TEST SERIES UGC-NET/JRF DEC. 2018

BOOKLET SERIES B

Paper Code 87

Test Type: TEST SERIES

COMPUTER SCIENCE & APPLICATIONS

Duration: 01:30 Hours

Date: 22-11-2018

Maximum Marks: 140

Read the following instructions carefully:

1. Single Paper Test is divided into **TWO** Parts.
2. **Part - I:** This part shall carry **20** questions. Each question shall be of **2 marks.**
3. **Part - II:** This part shall contain **50** questions. Each question shall be of **2 marks**.
4. There will be no negative marking.
5. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.
6. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

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T : 011-27653355, 27654455
www.careerendeavour.com

REGISTERED OFFICE :
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Metro Station, Gate No. 3,
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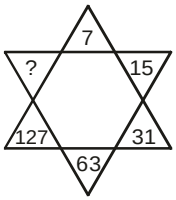
T : 011-26851008, 26861009
E : info@careerendeavour.com

PAPER – I

1. Find the missing number :



(a) 190 (b) 221 (c) 236 (d) 255

2. A man is facing west. He turns 45º in the clockwise direction and then another 180º in the same direction and then 270º in the anti-clockwise direction. Which direction is he facing now ?
(a) South (b) North-west (c) West (d) South-west

Read the following information and answer the questions (Q. 3 and Q. 4) :

Six lectures : A, B, C, D, E and F are to be delivered from monday to sunday, one lecture every day.
Lecture C cannot be delivered on friday.
Lecture A delivered immediately after lecture D.
There should be gap of two days between lecture B and F. There is one holiday except saturday.
Lecture F is delivered on the next day of holiday lecture E is delivered on wednesday and it is not immediately followed by lecture F.

3. On which day was lecture D delivered ?
(a) Friday (b) Saturday (c) Sunday (d) Thursday

4. On which day was holiday ?
(a) Sunday (b) Friday (c) Monday (d) None of these

5. If marked price of a chair is ` 800. A trade man buys it at discount of 10%, 15%, he spends ` 28 on it's carring. If he sells it for ` 800 then what is his percentage profit ?
(a) 25% (b) 20% (c) 10% (d) 15%

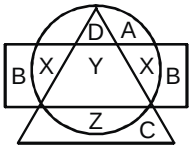
6. Find the missing alphabet :

A	D	H
F	I	M
?	N	R

(a) K (b) N (c) O (d) P

7. Make your answer accordingly the given data words with no vowel, words with one vowel words with two vowels :
(a)  (b)  (c)  (d) 

Direction for Q. 8 to Q. 9 :
The circle represents college professor. The triangle stands for surgical specialist, and medical specialist are represented by the rectangle.



8. C represents :
(a) Medical specialists (b) College professors
(c) Surgical specialists (d) Medical and surgical specialist

9. College professors who are also surgical specialists are represented by
(a) A (b) B (c) C (d) D

10. Find the unknown value in the proportion : $(2x+1):2=(x+2):5$
(a) –1/8 (b) 3/8 (c) –3/8 (d) 8/3

***Direction**: The passage is followed by 3 questions (11 to 13) based on its content. After reading passage, choose the best answer to each question. Answer all questions following the passage on the basis of what is stated or implied in the passage.*

The Montreal Protocol on Substances that Deplete the Ozone Layer, signed in 1987 by more than 150 nations, has attained its short-term goals: it has decreased the rate of increase in amounts of most ozone-depleting chemicals reaching the atmosphere and has even reduced the atmospheric levels of some of them. The projection that the ozone layer will substantially recover from ozone depletion by 2050 is based on the assumption that the protocol's regulations will be strictly followed. Yet there is considerable evidence of violations, particularly in the form of the release of ozone-depleting chlorofluorocarbons , which are commonly used in the refrigeration, heating, and air conditioning industries. These violations reflect industry attitudes; for example, in the United States, 48 percents of respondents in a recent survey of subscribers to Air Conditioning, Heating, and Refrigeration News, an industry trade journal, said that they did not believe that CFC's damage the ozone layer. Moreover, some in the industry apparently do not want to pay for CFC substitutes, which can run five times the cost of CFC's. Consequently, a black market in imported illicit CFC's has grown. Estimates of the contraband CFC trade range from 10,000 to 22,000 tons a year, with most of the CFC's originating in India and China, whose agreements under the Protocol still allow them to produce CFC's. In fact, the United States Customs Service reports that CFC-12 is a contraband problem second only to illicit drugs.

