

TEST SERIES UGC-NET/JRF Jan. 2017

BOOKLET SERIES **B**

Paper Code **87**

Test Type: **TEST SERIES**

COMPUTER SCIENCE & APPLICATIONS

Duration: 02:00 Hours

Date: 24-12-2016

Maximum Marks: 120

Read the following instructions carefully:

1. Attempt all the questions.
2. This booklet contain 60 Objective Type Questions, each Question carry 2 marks each.
3. There will be no negative marking.
4. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.
5. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.



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1. The given LPP problem

$$\text{Max } z = 2x + 6y$$

$$\text{Subject to } x + 3y \leq 60$$

$$3x + 4y \leq 120$$

$$x \geq 10$$

$$x, y \geq 0$$

has _____ solution

- (a) Alternate optimal (b) Infeasible (c) Unbounded (d) None of the above

2. When at least one of non-basic variable has $c_j - z_j = 0$ then it has _____ solution.

- (a) Optimal solution (b) Infeasible (c) Unbounded (d) Alternate optimal

3. The given LPP problem

$$\text{Min } z = -50x + 20y$$

$$2x - y \geq -5$$

$$3x + y \geq 3$$

$$2x - 3y \leq 12$$

$$x, y \geq 0$$

has _____ solution.

- (a) Unbounded (b) Feasible (c) No feasible (d) None of the above

4. Solve the following assignment problem using HAM

	1	2	3	4	5
A	9	11	14	11	7
B	6	15	13	13	10
C	12	13	6	8	8
D	11	9	10	12	9
E	7	12	14	10	14

find optimal solution.

- (a) 32 (b) 34 (c) 36 (d) 38

5. Solve the following transportation problem using VAM.

		Customer				
		1	2	3	4	
Warehouse	A	270	230	310	690	100
	B	100	450	400	320	80
	C	300	540	350	570	80
		60	120	50	40	

Here each entry corresponds to the distance between customer and warehouse.

Given, cost of transportation = 20 paise / km.

Find the minimum total cost –

- (a) Rs 13500 (b) Rs 13600 (c) Rs 13780 (d) Rs 13920



6. Find the initial basic feasible solution by North-West corner method.

	1	2	3	4	Supply
A	3	1	7	4	250
B	2	6	5	9	350
C	8	3	3	2	400
Demand	200	300	350	150	

- (a) 3800 (b) 3700 (c) 4000 (d) 3900

7. Below is the initial basic feasible solution for the problem –

	A	B	C	
I	3	1	8	12
II	9	4	0	14
III	17	6	7	4
	9	10	11	

is given as,

	A	B	C
I	9	3	
II		7	7
III			4

Find the optimal solution –

- (a) 74 (b) 84 (c) 80 (d) 76

8. The number of lines that can be drawn in an assignment problem is equal to –

- (a) m or n (b) $m + n - 1$ (c) $m + n$ (d) $m - 1$ or $n - 1$

Where m is number of rows, n is number of columns.

9. Solve the LPP problem –

$$\begin{aligned} \text{Max } & 6x_1 + 5x_2 \\ & x_1 + x_2 \leq 5 \\ & 3x_1 + 2x_2 \leq 12 \\ & x_1, x_2 \geq 0 \end{aligned}$$

The above problem has –

- (a) Optimal solution (b) Degenerate (c) Unbounded (d) Infeasible

10. If in cost matrix of an assignment problem, we multiply each c_{ij} by a constant $k > 0$ then for the charged problem

- (a) optimal solution remains same but optimal value changes to optimal cost + k
 (b) optimal solution remains same but optimal value changes to $k \times$ optimal cost
 (c) optimal solution changes but optimal value remains the same
 (d) both optimal solution and value changes

