

## POST GRADUATE COMMON ENTRANCE TEST - 2015

DATE & TIME	COURSE	SUBJECT						
08-08-2015 10.30 AM TO 12.30 PM	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 SERIAL NUMBER						
<table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> </tr> </table>								358217
		VERSION CODE						
		A - 1						

### 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 am.**
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 AM, TILL THEN;**
  - Do not remove the seal / staple present on the right hand side 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 10.30 am, remove the seal / staple stapled on the right hand side 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 ballpoint 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 (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 - 75)

SEAL

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**COMPUTER SCIENCE ENGINEERING****PART - 1****(50 X 1 = 50)**

(Each question carries one mark)

1. What is the cardinality of the powerset of the set {a, b, c, d} ?
  - a. 4
  - b. 16
  - c. 8
  - d. 12
2. If  $p$  : The sun has set  
 $q$  : The moon has risen  
then symbolically the statement, "the sun has not set" or "the moon has not risen" is written as
  - a.  $\sim p \wedge q$
  - b.  $\sim q \vee p$
  - c.  $p \wedge \sim q$
  - d.  $\sim p \vee \sim q$
3. Boolean algebra is different from ordinary algebra in which way?
  - a. They are actually the same
  - b. Boolean algebra can describe upto 3 levels of logic levels
  - c. Boolean algebra have only two discrete levels 0 and 1
  - d. Boolean algebra can represent more than 1 discrete levels between 0 and 1
4.  $[\sim q \wedge (P \rightarrow q)] \rightarrow \sim P$  is
  - a. Contradiction
  - b. Tautology
  - c. Contingency
  - d. Invalid
5. If A is any set, then
  - a.  $A \cup A' = \emptyset$
  - b.  $A \cap A' = \emptyset$
  - c.  $A \cup A' = \mathcal{U}$
  - d. None of the above
6. The average search time of hashing with linear probing will be less if the load factor is:
  - a. Equal to one
  - b. Is far less than one
  - c. Is far greater than one
  - d. None of the above
7. Sparse matrices have
  - a. High dimensions
  - b. Many non zero entries
  - c. Many zero entries
  - d. None of the above
8. If we use merge sort to sort an array with 'n' elements, what is the worst case time required to sort?
  - a.  $O(\log n^2)$
  - b.  $O(n^2)$
  - c.  $O(n \log n)$
  - d.  $O(n)$
9. Which of the following algorithms is not a greedy algorithm ?
  - a. Dijkstra's algorithm
  - b. Prims algorithm
  - c. Kruskal algorithm
  - d. Heap sort
10. Stack cannot be used to
  - a. Allocating resources and scheduling
  - b. Reversing string
  - c. Implementation of recursion
  - d. Evaluation of expression in port fix form

**Space For Rough Work**

11. What is the worst case time complexity of a sequence of  $n$  multidequeue ( ) operations on an initially empty queue
- $\theta(n)$
  - $\theta(n+k)$
  - $\theta(nk)$
  - $\theta(n^2)$
12. Which of these is not a type of fragmentation
- Code fragmentation
  - External fragmentation
  - Data fragmentation
  - Internal fragmentation
13. SCSI stands for
- Small Component System Interface
  - Small Computer System Interface
  - Small Computer Signal Interface
  - Small Component Signal Interface
14. The complete set of only those Logic gates designated as universal gates is
- NOT, OR and AND gates
  - NOR and NAND gates
  - XOR, NOR and NAND gates
  - XNOR, NOR and NAND gates
15. Increasing the RAM of a computer typically improves performance because
- Virtual memory increases
  - Fewer segmentation faults occur
  - Larger RAM'S are faster
  - Fewer page faults occur
16. The private work space dedicated to a subroutine is called as
- Heap
  - Reserve space
  - Stack
  - Node
17. Consider the following sequence of micro-operations
- $MBR \leftarrow PC$   
 $MAR \leftarrow X$   
 $PC \leftarrow Y$   
 $Memory \leftarrow MBR$
- Which one of the following is a possible operation performed by this sequence
- Conditional branch
  - Initiation of the interrupt service
  - Operand fetch
  - Instruction fetch
18. Which of the following statements is true?
- If a languages is context free it can always be accepted by a deterministic push - down automation
  - The union of two context free languages is context free
  - The intersection of two context free languages is context free
  - The complement of a context free languages is context free
19. The PDA is called non-deterministic PDA when there are more than one outgoing edges from which state ?
- START or READ
  - POP or REJECT
  - READ or POP
  - PUSH or POP