11. According to the passage, which of the following best describes most ozone-depleting chemicals in 1996 as compared to those in 1987?
(a) The levels of such chemicals in the atmosphere had decreased.
(b) The number of such chemicals that reached the atmosphere had declined.
(c) The amounts of such chemicals released had increased but the amounts that reached the atmosphere had decreased.
(d) The rate at which such chemicals were being reduced in the atmosphere had slowed.

12. The author of the passage compares the smuggling of CFC's to the illicit drug trade most likely for which of the following reasons?
(a) To qualify a previous claim
(b) To emphasize the extent of a problem
(c) To provide an explanation for an earlier assertion
(d) To suggest that the illicit CFC trade, likely the illicit drug trade, will continue to increase

13. The passage suggests which of the following about the illicit trade in CFC's?
(a) It would cease if manufacturers in India and China stopped producing CFC's.
(b) Most people who participate in such trade do not believe that CFC's deplete the ozone layer.
(c) It will probably surpass illicit drugs as the largest contraband problem faced by the United States Custom Services.
(d) It is fostered by people who do not want to pay the price of CFC substitutes.

14. Members of selection committee for the selection of chairman of NHRC consists of:
1. PM. **2.** Speaker.
3. Deputy Chairman of RS. **4.** Leaders of the opposition in LS.
5. Leaders in the opposition in RS. **6.** Chief Justice of India.
7. Home minister. **8.** Minister of Social Justice & Welfare.
(a) All except 7 (b) All except 7 & 8
(c) All except 6 & 8 (d) None of the above options are correct

15. Which of the following statements are correct:
1. The salary, allowances and other service conditions of the Chief Information Commissioner are similar to those of the Chief Election Commissioner.
2. The salary, allowances and other service conditions of the State Information Commissioner are similar to those of the Chief Justice of High Court.
3. The salary, allowances and other service conditions of the Chief Vigilance Commissioner are similar to those of the Chairman of UPSC.
(a) 1 & 3 only (b) 1 & 2 only (c) 2 & 3 only (d) 1, 2 & 3

16. Which among the following is an ODD statement :
(a) Knowledge is static
(b) In India in most of the institutions, One way interaction prevails in classrooms.
(c) In India in most of the institutions,Majority of teachers use lecture method.
(d) In India in most of the institutions,Most of the classroom are poorly equipped.

17. Use of telecast materials
(a) increases retention power (b) enhances concentration and learning
(c) reduces the burden of the teacher (d) none of the above

18. Which of the following is/are effects of UV radiation?
1. It causes premature ageing
2. It leads to skin cancer
3. It increases the risk of lung cancer
Select the correct answer from the following codes
(a) Only 1 (b) Only 1 and 2 (c) Only 2 and 3 (d) 1, 2 and 3

19. Which of the following carcinogens are released by using pesticides?
1. Benzidine and benzene
2. Nickel
3. DDT
Select the correct answer from the following codes:
(a) Only 1 (b) Only 1 and 2 (c) Only 2 and 3 (d) 1,2 and 3

20. _____ are problems arising from expression.
(a) Cultural barriers (b) Semantic problems
(c) Wrong assumptions (d) Selecting perception

PAPER – II

21. Which of the following statement is/are true?
(a) The resolution of two clauses is a horn clauses
(b) A clause containing 1 positive literal and atleast 1 negative literal is known as positive or definite horn clause
(c) A clause containing atmost one positive literal is called Horn clause
(d) All of the above.