11. A microprogram written as string of 0's and 1's is a
- (a) Symbolic microinstruction (b) binary argument
(c) symbolic microinstruction (d) binary micro-program
12. Data hazards occur when
- (a) Greater performance loss
(b) Pipeline changes the order of read/write access to operands
(c) Some functional unit is not fully pipelined
(d) Machine size is limited
13. Which Logic circuit would you use for addressing memory?
- (a) Full adder (b) Multiplexer
(c) Decoder (d) Direct memory access
14. When the RET instruction at the end of subroutine is executed,
- (a) the information where the stack is initialized is transferred to the stack pointer
(b) the memory address of the RET instruction is transferred to the program counter
(c) two data bytes stored in the top two locations of the stack are transferred to the program counter
(d) two data bytes stored in the top two locations of the stack are transferred to the stack pointer
15. In a vectored interrupt the
- (a) Branch address is assigned to a fixed location in memory.
(b) Interrupting source supplies the branch information to the processor an interrupt vector
(c) Branch address is obtained from a register in the processor.
(d) None of the above.
16. SIMD can be used for
- (a) Railway reservation (b) Weather forecasting
(c) Matrix multiplication (d) All of the above
17. The correct matching for the following pair is
- (A) DMA I/O (1) High speed RAM
(B) Cache (2) Disk
(C) Interrupt I/O (3) Printer
(D) Condition Code Register (4) ALU
(a) A-4 B-3 C-1 D-2 (b) A-2 B-1 C-3 D-4
(c) A-4 B-3 C-2 D-1 (d) A-2 B-3 C-4 D-1
18. Consider the following program segment for a hypothetical CPU having three user registers R1, R2 and R3.
- | Instruction | Operation | Instruction Size(in words) |
|---------------|-------------------------------|----------------------------|
| MOV R1,5000; | R1 \leftarrow Memory[5000] | 2 |
| MOV R2, (R1); | R2 \leftarrow Memory[(R1)] | 1 |
| ADD R2, R3; | R2 \leftarrow R2 + R3 | 1 |
| MOV 6000, R2; | Memory [6000] \leftarrow R2 | 2 |
| HALT | Machine halts | 1 |
- Consider that the memory is byte addressable with size 32 bits, and the program has been loaded starting from memory location 1000 (decimal). If an interrupt occurs while the CPU has been halted after executing the HALT instruction, the return address (in decimal) saved in the stack will be
- (a) 1007 (b) 1020 (c) 1024 (d) 1028
19. In the following indexed addressing mode instruction, MOV 5(R1),LOC the effective address is _____.
- (a) EA = 5+R1 (b) EA = R1 (c) EA = [R1] (d) EA = 5+[R1]

20. Consider a 4 way set associative cache consist of 128 lines with a line size of 64 words. The CPU generates a 20 bit address of a word in main memory. The number of bits in the TAG, LINE, and WORD fields are respectively
 (a) 9,6,5 (b) 7,7,6 (c) 7,5,9 (d) 9,5,6
21. Which of the following is program group
 (a) Accessories (b) Paint (c) Word (d) All of above
22. Which is not application software
 (a) Windows NT (b) Page Maker (c) WinWord XP (d) Photoshop
23. The program compresses large files into a smaller file
 (a) WinZip (b) WinShrink (c) WinStyle (d) None of above
24. Which of the following is an example of a real time operating system
 (a) Lynx (b) MS DOS (c) Windows XP (d) Process Control
25. Which of the following operating system does not implement the multitasking truly
 (a) Windows 98 (b) Windows NT (c) Windows XP (d) MS DOS
26. Which of the following windows versions support 64 bit processor
 (a) Windows 98 (b) Windows 2000 (c) Windows XP (d) Windows 95
27. Match for following :
- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>List-1</p> <p>x. head
 y. grep
 z. od
 w. tr</p> <p>(a) $x-q, y-r, z-p, w-s$
 (c) $x-q, y-p, z-r, w-s$</p> | <p>List-2</p> <p>p. search a file for some pattern
 q. extracts first 10 lines of file by default
 r. octal dump file
 s. translate between characters</p> <p>(b) $x-q, y-p, z-s, w-r$
 (d) $x-s, y-p, z-r, w-q$</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
28. The default permissions of a file when it is created for the first time, is controlled by
 (a) chmod (b) f mask (c) u mask (d) None of these
29. If 5 terminals are currently logged on, then the commands
 $\$ who > abc$
 $\$ date | tee abc | wc -l$, displays
 (a) 5 (b) 6 (c) 0 (d) An error message
30. The correct system call to write 16 bits message stored within buffer at the terminal.
 (a) write (0, buffer, 16) (b) write (1, buffer, 16)
 (c) write (0, buffer, 2) (d) write (1, buffer, 21)
31. For the input string 01100101110. What will be the output string if the delimiter 0111 is used during framing using bit stuffing method ?
 (a) 0110001011010 (b) 011001011100 (c) 011001011010 (d) 0110010011010
32. What is the maximum length of the frame in Ethernet Network ?
 (a) 1500 bytes (b) 256 bytes (c) 53 bytes (d) None of these
33. A packet has arrived in which the output value is 250, the value of HLEN is 10, and the value of the total length is 300. What are the numbers of the first byte and the last byte ?
 (a) 1600, 1760 (b) 2000, 2159 (c) 2000, 2259 (d) 2000, 2260
34. What is the length of the codeword if we need to send a message of 10 bits ?
 (a) 12 (b) 13 (c) 14 (d) 15

