

POST GRADUATE COMMON ENTRANCE TEST-2017

DATE and TIME	COURSE	SUBJECT
01-07-2017 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
	C - 1	107139

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)



COMPUTER SCIENCE & ENGINEERING

PART – 1

Each question carries one mark.

(50 × 1 = 50)

1. Concurrent processes are processes that
 - (A) do not overlap in time
 - (B) overlap in time
 - (C) are extended by a processor at the same time
 - (D) Process generated from the same operating system
2. Which of the following are real – time systems ?
 - (A) Railway reservation system
 - (B) Aircraft control system
 - (C) Payroll system
 - (D) Hotel reservation system
3. Dirty bit is used to show the
 - (A) page that is modified after being loaded into cache memory.
 - (B) page that is less frequently accessed.
 - (C) wrong page in the memory.
 - (D) page with corrupted data.
4. The first-fit, best-fit and the worst-fit algorithm can be used for
 - (A) Contiguous allocation of memory
 - (B) Linked allocation of memory
 - (C) Indexed allocation of memory
 - (D) Random allocation of memory
5. MS – DOS
 - (A) does not support multi-programming
 - (B) supports multiprogramming to some extent
 - (C) support multiprogramming fully
 - (D) support mobile communication
6. In which of the following scheduling policies does context switching never take place ?
 - (A) Round Robin
 - (B) First-come-First-served
 - (C) Pre-emptive
 - (D) Time sharing

Space For Rough Work

7. Which page replacement algorithm suffers from Belady's anomaly ?
- (A) FIFO replacement
 - (B) Optimal replacement
 - (C) LRU replacement
 - (D) Stack algorithm
8. 'Aging' is
- (A) keeping track of cache contents.
 - (B) keeping track of what pages are currently residing in the memory.
 - (C) keeping track of how many times a given page is referenced.
 - (D) Increasing the priority of jobs to ensure termination in a finite time.
9. Memory protection is normally done by the
- (A) user himself
 - (B) processor and associated hardware
 - (C) compiler
 - (D) user program
10. When an interrupt occurs, an operating system
- (A) ignores the interrupt
 - (B) always changes the state of the interrupted process after processing the interrupt.
 - (C) always resumes execution of the interrupted process after processing the interrupt.
 - (D) may change the state of the interrupted process to "blocked" and schedule another process.
11. A phone number in a database is an example of
- (A) Record
 - (B) Field
 - (C) Sort
 - (D) File
12. The concept of locking can be used to solve the problem of
- (A) lost update
 - (B) scheduling
 - (C) memory management
 - (D) deadlock

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13. Given an attribute X, another attribute Y is dependent on it, if for a given X

- (A) There are many Y values
- (B) There is only one value of Y
- (C) There is one or more Y values
- (D) There is none or one Y values

14. Which normal form is considered adequate for relational database design ?

- (A) 2 NF
- (B) 3 NF
- (C) 4 NF
- (D) BCNF

15. A relationship where weak entity is one of the participating entities is called as

- (A) Weak relationship
- (B) Binary relationship
- (C) Identifying relationship
- (D) Recursive relationship

16. Degree of relationship means

- (A) number of attributes of the relationship
- (B) number of entities participating in relationship
- (C) number of entities in the ER model
- (D) number of relationships in ER model

17. The topology with highest reliability is

- (A) Bus topology
- (B) Star topology
- (C) Ring topology
- (D) Mesh topology

18. The size of an ATM cell is

- (A) 48 Bytes
- (B) 53 Bytes
- (C) 52 Bytes
- (D) 43 Bytes

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19. The address class meant for multicasting is
- (A) Class C
 - (B) Class D
 - (C) Class E
 - (D) Class B
20. Which company developed RP/IP protocol for networking ?
- (A) IBM
 - (B) DEC
 - (C) NOVELL
 - (D) DARPA
21. Bridges function is _____.
- (A) physical
 - (B) network
 - (C) data – link
 - (D) session
22. _____ allows LAN users to share computer programs and data.
- (A) Communication Server
 - (B) Proxy Server
 - (C) Print Server
 - (D) File Server
23. The four lowest layers of the 7 – layered OSI reference model are
- (A) Transport, Session, Presentation, Application
 - (B) Physical, Data-link, Network, Transport
 - (C) Physical, Network, Transport, Session
 - (D) Physical, Presentation, Transport, Network
24. Which of the following is not a field in the Ethernet Message Packet ?
- (A) Type
 - (B) Data
 - (C) Pin-code
 - (D) Address
25. Which of the following ISO level is more closely related to the physical communications ?
- (A) Application
 - (B) Session
 - (C) Network
 - (D) Data-link
26. What is ASP ?
- (A) This is a language.
 - (B) This is a scripting language.
 - (C) This is a package.
 - (D) This is a testing tool.