22. What is the Skolemization of the following
$\forall k \exists x \forall y \forall z \exists a \forall u \exists b P(k, x, y, z, a, u, b)$
(a) $\forall k \forall y \forall z \forall u P(k, c_1, y, c_2, u, c_3)$
(b) $\forall k \forall y \forall z \forall u P(k, c_1, y, z, f(y, z), u, f(y, z, u))$
(c) $\forall k \forall y \forall z \forall u P(k, c_1, y, z, f(y, z), u, g(y, z, u))$
(d) None of these

23. Consider the following Prolog Knowledge base
A(1).
B(1).
A(2).
B(2).
D(2).
C(x,y,z :- D(z), A(x), !, B(y).
If we fire a query ?-C(x,y). What is the output
(a) $z = 2, x = 1, y = 1; x = 1, y = 2$
(b) $z = 2, x = 1, y = 1; x = 1, y = 2 x = 2, y = 1; x = 2, y = 2$
(c) $z = 3 x = 1, y = 2; x = 2, y = 2$
(d) None of the above

24. What is the pridicate for finding the length of a List in Prolog?
(a) $length([], 0)$
$length([X \mid L], N) :- length(L, N_1), N$ is $N_1 + 2$
(b) $length([], 0)$
$length([X \mid L], N) :- length(L, N_1), N$ is $N_1 - 1$
$length([], 0)$
(c) $length([X \mid L], N) :- length(L, N_1), N$ is $N_1 + 1$
(d) None of the above

25. Consider the following statements
S1. DFS is always better than BFS
S2. Best first search is not a greedy search method
S3. A* is optimal if heuristics always underestimates
S4. Simple Minimax search and Minimax search with alpha beta pruning gives identical value of the game.
Which of the above statement is correct?
(a) S1 and S2 only
(b) S3, S4 only
(c) S1, S3 and S4 only
(d) S1, S2, S3, S4

26. Which of the following is not a Horn Clause?

(a) $\neg AV\neg BVCV\neg D$ (b) $\neg AV\neg BV\neg CV\neg D$

(c) $\neg AVD$ (d) $\neg AV\neg BVCVD$

27. Which of the following correctly represent the following in Prolog?
marry likes all animals but snakes

(a) $like(marry, X) :- snake(X), !, fail.$
$like(marry, X).$

(b) $like(marry, X) :- snake(X), fail.$
$like(marry, X).$

(c) $like(marry, X) :- snake(X), !.$
$like(marry, X).$

(d) $like(marry, X) :- !snake(X), fail.$
$like(marry, X).$

28. $\exists! xP(x)$ is equivalent to

(a) $\exists x\left(P(x)\wedge\forall y\left(P(y)\Rightarrow(y=x)\right)\right)$ (b) $\forall x\left(P(x)\wedge\forall y\left(P(y)\Rightarrow(y=x)\right)\right)$

(c) $\exists x\left(P(x)\wedge\exists y\left(P(y)\Rightarrow(y=x)\right)\right)$ (d) $\forall x\left(P(x)\wedge\forall y\left(P(y)\Rightarrow(y=x)\right)\right)$

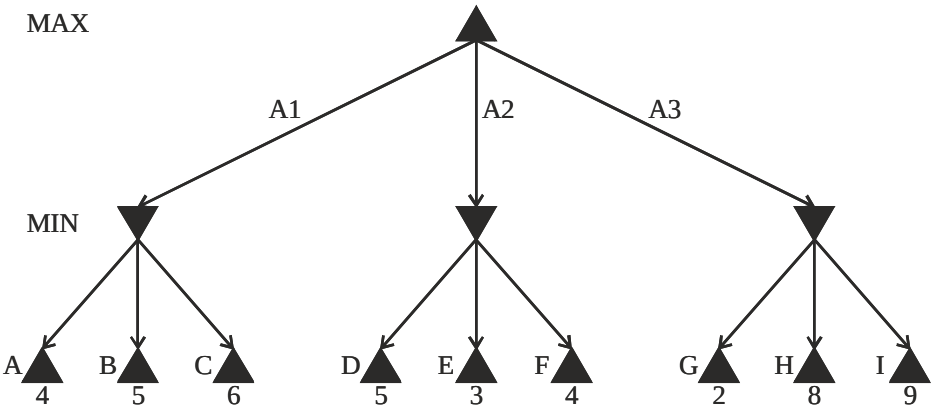
29. Consider the following Tower of Hanoi problem

Left : Initial state Right : Goal state

The cost of moving the small disk is 1, moving the middle sized disk is 2, and moving the large disk is 3. Hence the average cost is 2. Define the heuristic function h as follows: 2×number of disks not on the rightmost peg.
What is the h value of the initial state?

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

30. Consider the following part of a two-player game tree



If we apply the alpha beta prunning which of the following nodes will be prunned?

