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Sample Question Paper for M.Tech
(Computer Science & Engineering)
SPSAT'18

INSTRUCTIONS

The test is 60 minutes long & consists of 40 multiple choice questions (MCQ) adding up to 40 marks.

1. The smallest integer than can be represented by an 8-bit number in 2's complement form is

   (a) -256   (b) -128   (c) -127   (d) 0

2. A RAM chip has a capacity of 1024 words of 8 bits each (1K×8). The number of 2×4 decoders with enable line needed to construct a 16K×16 RAM from 1K×8 RAM i

   (a) 4   (b) 5   (c) 6   (d) 7

3. In an IPv4 datagram, the M bit is 0, the value of HLEN is 10, the value of total length is & the fragment offset value is 300. The position of the datagram, the sequence numbers of the first & the last bytes of the payload, respectively are

   (a) Last fragment, 2400 & 2789   (b) First fragment, 2400 & 2759

   (c) Last fragment, 2400 & 2759   (d) Middle fragment, 300 & 689

4. A shared variable x, initialized to zero, is operated on by four concurrent processes W, X, Y, Z as follows. Each of the processes W & X reads x from memory, increments by one, stores it to memory, & then terminates. Each of the processes Y & Z reads x from memory, decrements by two, stores it to memory, & then terminates. Each process before reading x invokes the P operation (i.e., wait) on a counting semaphore S & invokes the V operation (i.e., signal) on the semaphore S after storing x to memory. Semaphore S is initialized to two. What is the maximum possible value of x after all processes complete execution?

   (a) -2   (b) -1   (c) 1   (d) 2

5. Consider the following sequence of micro–operations

   (a) MBR ← PC   (b) MAR ← X   (c) PC ← Y   (d) Memory←MBR

6. Which one of the following is a possible operation performed by this sequence?

   (a) Instruction fetch   (b) Operand fetch

   (c) Conditional branch   (d) Initiation of interrupt service

7. The tester now tests the program on all input strings of length five consisting of characters 'a', 'b', 'c', 'd' & 'e' with duplicates allowed. If the tester carries out this testing with the four test cases given above, how many test cases will be able to capture the flaw?

    (a) Only one   (b) Only two   (c) Only three   (d) All of the above

8. Suppose the instruction set architecture of the processor has only two registers. The only allowed compiler optimization is code motion, which moves statements from one place to another while preserving correctness. What is the minimum number of spills to memory in the compiled code?

    (a) 0   (b) 1   (c) 2   (d) 3

9. What is the minimum number of registers needed in the instruction set architecture of the processor to compile this code segment without any spill to memory? Do not apply any optimization other than optimizing register allocation

    (a) 3   (b) 4   (c) 5   (d) 6

10. The elements of an array are stored successively in memory cells because

    (a) By this way computer can keep track only the address of the first element & the addresses of other elements can be calculated

    (b) The architecture of computer memory does not allow arrays to store other than serially

    (c) Both

    (d) None of the above

11. Translator for low level programming language were termed as

    (a) Assembler   (b) Compiler   (c) Linker   (d) Loader

12. Analysis which determines the meaning of a statement once its grammatical structure becomes known is termed as

    (a) Semantic analysis   (b) Syntax analysis   (c) Regular analysis   (d) General analysis

13. 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

14. Shell is the exclusive feature of

    (a) UNIX   (b) DOS

    (c) System software   (d) Application software

15. Interval between the time of submission & completion of the job is called

    (a) Waiting time   (b) Turnaround time   (c) Throughput   (d) Response time

16. A program in execution is called

    (a) Process   (b) Instruction   (c) Procedure   (d) Function

17. The scheduling in which CPU is allocated to the process with least CPU-burst time is called

(a)   Priority Scheduling   (b)   Shortest job first Scheduling

(c)   Round Robin Scheduling   (d)   Multilevel Queue Scheduling

18. Tickets numbered 1 to 20 are mixed up & then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

(a)   1/2   (b)   2/5   (c)   9/15   (d)   8/20

19. What is the probability of getting a sum 9 from two throws of a dice?

(a)   1/6   (b)   1/8   (c)   1/9   (d)   1/12

20. If one-third of one-fourth of a number is 15, then three-tenth of that number is:

(a)   35   (b)   36   (c)   45   (d)   54

21. The difference between a two-digit number & the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?

(a)   3   (b)   4   (c)   9   (d)   0

22. Two numbers are respectively 20% & 50% more than a third number. The ratio of the two numbers is:

(a)   2 : 5   (b)   3 : 5   (c)   4 : 5   (d)   6 : 7

23. Two students appeared at an examination. One of them secured 9 marks more than the other & his marks was 56% of the sum of their marks. The marks obtained by them are:

(a)   39, 30   (b)   41, 32   (c)   42, 33   (d)   43, 34

24. IEEE 802.16 popularly called

(a)   Ethernet   (b)   WiFi

(c)   WiMAX   (d)   Wireless Sensor Network

25. The probability that a single bit will be in error on a typical public telephone line using 4800 bps modem is 10 to the power -3. If no error detection mechanism is used, the residual error rate for a communication line using 9-bit frames is approximately equal to

(a)   0.003   (b)   0.009   (c)   0.991   (d)   0.999

26. The total time to prepare a disk drive mechanism for a block of data to be read from is its

(a)   Latency

(b)   Latency plus transmission time

(c)   Latency plus seek time

(d)   Latency plus seek time plus transmission time

27. A grammar for a programming language is a formal description of

(a)   Syntax   (b)   Semantics   (c)   Structure   (d)   Code

28. File record length

(a)   Should always be fixed

(b) Should always be variable

(c) Depends upon the size of file

(d) Should be chosen to match the data characteristics

29. In which of the following page replacement policies Balady's anomaly occurs?

(a) FIFO   (b) LRU   (c) LFU   (d) NRU

30. Virtual memory can be implemented with

(a) Segmentation   (b) Paging

(c) None of the above   (d) All of the above

31. Recognition of basic syntactic constructs through reductions, this task is performed by

(a) Lexical analysis   (b) Syntax analysis

(c) Semantic analysis   (d) Structure analysis

32. Which of the following are language processors?

(a) Assembler   (b) Compiler   (c) Interpreter   (d) All of the above

33. Adaptive system management is

(a) It uses machine-learning techniques. Here program can learn from past experience & adapt themselves to new situations

(b) Computational procedure that takes some value as input & produces some value as output

(c) Science of making machines performs tasks that would require intelligence when performed by humans

(d) None of the above

34. Bayesian classifiers is

(a) A class of learning algorithm that tries to find an optimum classification of a set of examples using the probabilistic theory.

(b) Any mechanism employed by a learning system to constrain the search space of a hypothesis

(c) An approach to the design of learning algorithms that is inspired by the fact that when people encounter new situations, they often explain them by reference to familiar experiences, adapting the explanations to fit the new situation.

(d) None of the above

35. A public key encryption system

(a) Allows only the correct receiver to decode the data

(b) Allows only one to decode the transmission

(c) Allows only the correct sender to decode the data

(d)   Does not encode the data before transmitting it

36. Which of the following is most general phase structured grammar?

(a)   Context – Sensitive   (b)   Regular

(c)   Context – Free   (d)   None of the above

37. Algorithm is

(a)   It uses machine-learning techniques. Here program can learn from past experience & adapt themselves to new situations

(b)   Computational procedure that takes some value as input & produces some value as output

(c)   Science of making machines performs tasks that would require intelligence when performed by humans

(d)   None of the above

38. Bias is

(a)   A class of learning algorithm that tries to find an optimum classification of a set of examples using the probabilistic theory

(b)   Any mechanism employed by a learning system to constrain the search space of a hypothesis

(c)   An approach to the design of learning algorithms that is inspired by the fact that when people encounter new situations, they often explain them by reference to familiar experiences, adapting the explanations to fit the new situation.

(d)   None of the above

39. Background knowledge referred to

(a)   Additional acquaintance used by a learning algorithm to facilitate the learning   process

(b)   A neural network that makes use of a hidden layer

(c)   It is a form of automatic learning

(d)   None of the above

40. Which of the following is true?

(a)   Block cipher technique is an encryption technique

(b)   Steam cipher technique is an encryption technique

(c)   Both (a) & (b)

(d)   Neither (a) nor (b)