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27. A box contains six red balls and four green balls. Four balls are selected at random from the box. What is the probability that the two of the selected balls will be red and two will be green ?
- (A) $4/10$
 (B) $3/7$
 (C) $1/15$
 (D) $4/7$
28. If $n(A) = 115$, $n(B) = 326$, $n(A-B) = 47$, then $n(A \cup B)$ is equal to
- (A) 373
 (B) 165
 (C) 370
 (D) 150
29. $(P \rightarrow Q) \wedge (R \rightarrow Q)$ is equivalent to
- (A) $(P \vee Q) \rightarrow R$
 (B) $(P \vee R) \rightarrow Q$
 (C) $(P \wedge R) \rightarrow Q$
 (D) $(P \wedge Q) \rightarrow R$
30. The number of words that can be formed out of the letters of the word, COMMITTEE is :
- (A) $\frac{9!}{(2!)^3}$
 (B) $\frac{9!}{(2!)^2}$
 (C) $\frac{9!}{2!}$
 (D) $9!$
31. The maximum number of edges in a n -node undirected graph without self-loops is _____.
- (A) n^2
 (B) $\frac{n(n-1)}{2}$
 (C) $n-1$
 (D) $\frac{(n+1)(n)}{2}$
32. The best data structure to check whether an arithmetic expression has balanced parentheses or not is a _____.
- (A) Queue
 (B) Stack
 (C) Tree
 (D) List

Space For Rough Work

33. Which one of the following algorithm design technique used in finding all pairs of shortest distances in graph ?
- (A) Dynamic programming
 - (B) Back tracking
 - (C) Greedy
 - (D) Divide and Conquer
34. An $m \times n$ matrix A is said to be sparse if
- (A) many of its elements are non-zero.
 - (B) many of its elements are zero.
 - (C) many of its elements are unit.
 - (D) many of its elements are negative.
35. Which one is not Divide and Conquer algorithm ?
- (A) Merge sort
 - (B) Quick sort
 - (C) Heap sort
 - (D) Binary search
36. The best-case analysis of the Quick Sort
- (A) $O(n(n-1)/2)$
 - (B) $O(n^2)$
 - (C) $O(n)$
 - (D) $O(n \log_2 n)$
37. Level order transversal of a rooted tree can be done by stacking from the root and performing
- (A) Pre-order traversal
 - (B) In-order traversal
 - (C) Pre-order traversal
 - (D) Breadth first search
38. Which of the following are register ?
- (A) Accumulator
 - (B) Buffer
 - (C) Decoder
 - (D) Encoder

Space For Rough Work

39. Which of the following weights makes the complement operation easier in BCD form ?
- (A) 8 - 4 - 2 - 1
 - (B) Excess - 3
 - (C) 2 - 4 - 2 - 1
 - (D) 3 - 2 - 1 - 0
40. The simplified form of the Boolean function $F = X'YZ + XY'Z' + XYZ + XYZ'$ is
- (A) $F = X'Z + X'Y$
 - (B) $F = YZ + XZ'$
 - (C) $F = YZ' + XY'$
 - (D) $F = YZ + X'Y$
41. A half adder is also known as
- (A) AND circuit
 - (B) NAND circuit
 - (C) NOR circuit
 - (D) EX-OR circuit
42. Which of the following does not have 8 data lines ?
- (A) 8085
 - (B) 8086
 - (C) 8088
 - (D) 2-80
43. A multiplexer is also known as
- (A) Coder
 - (B) Decoder
 - (C) Data selector
 - (D) Multi-vibrator
44. The seek time of a disk is 30 ms. It rotates at the rate of 30 rotations per second. Each track has a capacity of 300 words. One access time is approximately
- (A) 47 ms
 - (B) 50 ms
 - (C) 60 ms
 - (D) 62 ms

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45. Flip-flop is a
- (A) Sequential circuit
 - (B) Combinatorial circuit
 - (C) Parallel circuit
 - (D) Hamottanian circuit
46. Instructions in which all the operands are stored in stack are called as
- (A) Three address instructions
 - (B) Two address instructions
 - (C) One address instructions
 - (D) Zero address instructions
47. The word 'formal' in formal languages means
- (A) the symbols used have well-defined meanings.
 - (B) they are unnecessary, in reality.
 - (C) Only the form of the strings of symbols is significant.
 - (D) as the languages cannot be termed as informal.
48. A language L is accepted by a Pushdown Automation if and only if it is
- (A) Context sensitive
 - (B) Recursive
 - (C) Context free
 - (D) Right – Linear
49. The lexical analyzer is in which phase of a complier ?
- (A) First
 - (B) Second
 - (C) Third
 - (D) Last
50. Compiler can diagnose
- (A) Grammatical errors only
 - (B) Logical errors only
 - (C) Grammatical as well as Logical errors
 - (D) Neither Grammatical nor Logical errors

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PART - 2

Each question carries two marks.