(a) {G, H, I} (b) {A, D, G} (c) {C, F, I} (d) {F, H, I}

31. Operation in the neural networks can perform what kind of operations?

(a) Serial (b) Parallel (c) Serial or parallel (d) None of these

32. Let $X = \{2, 4, 6, 8\}$ and A, B, C are fuzzy set like _____

$$A = \left\{\frac{\cdot 2}{2}, \frac{\cdot 5}{4}, \frac{\cdot 8}{6}, \frac{\cdot 6}{8}\right\};\ B = \left\{\frac{\cdot 3}{2}, \frac{\cdot 5}{4}, \frac{\cdot 9}{6}, \frac{\cdot 1}{8}\right\};\ C = \left\{\frac{\cdot 3}{2}, \frac{\cdot 5}{4}, \frac{\cdot 9}{6}, \frac{\cdot 1}{8}\right\}$$

So which option is correct ?

(a) $A \subset B$ but $B \not\subset A$ (b) $C \subset B$ but $B \not\subset C$

(c) $A \not\subset C$ and $C \not\subset A$ (d) All of the above

33. Involutive property of the standard fuzzy complement c, for each a? [,] is ——

(a) c (c(a)) = c(a) (b) c (c(a)) = 1 (c) c (c(a)) = 0 (d) c (c(a)) = a

34. Consider a fuzzy set old as defined below old={(20,0),(30,0.2),(40,0.4),(50,0.6),(60,0.8),(70,1),(80,1)}. Then the alpha-cut for alpha=0.4 for the set old will be

(a) {(40,0.3)}

(b) {50,60,70,80}

(c) {(20,0.1),(30,0.2)}

(d) {(20,0),(30,0),(40,1),(50,1),(60,1),(70,1),(80,1)}

35. A function, $f(x) = \dfrac{1}{1 + \text{expr}(-\lambda x)}$ where $\lambda =$ slope factor is _____

(a) Threshold funciton (b) Bipolar sigmoidal function

(c) Binary sigmoidal function (d) All of the above

36. Let us consider the language : $L = (a^5 + a^{11})^*$. What is the largest string which can't be generated by L ?

(a) a^{55} (b) a^{44} (c) a^{39} (d) a^{51}

37. Consider the following two languages :

$L_1 =$ The set of all binary palindromes.

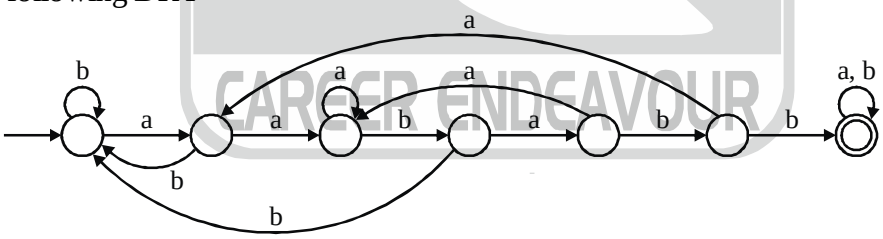
$L_2 =$ The set of all even length palindromes.

What is the language $L_1 - L_2$ and $L_2 - L_1$?

(a) L_1 and L_2 respectively (b) L_2 and L_1 respectively

(c) The set of all odd length binary strings and ϕ (d) None of the above

38. Consider the following DFA



The language accepted by the above DFA is?

(a) The set of all strings ending with aababb over {a, b}

(b) The set of all strings starting with aababb over {a, b}

(c) The set of all strings containing with aababb over {a, b}

(d) The set of all strings does not containing aababb over {a, b}

39. Consider the following statements :

S_1 : All regular languages are context free language.

S_2 : All recursive enumerable languages are recursive language.

S_3 : All context sensitivelanguages are recursive enumerable language.

S_4 : All context free languages are not regular language.

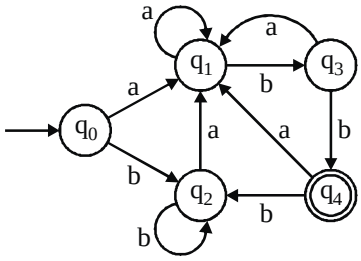
Which of the above is(are) correct ?

