PGCET-2014

CS

DAY and TIME	COURSE	SUBJECT
DAY-1 10.30 am to 12.30 pm SESSION : FORENOON	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
	A - 3	111103

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 10.25 a.m.**
4. The Serial Number of this question booklet should be entered 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.
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 10.30 a.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.

SEAL

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 10.30 a.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.**
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 12.30 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. Hand over the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet, 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)

COMPUTER SCIENCE & ENGINEERING

PART – 1

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

1. If a switch receives a frame and the source MAC address is not in the MAC address table but the destination address is, what will the switch do with the frame ?
   (A) Discard it and send an error message back to the originating host
   (B) Flood the network with the frame
   (C) Add the source address and port to the MAC address table and forward the frame out the destination port.
   (D) Add the destination to the MAC address table and then forward the frame

2. The system software which is not a translator :
   (A) Compiler (B) Assembler
   (C) Loader (D) None of these

3. Storage mapping is done by
   (A) Operating System (B) Compiler
   (C) Linker (D) Loader

4. Garbage collection system software
   (A) Collects all free space
   (B) Collects all allocates but not used space
   (C) Frees all allocated but not used space
   (D) Group spaces that are used one contiguous area

5. The segment base specified using the register named is
   (A) ORG Instructions (B) TITLE Instruction
   (C) ASSUME Instruction (D) SEGMENT Instruction

6. A series of statements explaining how the data is to be processed is called
   (A) Assembly (B) Machine
   (C) Pascal (D) Program

7. The proposition $p \wedge (-p \vee q)$ is
   (A) Tautology (B) Contradiction
   (C) Logically equivalent to $p \wedge q$ (D) None of the above

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Space For Rough Work

8. In predicate logic – $\forall \times P(x)$ is equivalent to

(A) $\exists \times P(x)$ (B) $\exists \times - P(x)$

(C) $\forall \times - P(x)$ (D) None of the above

9. The probability of getting at least TWO heads when tossing a coin 3 times is

(A) 1/8 (B) 3/8

(C) 1/2 (D) 5/8

10. The probability that TWO friends share the same birth month is

(A) 1/6 (B) 1/12

(C) 1/144 (D) 1/24

11. The mean and standard deviation of binomial distribution are 10 and 2 respectively. The value of p is

(A) 1.0 (B) 0.8

(C) 0.6 (D) 0.4

12. Linked lists are not suitable for implementing

(A) Insertion sort (B) Binary search

(C) Radix sort (D) Polynomial manipulation

13. The inorder and preorder traversal of a binary tree are d b e a f c g and a b d e c f g. The post order traversal of the binary tree is

(A) d e b f g c a (B) e d b g f c a

(C) e d b f g c a (D) d e f g b c a

14. In quick sort for sorting n elements, the $n/4^{th}$ smallest element is selected as pivot using an O(n) time algorithm. What is the worst case time complexity of the quick sort ?

(A) $\Theta(n)$ (B) $\Theta(n\log n)$

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

Space For Rough Work

15. Which one of the following arrays represent a binary max-heap ?

(A) {25, 12, 16, 13, 10, 8, 14} (B) {25, 14, 13, 16, 10, 8, 12}

(C) {25, 14, 16, 13, 10, 8, 12} (D) {25, 14, 12, 13, 10, 8, 6}

16. Which of the following algorithms has lowest worst case complexity ?

(A) Merge sort (B) Bubble sort

(C) Quick sort (D) Selection sort

17. Context Free Languages are closed under

(A) Union and Intersection

(B) Union and Kleene closure

(C) Intersection and Complementation

(D) Complement and Kleene closure

18. What is the use of web font in HTML ?

(A) That is the core font that is used to develop web pages.

(B) That enables to use fonts over the web without installation.

(C) That is the special font that is developed by Microsoft corporation.

(D) All of the above.

19. Which of the following identifies a specific web page and its computer on the web ?

(A) Website (B) Website address

(C) URL (D) Domain Name

20. Well-formed XML document means

(A) It contains a root element.