(25 × 2 = 50)

51. The following program
main ()

```
{
    float a = .5, b = .7;
    if (b < .7)
    if (a < .5)
        printf ("TELO");
    else printf ("MILO");
    else printf ("RENO");
```

- (A) MILO
- (B) TELO
- (C) RENO
- (D) PLO

52. What is $f(L)$, if L is a language given by $0^* (0 + 1)^* 1^*$ and $f(0) = x$, $f(1) = y^*$?

- (A) x^*y^*
- (B) xy^*
- (C) yx^*
- (D) x^*xy

53. Consider a computer with 8 mega bytes of main memory and a 128 K cache. The cache block size is 4 K. It uses a direct mapping scheme for a cache management. How many different main memory blocks can map into a given physical cache block?

- (A) 2048
- (B) 256
- (C) 64
- (D) 248

54. Consider the following set of processes with arrival times and the CPU first times given in milliseconds :

Process	Arrival Time	First time
P1	0	5
P2	1	3
P3	2	3
P4	4	1

What is the average turn around fire for these processes with preempted shortest remounting five processing first algorithm is implemented?

- (A) 5.50
- (B) 5.75
- (C) 6.00
- (D) 6.25

55. Each process P_i , $i = 1, 2, 3, \dots, 9$ is coded as follows :

```
repeat P {mutex}
    {critical section}
v {mutex}
forever
```

The code for P_{10} is identical except that it uses $v\{mutex\}$ instead of $P\{mutex\}$, what is the largest number of processes that can be inside the critical section at any moment?

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

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56. The seek time of a disk is 30 ms. It rotates at the rate of 30 rotations per second. Each track has a capacity of 300 words. The access time is approximately

- (A) 47 ms
- (B) 50 ms
- (C) 60 ms
- (D) 62 ms

57. The relation schema. Student-performance (name, courseno, rollno, grade) has the following dependencies :

name, courseno \rightarrow grade, rollno,
courseno \rightarrow grade.

name \rightarrow rollno, rollno \rightarrow name.

The highest normal form of their relation schema is

- (A) 2 NF
- (B) 3 NF
- (C) BCNF
- (D) 4 NF

58. Given the functional dependencies $x \rightarrow w, x \rightarrow y, y \rightarrow z$ and $z \rightarrow pq$.

Which of the following does not hold good ?

- (A) $x \rightarrow z$
- (B) $w \rightarrow z$
- (C) $x \rightarrow wy$
- (D) $x \rightarrow w$

59. The linker copies all library routines used in the program into the executable image, this process is referred to as _____.

- (A) Assembling
- (B) Dynamic linking
- (C) Static linking
- (D) Compiling

60. Suppose that the Aloha Protocol is used to share a 56 kbps satellite channel. Suppose that packets are 1000 bits long. What is the maximum throughput of the system in packet / second ?

- (A) 15
- (B) 10
- (C) 12
- (D) 14

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61. A system is using NRZ-I to transfer 10 mbps data. What are the average signal rate and minimum bandwidth ?
- (A) 50 K band, 50 Khz
 (B) 500 band, 500 Hz
 (C) 500 K band, 500 mHz
 (D) 500 K band, 500 KHz
62. To detect a missing token, the monitor watches for a passing token in the ring and maintains a timer equal to the maximum possible token rotation time. This interval equals _____.
- (A) $\text{NumStations} \times \text{THT} + \text{Ring} - \text{Latency}$
 (B) $\text{NumStations} + \text{THT} * \text{Ring} - \text{Latency}$
 (C) $\text{NumStations} \times \text{THT} - \text{Ring} - \text{Latency}$
 (D) $\text{NumStations} - \text{THT} * \text{Ring} - \text{Latency}$
63. Suppose an ATM switch has 16 ports each operating at SONET OC-3 transmission rate 155 mbps. What is the maximum possible throughput of the switch ?
- (A) 2.48 Gbps
 (B) 3.50 Gbps
 (C) 2.01 Gbps
 (D) 3.20 Gbps
64. A small organization has a class C address for 7 networks each with 24 hosts. What is an appropriate subnet mask :
- (A) 255. 255. 255. 220
 (B) 255. 255. 258. 221
 (C) 255. 255. 255. 222
 (D) 255. 255. 255. 224
65. A binary relation $R = \{(1, 1), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (3, 3), (3, 4)\}$. On the set $A = \{1, 2, 3, 4\}$ is _____.
- (A) Reflexive, Symmetric and transitive
 (B) Neither reflexive nor irreflexive but transitive
 (C) Irreflexive, symmetric and transitive
 (D) Irreflexive and antisymmetric

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66. It is desired to find the no. of defective chips in a computer chip production unit. Obviously the probability of finding a defective chip does not depend on whether the previous chip was defective or not. The probability distribution is _____.