(a) S_1 only (b) S_1, S_4, S_3 only (c) S_1, S_4 only (d) S_1, S_4, S_3, S_2

40. If $L = \{a^n \mid n \geq 0\}$, then L^{1000} ?

(a) L (b) $\{a^n \mid n \geq 1000\}$ (c) $\{a^n \mid n \leq 1000\}$ (d) None of these

41. Consider the following DFA



What is the number of state is minimized DFA ?

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

42. Which of the following statement is TRUE?

S_1 : If a DFA M has *n* states and it accepts a string *w* of length at least *n* then M accepts infinite number of strings.

S_2 : All subset of non regular set is non regular.

(a) S_1 only (b) S_2 only (c) S_1 and S_2 (d) neither S_1 nor S_2

43. If $L_1 = \{w \in \{0,1\}^* \mid N_0(w) \bmod 11 \neq 2\}$

$L_2 = \{w \in \{0,1\}^* \mid N_1(w) \bmod 17 \neq 2\}$

How many final states are there in DFA accepting $L_1 \oplus L_2$?

(a) 161 (b) 187 (c) 16 (d) 26

44. The FIRST and FOLLOW sets for the grammar

$S \rightarrow SS+ \mid SS* \mid a$

(a) FIRST (S) = {a}
FOLLOW {S}

(b) FIRST (S) = {+}
FOLLOW (S) = {+, *, $}

(c) FIRST (S) = {a}
FOLLOW(S) = {+, *, $}

(d) None of these

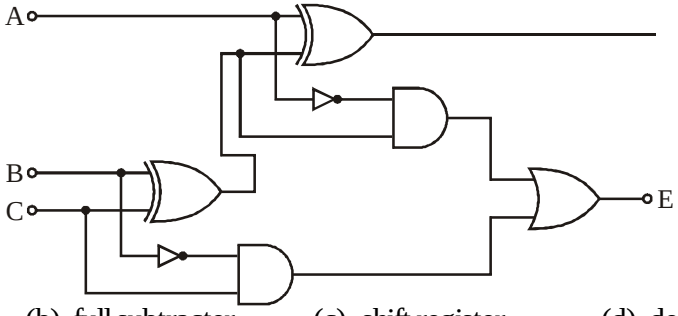
45. Consider the grammar

$S \rightarrow a, S \rightarrow ab$

The given grammar is

(a) LR(1) only (b) LL(1) only (c) Both LR(1) and LL(1) (d) LR(1) but not LL(1)

46. The circuit shown in the given figure is a



(a) full adder (b) full subtracter (c) shift register (d) decade cousnter

47. Consider a set of n tasks with known runtimes r_1, r_2, ..., r_n to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the best average waiting time?
(a) Round Robin (b) Shortest job first
(c) Highest response ratio next (d) first come first served

48. Disk requests are received by a disk drive for cylinder 5, 25, 18, 3, 39, 8 and 35 in that order. A seek takes 5 msec per cylinder moved. How much seek time is needed to serve these requests for a Shortest Seek First (SSF) algorithm? Assume that the arm is at cylinder 20 when the last of these requests is made with none of the requests yet served
(a) 125 msec (b) 295 msec (c) 575 msec (d) 750 msec

49. Consider a system having 'm' resources of the same type. The resources are shared by 3 processes A, B, C, which have peak time demands of 3, 4, 6 respectively. The minimum value of 'm' that ensures that deadlock will never occur is
(a) 11 (b) 12 (c) 13 (d) 14

50. The Boolean theorem $AB + \bar{A}C + BC = AB + \bar{A}C$ corresponds to
(a) $(A + B) \cdot (\bar{A} + C) \cdot (B + C) = (A + B) \cdot (\bar{A} + C)$
(b) $AB + \bar{A}C + BC = AB + BC$
(c) $AB + \bar{A}C + BC = (A + B) \cdot (\bar{A} + C) \cdot (B + C)$
(d) $(A + B) \cdot (\bar{A} + C) \cdot (B + C) = AB + \bar{A}C$

51. How many 2-input multiplexers are required to construct a 2^{10}-input multiplexer ?
(a) 1023 (b) 31 (c) 10 (d) 127

52. We can make a class abstract by
(a) Declaring it abstract using the virtual keyword
(b) Making at least one member function as virtual function
(c) Making at least one member function as pure virtual function
(d) Making all member function constant