**Space For Rough Work**

20. Let  $w$  be any string of length  $n$  in  $\{0,1\}$ . Let  $L$  be the set of all substrings of  $w$ . What is the minimum number of states in a non deterministic finite automation that accepts  $L$  ?
- a.  $n - 1$                       b.  $n$   
c.  $n + 1$                       d.  $2n - 1$
21. Which of the following is true?
- a. Every subset of a regular set is regular  
b. Every finite subset of a non regular set is regular  
c. The union of two non- regular sets is not regular  
d. Infinite union of finite sets is regular
22. The smallest finite automation which accepts the language  $\{x/\text{length of } x \text{ is divisible by } 3\}$  has:
- a. 2 states                      b. 3 states  
c. 4 states                      d. 5 states
23. Bottom up passing involves
- a. Shift reduce  
b. Handle pressuring  
c. Operator check  
d. a and b
24. Which of the following system software resides in main memory always?
- a. Text editor                      b. Assembler  
c. Linker                          d. Loader
25. Which of the following software tool is a passer generator?
- a. Lex                              b. YACC  
c. Both a & b                      d. None of the above
26. Type checking is normally done during?
- a. Lexical analysis  
b. Syntax analysis  
c. Syntax directed translation  
d. Code generation
27. YACC resolves conflicts of type
- a. Reduce - Reduce    b. Shift - Reduce  
c. Shift - Shift              d. a and b
28. Piece of code that only one thread can execute at a time is called
- a. Synchronization  
b. Mutual exclusion  
c. Critical section  
d. All of the above
29. A page fault occurs when
- a. The dead lock happens  
b. The segmentation starts  
c. The page is found in the memory  
d. The page is not found in the memory
30. In Round Robin CPU scheduling as the time quantum is increased, the average turn around time
- a. Increases  
b. decreases  
c. Remains constant  
d. Varies irregularly

**Space For Rough Work**

31. To avoid the race condition, the number of Processes that may be simultaneously inside their critical section is
- a. 8                                      b. 1  
c. 16                                      d. 0
32. In which one of the following page replacement policies, Belady's anomaly may occur?
- a. FIFO                                      b. Optimal  
c. LRU                                      d. MRU
33. The program which interacts with the inner part of the Kernel is called
- a. Compiler                                b. Shell  
c. Device driver                          d. Protocol
34. Given the basic ER and relational models, which of the following is INCORRECT?
- a. An attribute of an entity can be composite  
b. In a row of a relational table, an attribute can have more than one value  
c. An attribute of an entity can have more than one value  
d. In a row of a relational table, an attribute can have exactly one value or a null value
35. Which of the following concurrency controls protocols ensure both conflict serializability and freedom from dead-lock?
- I. Two phase locking  
II. Time stamp ordering
- a. I only  
b. II only  
c. Both I and II  
d. Neither I nor II
36. If every non-prime attribute of R is non-transitively dependent on every super key of R then that table is in
- a. 1 NF                                      b. 2 NF  
c. 3 NF                                      d. 4 NF
37. A composite attribute is converted to individual attributes in which normal form?
- a. First                                      b. Second  
c. Third                                      d. Fourth
38. A type of query that is placed within a "WHERE" or "HAVING" clause of another query is called
- a. Super query                              b. Sub query  
c. query                                      d. Master query
39. Functional dependencies are the types of constraints that are based on
- a. superset key  
b. key  
c. key revisited  
d. None of these
40. One of the header fields in an IP datagram is the Time to Live (TTL) Field. Which of the following statements best explains the need of this field?
- a. It can be used to prioritize packets  
b. It can be used to reduce delays  
c. It can be used to optimize throughput  
d. It can be used to prevent packet looping

**Space For Rough Work**

41. An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask would be
- 255.255.0.0
  - 255.255.252.0
  - 255.255.128.0
  - 255.255.64.0
42. What does the port number in a TCP connection specify?
- The quality of data transmitted
  - The quality of data connection
  - Communication process on the two end systems
  - The size of the data
43. What is the natural mask of a class C network?
- 255.255.255.255
  - 255.255.255.0
  - 1.1.1.0
  - 255.255.0.0
44. Which of the following provides reliable communication?
- TCP
  - UDP
  - IP
  - All of the above
45. Which one of the following allows a user at one site to establish a connection to another site and then pass keystrokes from local host to remote host?
- DNS
  - TELNET
  - HTTP
  - FTP
46. Which function may be used to send messages to users requesting for text input in a Javascript application ?
- Alert ( )
  - Get Input ( )
  - Prompt ( )
  - Confirm ( )
47. Which method is used to specify a containers Layout in JSP?
- Layout ( )
  - Container layout ( )
  - Set con layout ( )
  - Set layout ( )
48. In ASP, which function returns a Boolean value that indicates whether a specified expression can be evaluated as a number ?
- IS Numeric ( )
  - IS Number ( )
  - ISNU ( )
  - None of the above
49. Address 192.5.48.2 belongs to
- Class A
  - Class C
  - Class B
  - Class D
50. Which one of the following uses the greatest number of layers in the OSI model ?
- Bridge
  - Repeater
  - Router
  - Gateway