(B) It contain an element.

(C) It contains one or more elements.

(D) Must contain one or more elements and root element must contain all other elements.

Space For Rough Work

21. 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

22. "Throughput" of a system is

(A) Number of programs processed by CPU per unit time
(B) Number of times the program is invoked by the system
(C) Number of requests made to a program by the system
(D) None of the above

23. A scheduler which selects processes from secondary storage device is called

(A) Short term scheduler
(B) Long term scheduler
(C) Medium term scheduler
(D) Process scheduler

24. Shell is the exclusive feature of

(A) UNIX
(B) DOS
(C) System software
(D) Application software

25. The most open source DBMS.

(A) Microsoft SQL Server
(B) Microsoft Access
(C) MySQL
(D) Oracle

26. The relational database environment has all of the following components except

(A) Users
(B) Separate files
(C) Database
(D) Query languages

27. The statement in SQL which allows changing the definition of a table is

(A) Alter
(B) Update
(C) Create
(D) Select

Space For Rough Work

28. Assembly language

(A) uses alphabetic codes in place of binary numbers used in machine language is the easiest language to write programs.

(B) need not be translated into machine language.

(C) same as machine language.

(D) None of these

29. In computers, subtraction is generally carried out by

(A) 9's complement (B) 10's complement

(C) 1's complement (D) 2's complement

30. In a vectored interrupt,

(A) The branch address is assigned to a fixed location in memory.

(B) The interrupting source supplies the branch information to the processor through an interrupt vector.

(C) The branch address is obtained from a register in the processor.

(D) None of the above.

31. Von Neumann architecture is

(A) SISD (B) SIMD

(C) MIMD (D) MISD

32. The transition function of DFA is

(A) $Q \times \Sigma \rightarrow Q$ (B) $Q \times \Sigma \rightarrow 2^Q$

(C) $Q \times (\Sigma \cup \in) \rightarrow Q$ (D) None of the above

Space For Rough Work

33. Two of the following regular expressions are equivalent

(i) (00)* (ii) 00*

(iii) 0+ (iv) 0

(A) (i) and (ii) (B) (ii) and (iii)

(C) (iii) and (i) (D) (i) and (iv)

34. Which of the following statements are TRUE ?

(A) Every NFA is DFA but vice-versa is not.

(B) Every DFA is NFA but vice-versa is not.

(C) Every DFA is NFA but vice-versa also TRUE.

(D) None of the above.

35. Kleenes theorem accepts the input as

(A) Finite automata (B) Regular Expression

(C) Context sensitive grammar (D) Pushdown automata

36. Chomsky hierarchy deals with

(A) Construction of grammars

(B) Derivation of string from the grammar

(C) Classification of grammars

(D) Simplification of grammars

37. A binary tree in which every non leaf node has non-empty left and right subtrees is called a strictly binary tree. Such a tree with 10 leaves

(A) cannot have more than 19 nodes

(B) has exactly 19 nodes

(C) has exactly 17 nodes

(D) cannot have more than 17 nodes

38. An algorithm is made up of 2 modules M_1 and M_2. If the order of M_1 is f(n) and M_2 is g(n) then the order of the algorithm is

(A) Max(f(n),g(n)) (B) Min(f(n),g(n))

(C) f(n)+g(n) (D) f(n) × g(n)

Space For Rough Work

39. 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

40. Which of the following algorithms exhibits the unnatural behaviour that, minimum number of comparisons are needed if the list to be sorted is in the reverse sorted order and maximum number of comparisons is needed if they are already in sorted order ?

(A) Heap Sort
(B) Radix Sort
(C) Binary insertion sort
(D) There can't be any such sorting technique

41. An item that is read as an input can either be pushed to a stack and later popped and printed or printed directly. Which of the following will be the output if the input is the sequence of items 1, 2, 3,4, 5 ?