35. If one does not want any-one else to read or write to a file named file y, except through a program in file, file x, then he may use
 (a) chmod 4 + c file x, chmod go-rw file y (b) chmod 4711 file x, chmod go-rw file y
 (c) chmod 4711 file y, chmod go-rw file x (d) chmod 4 + s file y, chmod go-rw file x
36. Following access control methods are used for the guided media, except
 (a) Slotted Aloha (b) CSMA/CA (c) CSMA/CD (d) All of these
37. If the subnet mask of the network is 255.255.248.0 and IP Address of same node of the network is 169.78.96.59. Then what is the subnetwork ID ?
 (a) 169.78.56.65 (b) 255.78.96.4 (c) 169.78.45.0 (d) 169.78.96.0
38. Match the following :
 A. Presentation layer i. Provides access for the end user
 B. Data link layer ii. Error control and Flow control
 C. Application layer iii. Format and code conversion
 D. Transport layer iv. Port Addressing
 (a) A-i, B-iii, C-iv, D-ii (b) A-iii, B-ii, C-i, D-iv
 (c) A-i, B-ii, C-iii, D-iv (d) A-iii, B-iv, C-ii, D-i
39. Which of the following statement is CORRECT ?
 (a) Ethernet frame includes a CRC field and IP packet includes a checksum field
 (b) Both Ethernet frame and IP packet include checksum field
 (c) Ethernet frame includes a checksum field and IP packet includes a CRC field
 (d) Both Ethernet frame and IP packet include CRC field
40. In a sliding window ARQ scheme, the transmitters window size in M and receiver's window size in N. The minimum number of distinct sequence numbers required to ensure correct operation of the ARQ scheme is
 (a) Max (M, N) (b) M * N (c) Min (M, N) (d) M + N
41. Find the 8-bit data stream for the following case
-
- (a) 11000100 (b) 1001001 (c) 11001101 (d) 11001001
42. If x is of integer type then the expressions :
 $\frac{3*(x-8)}{9}$ and $\frac{(x-8)}{9*3}$
 (a) Must yield the same value (b) Must yield different value
 (c) May or may not yield same value (d) None of these
43. Minimum is a function that returns the minimum of two integral, given as arguments. Which of the following statements find the minimum of three given numbers ?
 (a) min (min (a, b), min (a, c)) (b) min (a, min (a, c))
 (c) min (min (a, b), min (b, c)) (d) min (b, min (a, c))
44. a → b is syntactically correct if
 (a) 'a' and 'b' are structure
 (b) 'a' is a structure and 'b' is a pointer to a structure
 (c) 'a' is a pointer to a structure and 'b' is a structure
 (d) 'a' is a pointer to a structure in which 'b' is a field

45. A function `xyz` is defined as

```
void xyz (int x = 0, int y = 10) ;
{   cout << x << y;
}
```

Which of the following function calls is/are illegal ?
(Assume a, b are declared as integers).
(a) `xyz ()`; (b) `xyz (a)` (c) `xyz (b, b)`; (d) None of these
46. The statements

```
int a = 5 ;
cout << "Hello" << (a << 2) << "Hi" ;
```

outputs
(a) Hello 52 Hi (b) Hello 20 Hi (c) Hello 25 Hi (d) Error message will come
47. Choose the correct remarks.
(a) C++ allows any operator to be overloaded
(b) Some of the exciting operators can not be overloaded
(c) Operator precedence can not be changed
(d) Both (b) and (c)
48. Which among the following is not used in C++ for exception handling ?
(a) `unexcepted ()` (b) `terminate ()` (c) `catch (..)` (d) `try`
49. The following program

```
main ( )
{
    if (fork ( ) == 0) ;
    {
        sleep (10,000) ;
    }
}
```

result in the creation of
(a) an orphan process (b) a zombic process
(c) a process that executes forever (d) none of these
50. Class A

```
{
    int : i 1 ;
    protected : i 2 ;
    public : i 3 ;
};
```

Class B : public A

```
{
    public :
        int : i 4 ;
};
```

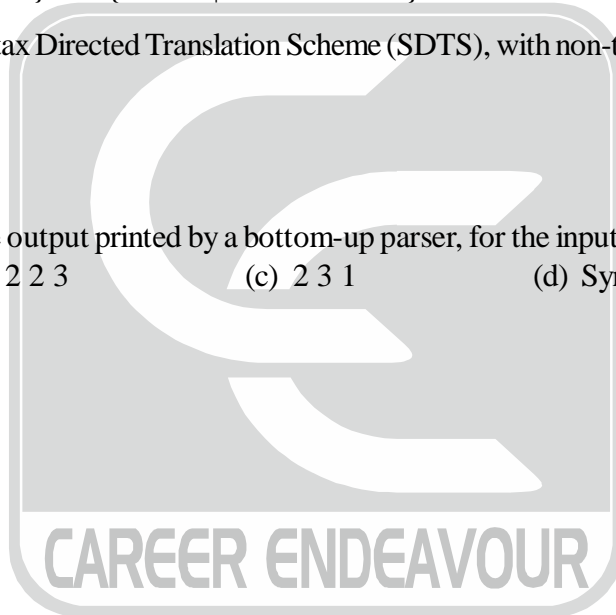
Class C : public B

```
{ } ;
```

The variable $i 2$ is accessible
(a) To a public function in class A (b) To a public function in class B
(c) To a public function in class C (d) All of these