53. In C, what is the effect of a negative number in a field width specifier ?
(a) the values arc displayed right justified (b) the values arc displayed centered
(c) the values arc displayed left justified (d) the values arc displayed as negative numbers

54. In sequential circuits :
S1 : NAND is not associative.
S2 : NOR and NAND are not distributive.
Which statements is/are ***true*** ?
(a) S1 only (b) S2 only (c) Both (d) None of these

55. Which of the following symbol is used to create a link to a named anchor in HTML ?
(a) & (b) @ (c) # (d) $

56. What will be the output of the following script command ?
document.write (2 + 5 + "8");
(a) 258 (b) error (c) 78 (d) 7

57. Find the output of the following : C++ code :
int * p, A[ ] = [20, 90, 70, 10];
p = A; A[2] + =10; p + = 2;
cout << * p << endl;
(a) 70 (b) 80 (c) 90 (d) 10

58. Which of the following JAVA statements declare and allocate a 2-dimensional array of integers with four rows and five columns.
(a) int array [4] [5]; (b) int array [ ] [ ] = new int [4] [5];
(c) int array [5] [4]; (d) int array [ ] [ ] = new int [5] [4];

59. Toggle flip-flop, popularly known as T flip-flop. To derive T flip-flop from JK flip-flop :
I : We must have input J = K = 0, the output $Q_{n+1} = Q_n$, i.e., output does not change its state.
II. And for J = K = 1, the output $Q_{n+1} = \overline{Q}_n$, i.e., output toggles.
(a) Only I (b) Only II (c) Both I and II (d) None of these

60. Consider the following statements about static member variable in class.
S_1: A static member variable exists before any object of its class is created.
S_2: One use of a static member variable is to provide access control to some shared resource used by all objects of a class.
Which of the following statements is/are TRUE ?
(a) S_1 (b) S_2 (c) Both (d) None of these

61. Find out the output of the following C code ?
```
int main( ) {
printf("%*.*s", 8, 4, "hello");
}
```
(a) ----hell (c) hello---- (c) hello (d) None of these

62. Names of the operating systems are given below ?
(1) Windows 2000 professional (2) Unix
(3) Linux (4) Mainframes
Following, operating system didn't provide multiuser facility ?
(a) (1) only (b) (1) and (4) (c) (4) only (d) All of these

63. There are 4 statements are given about threads and I/O (syn. and asyn.)
S1: Context switch time is longer for kernel level threads than for user level threads.
S2: Blocking are kernel level thread blocks all related thread.
S3: In both synchronous and asynchronous I/O and ISR(Interupt Service Routine) is invoked after completion of the I/O.
S4: In the case of synchronous I/O, the process waiting for the completion of I/O is woken up by the ISR that is invoked after the completion of I/O.
Which statements is/are TRUE ?
(a) S1 only (b) S2 and S3 only (c) S1 and S4 only (d) S2 and S4 only

64. Consider the following four process :

Process	A.T.	Priority	Burst Time
P0	2	10	8
P1	2	8	9
P2	3	12	6
P3	7	6	5

Using preemptive priority scheduling. Find the arithmetic mean of completion times of process P0, P1 and P2?
(a) 16.66 (b) 16.33 (c) 20.8 (d) 21

65. Two functions F1 and F2 that share a variable V. Initial value of V is 2

```
F1 ( )                    F2 ( )
{                         {
    X = V – 1;                Y = 2 * V;
    V = 2 * X;                V = Y – 1;
}                         }
```

The number of distinct value V can take on the execution of program ?
(a) 3 (b) 4 (c) 5 (d) 1

66. A paging scheme uses a translation book-aside buffer (TLB). A TLB access takes 10 ns. What is the effective access time (in ns), if the TLB hit ratio is 80% and there is no page fault ?
Assume memory access time is 50 ns ?
(a) 69 (b) 68 (c) 70 (d) 72