(A) 3, 4, 5, 1, 2
(B) 3, 4, 5, 2, 1
(C) 1, 5, 2, 3, 4
(D) 5, 4, 3, 1, 2

42. The circuit used to store one bit of data is known as

(A) Register
(B) Encoder
(C) Decoder
(D) Flip Flop

43. Logic X-OR operation of (4ACO) H & (B53F) H results

(A) AACB
(B) 0000
(C) FFFF
(D) ABCD

44. $(-27)_{10}$ can be represented in a signed magnitude format and in a 1's complement format as

(A) 111011 & 100100
(B) 100100 & 111011
(C) 011011 & 100100
(D) 00100 & 011011

Space For Rough Work

45. If one of the input to an _____ gate is inverted then it becomes INHIBITOR.

(A) AND (B) NAND

(C) NOR (D) XOR

46. An S-R Flip-Flop can be converted into a T Flip-Flop by connecting _____ to Q and _____ to Q'.

(A) S', R' (B) S, R'

(C) S', R (D) S, R

47. Which protocol does DHCP use at the Transport layer ?

(A) IP (B) TCP

(C) UDP (D) ARP

48. Which protocol is used to send a destination network unknown message back to originating hosts ?

(A) TCP (B) ARP

(C) ICMP (D) BootP

49. What does a VLAN do ?

(A) Acts as a fastest port to all servers.

(B) Provides multiple collision domains on one switch port.

(C) Breaks up broadcast domains in a layer 2 switch internetwork.

(D) Provides multiple broadcast domains within a single collision domain.

50. What is the purpose of Spanning Tree Protocol in a switched LAN ?

(A) To provide a mechanism for network monitoring in switched environments.

(B) To prevent routing loops in networks with redundant paths.

(C) To prevent switching loops in networks with redundant switched paths.

(D) To manage the VLAN database across multiple switches.

Space For Rough Work

PART –2

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

51. The smallest finite automation which accepts the language L = {w : Length of w is divisible by 3} has

(A) 2 states (B) 3 states

(C) 4 states (D) 5 states

52. What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask ?

(A) 14 (B) 15

(C) 16 (D) 30

53. What is the subnetwork number of a host with an IP address of 172.16.66.0/21 ?

(A) 172.16.36.0 (B) 172.16.48.0

(C) 172.16.64.0 (D) 172.16.0.0

54. What is the result of segmenting a network with a bridge (switch) ?

1. It increases the number of collision domains.
2. It decreases the number of collision domains.
3. It increases the number of broadcast domains.
4. It decreases the number of broadcast domains.
5. It makes smaller collision domains.
6. It makes larger collision domains.

(A) 1 and 5 (B) 2, 3 and 5

(C) 3, 4 and 6 (D) 1, 3 and 6

55. A self relocating programs is one which

(A) cannot be made to execute in area of storage other than the one designated for it.

(B) consists of program relevant information.

(C) can itself perform the relocation of its address-sensitive portions.

(D) All of the above.

Space For Rough Work

56. Software that measures, monitors, analyses and controls the real world events is called

(A) System software
(B) Real time software
(C) Scientific software
(D) Business software

57. The term regular definition is associated with

(A) Lexical analyzer
(B) Syntax analyzer
(C) Semantic analyzer
(D) None of the above

58. Which of the following are tautologies ?

(A) $((P \vee Q) \wedge Q) \leftrightarrow Q$
(B) $P \vee (P \rightarrow Q) \rightarrow P$
(C) $((P \vee Q) \wedge P) \rightarrow Q$
(D) None of these

59. The Principal Conjunctive Normal form of $(P \wedge Q) \vee (- P \wedge Q)$ is

(A) Sum of products
(B) Product of sums
(C) Both (A) and (B)
(D) None of these

60. If $P(A) = 0.4$, $P(A \cup B) = 0.7$ and A, B are independent, then $P(B) =$

(A) 0.2
(B) 0.3
(C) 0.5
(D) 0.6

61. Two girls have picked 10 roses, 15 sunflowers and 14 daffodils. What is the number of ways they can divide the flowers amongst themselves ?