**Space For Rough Work**

**PART - 2**

(Each question carries two marks)

**(25 X 2 = 50)**

51. A medical treatment has a success rate of 0.8. Two patients will be treated with this treatment. Assuming the results are independent for the two patients, what is the probability that neither one of them will be successfully cured?
- a. 0.5                                      b. 0.36  
c. 0.2                                        d. 0.04
52. If you flip a coin 10 times, what is the probability you will get exactly two heads?
- a. 0.0107                                    b. 0.9893  
c. 0.0439                                    d. 0.0098
53. The mean of ten numbers is 58. If one of the numbers is 40, what is the mean of the other nine?
- a. 11                                         b. 60  
c. 162                                        d. 540
54. Which of the following statement is a tautology?
- a.  $(\sim q) \wedge p) \wedge q$   
b.  $(\sim q \wedge p) \wedge (p \wedge \sim p)$   
c.  $(\sim q \wedge p) \vee (p \vee \sim p)$   
d.  $(\sim p \wedge q) \wedge (N \sim (p \wedge q))$
55. In a survey of 120 people, it was found that
- 65 read Newsweek magazine  
45 read Time  
42 read Fortune  
20 read both Newsweek and Time  
25 read both Newsweek and Fortune  
15 read both Time and Fortune  
8 read all these magazines
- Find the number of people who read exactly one magazine
- a. 45                                         b. 25  
c. 48                                         d. 56
56. The In order and Pre order traversal of a binary tree are
- 4,2,5, 1,3,6, and 1,2,4,5,3,6
- The Post order traversal of the binary tree is
- a. 4,5,2,6,3,1                                b. 1,5,2,4,6,3  
c. 4,5,6,3,2,1                                d. 1,2,5,6,4,3
57. Let G be connected undirected graph of 100 vertices and 300 edges. The weight of a minimum spanning tree of G is 500. When the weight of each edge of G is increased by 5, the weights of a minimum spanning tree becomes
- a. 2000                                        b. 1000  
c. 1995                                        d. 995

**Space For Rough Work**

58. The recurrence relation capturing the optimal time of the Tower of Hanoi problem with  $n$  disk is

- a.  $T(n) = 2T(n-2) + 2$
- b.  $T(n) = 2T(n-1) + n$
- c.  $T(n) = 2T(n/2) + 1$
- d.  $T(n) = 2T(n-1) + 1$

59. Write the Postfix expression form for the given infix expression:

$$A + B * (C + D) / F + D * E$$

- a.  $ABCD + * F / + DE * +$
- b.  $AB + CD * F / + DE *$
- c.  $ABCD + * / F + DE *$
- d.  $AB + CD * F / + D * E$

60. The IPC of a program that executes 35000 instructions and requires 17000 cycles to complete is

- a. 2.00                      b. 2.06
- c. 1.00                      d. 1.06

61. The simplified SOP (Sum of Product) form of the Boolean expression

$$(A + B' + C') \cdot (A + B' + C) \cdot (A + B + C')$$

- a.  $(A' \cdot B + C')$               b.  $(A + B' \cdot C')$
- c.  $(A' \cdot B + C)$               d.  $(A \cdot B + C)$

62. Regular expression for all strings that starts with  $a$  and ends with  $bba$  is

- a.  $aba^*b^*bba$
- b.  $ab(ab)^*bba$
- c.  $ab(a+b)^*bba$
- d. All of the above

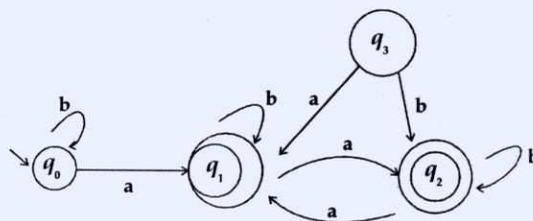
63. Consider the following regular expression

$$a^*(ab)^*(abc)^*$$

Which of the following regular expression denote the same language as the above regular expression ?