- (A) Binomial
- (B) Normal
- (C) Uniform
- (D) Triangular

67. If $U = \{1, 2, 3, 4, \dots, 8, 9\}$, $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$ and $C = \{3, 4, 5, 6\}$, then $(A \cup B)$ is

- (A) $\{5, 7, 9\}$
- (B) $\{1, 2, 3, 4, 6, 8\}$
- (C) $\{2, 4\}$
- (D) $\{\phi\}$

68. Which of the following proposition is a tautology ?

- (A) $(p \vee q) \rightarrow p$
- (B) $p \vee (q \rightarrow p)$
- (C) $p \vee (p \rightarrow q)$
- (D) $p \rightarrow (p \rightarrow q)$

69. The running time of an algorithm is represented by the following recurrence relation :

$$T(n) = \begin{cases} n & n \leq 3 \\ T\left[\frac{n}{3}\right] + cn & \text{otherwise} \end{cases}$$

Which one of the following represents the time complexity of the algorithm ?

- (A) $\theta(n)$
- (B) $\theta(n \log n)$
- (C) $\theta(n^2)$
- (D) $(\theta n^2 \log n)$

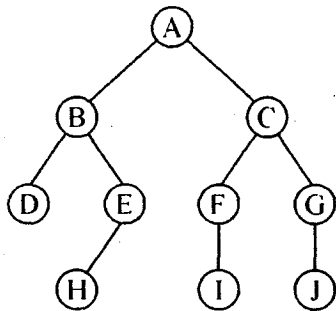
70. A circularly linked list is used to represent a queue. A single variable P is used to access the queue. To which node should P point, such that both the operations of enqueue (insert) and dequeue (delete) can be performed in constant time ?



- (A) Rear mode
- (B) Front mode
- (C) Not possible with a single point
- (D) Node next to front

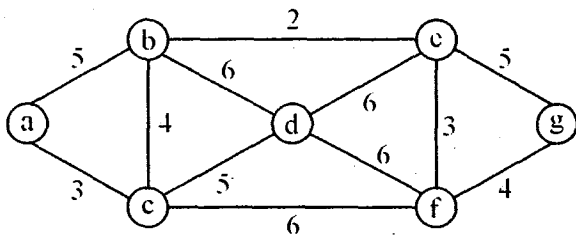
Space For Rough Work

71. Which of the following list of nodes corresponds to a post order traversal of the binary tree in the figure shown ?



- (A) DHEBIFJGCA
 (B) ABDEHCFI GL
 (C) DBEHIFLJGA
 (D) ABCDEFGHIJ

72. Consider the following graph :



Which one of the following is the sequence of the edges added to the minimum spanning tree using Kruskal's algorithm ?

- (A) (b, e) (a, c) (e, f) (b, c) (f, g) (c, d)
 (B) (b, e) (a, c) (e, f) (a, b) (d, f) (e, f)
 (C) (b, e) (a, c) (c, f) (e, g) (g, f) (a, b)
 (D) (b, e) (a, c) (c, f) (d, e) (d, f) (d, b)

73. A four variable Boolean function is given by $F(w, x, y, z) = \sum (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13) + \sum d (0, 14, 15)$ the simplified form of this function is

- (A) W
 (B) 0
 (C) 1
 (D) $WXY + \overline{W}XY$

74. Postfix expression for $(300 + 23) * (43 - 21) / (84 + 7)$ is

- (A) $847 + 43 21 * 300 23 +$
 (B) $43 21 - * 7 + / 300 23 84 7$
 (C) $300 + 23 43 - * / 84 7$
 (D) $300 23 + 43 21 - * 84 7 + /$

75. Using Quine - Mcclusky method, one of the prime implicates of the function $F(W, X, Y, Z) = \sum m (7, 9, 12, 13, 14, 15) + \sum d (4, 11)$ is

- (A) WXY
 (B) $\overline{X}Y$
 (C) XYZ
 (D) $\overline{W}YZ$

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