(A) 1638
(B) 2100
(C) 2640
(D) None of these

62. _____ specifies a search condition for a group or an aggregate.

(A) GROUP BY Clause
(B) HAVING Clause
(C) FROM Clause
(D) WHERE Clause

Space For Rough Work

63. The relational model is based on the concept that data is organized and stored in two dimensional tables called _____

(A) Fields
(B) Records
(C) Relations
(D) Keys

64. How can you open a link in a new browser window ?

(A) <a href = "url" target = "new">
(B) <a href = "url" target = "-blank">
(C) <a href = "url".new>
(D) <a href = "url" target – "open">

65. There are 10 different processes running on a workstation. Idle processes are waiting for an input event in the input queue. Busy processes are scheduled with the Round-Robin timesharing method. Which out of the following quantum times is the best value for small response times, if the processes have a short runtime, e.g. less than 10 ms ?

(A) tQ = 15 ms
(B) tQ = 40 ms
(C) tQ = 45 ms
(D) tQ = 50 ms

66. 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

67. Using the SQL GROUP BY phrase with a SELECT statement can help detect which of the following problems ?

(A) The multi-value, multi-column problem
(B) The inconsistent value problem
(C) The missing values problem
(D) The general-purpose remarks column problem

Space For Rough Work

68. If CS = 24F6 and IP = 634A, the physical address is

(A) 24F6 : 634A (B) 34F5F

(C) 2B2AA (D) 24F60

69. The capacity of a memory unit is defined by the number of words multiplied by the number of bits/word. How many separate address and data lines are needed for a memory of $4k \times 16$?

(A) 10 address, 16 data lines (B) 11 address, 8 data lines

(C) 12 address, 16 data lines (D) 12 address, 12 data lines

70. If we use internal data forwarding to speed up the performance of a CPU, then the sequence of operations

R1 -> M[100]

M[100] -> R2

M[100] -> R3

Can be replaced by

(A) R1 -> R3, R2 -> M[100]

(B) M[100] -> R2, R1 -> R2, R1 -> R3

(C) R1 -> M[100], R2 -> R3

(D) R1 -> R2, R1 -> R3, R1 -> M[100]

71. Which of the following statements are true ?

I. As the number of entries in the hash table increases the number of collisions increases.

II. Recursive programs are efficient.

III. The worst time complexity of quick sort is $O(n^2)$.

IV. Binary search implemented using a linked list is efficient.

(A) I and II (B) II and III

(C) I and IV (D) I and III

Space For Rough Work

72. The correct matching for the following pairs is

A.	All pairs shortest path	1.	Greedy
B.	Quick sort	2.	Depth First Search
C.	Minimum weight spanning tree	3.	Dynamic programming
D.	Connected components	4.	Divide and Conquer

(A) A-2, B-4, C-1, D-3 (B) A-3, B-4, C-1, D-2

(C) A-3, B-4, C-2, D-1 (D) A-4, B-1, C-2, D-3

73. Consider the following two functions :

$f(n)=n^3$, if $0 <= n<10,000$

n^2, otherwise

$g(n) = n$, if $0<=n<100$

n^2+5n, otherwise

Which of the following are true ?

I. f(n) is $O(n^3)$ II. g(n) is $O(n^3)$

III. O(f(n)) is same as O(g(n)) IV. g(n) is $O(n^2)$

(A) I only (B) II and III

(C) III only (D) III and IV

74. Let R_1 and R_2 regular sets defined over the alphabet then,

(A) $R_1 \cap R_2$ is not regular (B) $R_1 \cup R_2$ is not regular

(C) $\Sigma^* - R_1$ (D) R_1^* is not regular

75. Which of the following regular expressions are TRUE ?

(A) $r(*) = r^*$ (B) $(r^* s^*) = (r+s)^*$

(C) $(r+s)^* = r^* + s^*$ (D) $r^*s^* = r^* + s^*$

Space For Rough Work

A-3