- a.  $(a + ab + abc)^*$
- b.  $a^*(a+b)^*(a+b+c)^*$
- c.  $a^*(\epsilon + ab)^*(\emptyset + abc)^*$
- d.  $a^*+(ab)^*+(abc)^*$

64. Consider the following Finite state automation. The language accepted by this automation is given by the regular expression



- a.  $b^*ab^*ab^*ab^*$               b.  $(a + b)^*$
- c.  $b^*a(a + b)^*$               d.  $b^*ab^*ab^*$

Space For Rough Work

65. Consider three processes ( process id 0,1,2 respectively ) with compute time bursts 2,4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) Scheduling algorithm. In LRTF ties are broken by giving priority to the processes with the lowest process id. The average turn around time is:

- a. 13 units                      b. 14 units
- c. 15 units                      d. 16 units

66. A CPU generates 32-bit virtual addresses. The page size is 4KB. The processor has a translation look aside buffer (TLB) which can hold a total of 128 page table entries and is 4-way set associative. The minimum size of the TLB tag is:

- a. 11 bits                      b. 13 bits
- c. 15 bits                      d. 20 bits

67. Consider the following set of Processes, the length of CPU burst time given in mill seconds

Process	Burst time
P <sub>1</sub>	6
P <sub>2</sub>	8
P <sub>3</sub>	7
P <sub>4</sub>	3

Assuming the above process is being scheduled with the SJF Scheduling algorithm, the waiting time for P<sub>2</sub> is

- a. 16 ms                      b. 9 ms
- c. 3ms                      d. 0 ms

68. Consider the following schedule for transactions T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>

T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Read (X)	Read (Y)	Read (Y)
	Write (Y)	
Write (X)		Write (X)
	Read (Y)	
	Write (X)	

Which one of the schedules below is the correct serialization of the above ?

- a. T<sub>2</sub> → T<sub>1</sub> → T<sub>3</sub>
- b. T<sub>2</sub> → T<sub>3</sub> → T<sub>1</sub>
- c. T<sub>1</sub> → T<sub>3</sub> → T<sub>2</sub>
- d. T<sub>3</sub> → T<sub>1</sub> → T<sub>2</sub>

69. Consider the following four schedules due to three transactions using read and write on data item x, denoted by r(x) and w(x). Which one of them is conflict serializable ?

- a. r<sub>1</sub>(x); r<sub>2</sub>(x); w<sub>1</sub>(x); r<sub>3</sub>(x); w<sub>2</sub>(x)
- b. r<sub>2</sub>(x); r<sub>1</sub>(x); w<sub>2</sub>(x); r<sub>3</sub>(x); w<sub>1</sub>(x)
- c. r<sub>2</sub>(x); w<sub>2</sub>(x); r<sub>3</sub>(x); r<sub>1</sub>(x); w<sub>1</sub>(x)
- d. r<sub>3</sub>(x); r<sub>2</sub>(x); r<sub>1</sub>(x); w<sub>2</sub>(x); w<sub>1</sub>(x)

**Space For Rough Work**

70. Consider the following Log Sequence of two transactions on a bank account with initial balance 12000. To transfer 2000 to a mortgage payment and then apply a 5% interest.

1. T<sub>1</sub> start
2. T<sub>1</sub> B old = 12000    new = 10000
3. T<sub>1</sub> M old = 0        new = 200
4. T<sub>1</sub> Commit
5. T<sub>2</sub> Start
6. T<sub>2</sub> B<sub>2</sub> old = 10000    new = 10500
7. T<sub>2</sub> Commit

Suppose the database system crashes just before log record 7 is written and when the system is restarted, which one statement is true of the recovery procedure?

- a. We must redo log record 6 to set B to 10500
  - b. We must undo log record 6 to set B to 1000 and then redo log records 2 and 3
  - c. We can apply redo and undo operations in arbitrary order because they are independent
  - d. We need not redo log records 2 and 3 because transaction T<sub>1</sub> has committed
71. In a token ring network the transmission speed is 10<sup>7</sup> bps and the propagation speed is 200 metres/micro second. The 1-bit delay in this network is equivalent to
- a. 500 meters of cable
  - b. 20 meters of cable
  - c. 50 meters of cable
  - d. 200 meters of cable

72. Suppose the round trip propagation delay for a 10 Mbps ethernet having 48-bit jamming signal is 46.4 ms. The minimum frame size is :

- a. 94
- b. 416
- c. 464
- d. 512

73. Usually, it takes 10 bits to represent one character. How many characters can be transmitted at a speed of 1200 bps?

- a. 10
- b. 12
- c. 120
- d. None of the above

74. What is the correct HTML for adding a background color?

- a. < body colour = "yellow" >
- b. < body bgcolor = "yellow" >
- c. < background > < yellow </background >
- d. < body background = "yellow" >

75. Setting the following properties for object in ASP. Net results in  
 Response.Buffer = True  
 Response.Expires Absolute = 0  
 Response.Expires = 0  
 Response.CacheControl = "no-cache";  
 Which is the most probable explanation

- a. Avoid page to be cached
- b. Clears the buffer area
- c. The session expires
- d. None of the above

**Space For Rough Work**

**SEAL**