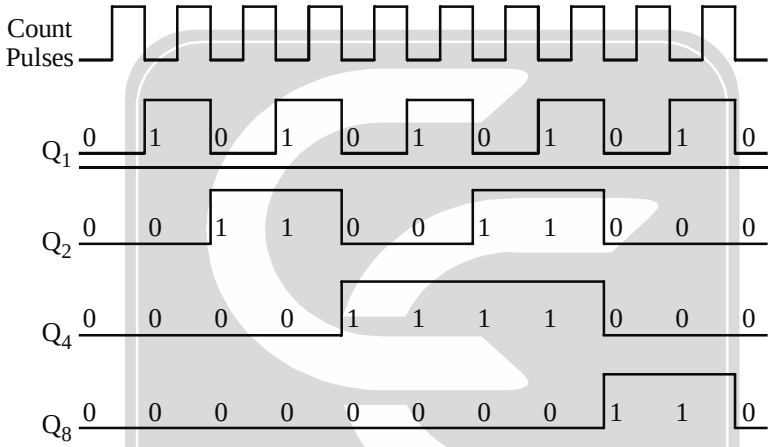
67. An application loads 100 libraries at start up. Loading each library requires exactly one disk access. The seek time of the disk to a random location is given as 10 ms. Rotational speed of a disk is 6000 rpm. If all 100 libraries are loaded from random locations on the disk, how long does it take to load all libraries?
(The time of transfer data from the disk block once the head has been positioned at the start of the block may be neglected).
(a) 0.50 s (b) 1.50 s (c) 1.25 s (d) 1.00 s

68. Assume that a main memory with only 4 pages, each of 8 bytes, is initially empty. The CPU generates the following sequence of virtual addresses and uses the least recently used (LRU) page replacement policy.

0, 4, 8, 20, 24, 26, 44, 12, 68, 71

How many page fault occur, and what is the sequence of pages respectively ?
(a) 6 and 3, 5, 2, 8 (b) 5 and 4, 3, 5, 2 (c) 6 and 4, 3, 5, 2 (d) 5 and 3, 5, 2, 8

69. To implement BCD riple counter we have logic diagram.



Timing diagram for the decimal counter

Which statement is false ? (Assuming logic diagram is correct)
(i) Q_1 is complemented on the negative edge of every count pulse.
(ii) Q_2 is complemented if $Q_8 = 0$ and Q_1 goes from 1 to 0. Q_2 is cleared if $Q_8 = 1$ and Q_1 goes from 1 to 0.
(iii) Q4 is complemented when Q2 goes from 1 to 0.
(iv) Q_8 is complemented when $Q_4Q_2 = 11$ and Q_1 goes from 1 to 0. Q_8 is cleared if either Q_4 or Q_2 is 0 and Q_1 goes from 0 to 1.
(a) (i) only (b) (ii) only (c) (iii) only (d) (iv) only

70. Given the k-map ?

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	0	1	0
$\bar{A}B$	1	1	1	1
AB	1	1	0	0
$A\bar{B}$	0	0	0	0

What will be simplified.
(a) $\bar{A}B + B\bar{C} + \bar{A}CD$ (b) $A\bar{B} + B\bar{C} + A\bar{C}D$
(c) $B(\bar{A} + \bar{C}) + AD$ (d) $(\bar{A} + \bar{C})B + AC$

Space for rough work

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UGC-NET COMPUTER SCIENCE & APPLICATIONS

Test Series- B

Date: 22-11-2018

ANSWER KEY

PAPER – I

1. (d)	2. (d)	3. (b)	4. (d)	5. (a)	6. (a)	7. (d)
8. (c)	9. (d)	10. (c)	11. (b)	12. (b)	13. (d)	14. (c)
15. (a)	16. (a)	17. (b)	18. (b)	19. (b)	20. (b)	

PAPER – II

21. (d)	22. (d)	23. (a)	24. (c)	25. (b)	26. (d)	27. (a)
28. (a)	29. (d)	30. (d)	31. (c)	32. (b)	33. (d)	34. (d)
35. (c)	36. (c)	37. (c)	38. (c)	39. (b)	40. (a)	41. (b)
42. (a)	43. (c)	44. (c)	45. (d)	46. (b)	47. (b)	48. (b)
49. (a)	50. (a)	51. (a)	52. (c)	53. (c)	54. (c)	55. (c)
56. (c)	57. (b)	58. (b)	59. (c)	60. (c)	61. (a)	62. (a)
63. (c)	64. (a)	65. (a)	66. (c)	67. (b)	68. (a)	69. (d)
70. (a)						