Polish notation, expression A*B+C*D is written as

(A) AB*CD*+

(B) A*BCD*+

(C) AB*CD+*

(D) A*B*CD+

71. What is correct HTML for making a hyperlink ?

(A) <a url ="http ://www.company.com"> company.com<ja>

(B) <a>http://www.company.com<ja>

(C) <a href ="http://www.company.com> company<ja>

(D) <a name ="http:// www.company.com">. company.com <(a)>

72. If the lattice (C, ≤) is a complemented chain, then

(A) $|C| \leq 1$

(B) $|C| \leq 2$

(C) $|C| > 1$

(D) C does not exist

73. Suppose a license plate contains Two letters followed by three digits with the first digit is not zero. How many different license plates can be printed ?

(A) 608000

(B) 608200

(C) 608400

(D) 608600

74. In a foot ball championship, 153 matches were played. Every team played one match with each other. The number of teams participating in the championship is

(A) 17

(B) 18

(C) 9

(D) 100

75. Back tracking is a problem associated with

(A) Top down parser

(B) Bottom up parser

(C) Both (A) & (B)

(D) None of the above

Space For Rough Work