51. Consider the following types of languages :
 L_1 : Regular, L_2 : Context-free, L_3 : Recursive, L_4 : Recursively enumerable.
 Which of the following is/are TRUE ?
 I. $L_3 \cup L_4$ is recursively enumerable
 II. $L_2 \cup L_3$ is recursive
 III. $L_1 \cap L_2$ is context-free
 IV. $L_1 \cup L_2$ is context-free
 (a) I only (b) I and III only (c) I and IV only (d) I, II and III only
52. Match the following :
- | List-1 | List-2 |
|------------------------|------------------------|
| P. Lexical analysis | 1. Leftmost derivation |
| Q. Top down parsing | 2. Type checking |
| R. Semantic analysis | 3. Regular expressions |
| S. Runtime environment | 4. Activation records |
| (a) P-1, Q-2, R-4, S-3 | (b) P-3, Q-1, R-2, S-4 |
| (c) P-2, Q-3, R-1, S-4 | (d) P-4, Q-1, R-2, S-3 |
53. Consider the following two statements :
 I. If all states of an NFA are accepting states then the languages accepted by the NFA is Σ^*
 II. There exists a regular language A such that for all languages B, $A \cap B$ is regular
 Which one of the following is CORRECT ?
 (a) Only I is true (b) Only II is true
 (c) Both I and II are true (d) Both I and II are false
54. A student wrote two context-free grammars G_1 and G_2 for generating a single C-like array declaration. The dimension of the array is at least one. For example, `int a[10][3]`; The grammars use D as the start symbol, and use six terminal symbols `int ; id [] num`.
- | Grammar G_1 | Grammar G_2 |
|---------------------------------|---------------------------------|
| $D \rightarrow \text{int } L ;$ | $D \rightarrow \text{int } L ;$ |
| $L \rightarrow \text{id}[E$ | $L \rightarrow \text{id}E$ |
| $E \rightarrow \text{num}]$ | $E \rightarrow E[\text{num}]$ |
| $E \rightarrow \text{num}][E$ | $E \rightarrow [\text{num}]$ |
- Which of the grammars correctly generate the declaration mentioned above ?
 (a) Both G_1 and G_2 (b) Only G_1 (c) Only G_2 (d) Neither G_1 nor G_2
55. Language L_1 is defined by the grammar: $S_1 \rightarrow aS_1b | \epsilon$ Language.
 L_2 is defined by the grammar: $S_2 \rightarrow abS_2 | \epsilon$
 Consider the following statements :
 P: L_1 is regular
 Q: L_2 is regular
 Which one of the following is TRUE ?
 (a) Both P and Q are true (b) P is true and Q is false
 (c) P is false and Q is true (d) Both P and Q are false
56. Consider the following languages.
 $L_1 = \{ \langle M \rangle \mid M \text{ takes at least } 2016 \text{ steps on some input} \}$,
 $L_2 = \{ \langle M \rangle \mid M \text{ takes at least } 2016 \text{ steps on all inputs} \}$ and
 $L_3 = \{ \langle M \rangle \mid M \text{ accepts } \epsilon \}$, where for each Turing machine M , $\langle M \rangle$ denotes a specific encoding of M
 Which one of the following is TRUE ?
 (a) L_1 is recursive and L_2, L_3 are not recursive
 (b) L_2 is recursive and L_1, L_3 are not recursive
 (c) L_1, L_2 are recursive and L_3 is not recursive
 (d) L_1, L_2, L_3 are recursive

57. Which one of the following grammars is free from left recursion ?
 (a) $S \rightarrow AB \quad A \rightarrow Aa | b \quad B \rightarrow c$ (b) $S \rightarrow Ab | Bb | c \quad A \rightarrow Bd | \epsilon \quad B \rightarrow e$
 (c) $S \rightarrow Aa | B \quad A \rightarrow Bb | Sc | \epsilon \quad B \rightarrow d$ (d) $S \rightarrow Aa | Bb | c \quad A \rightarrow Bd | \epsilon \quad B \rightarrow Ae | \epsilon$
58. Which of the following decision problems are undecidable ?
 I. Given NFAs $N1$ and $N2$, is $L(N1) \cap L(N2) = \Phi$?
 II. Given a CFG $G = (N, \Sigma, P, S)$ and a string $x \in \Sigma^*$, does $x \in L(G)$?
 III. Given CFGs $G1$ and $G2$, is $L(G1) = L(G2)$?
 IV. Given a TM M , is $L(M) = \Phi$?
 (a) I and IV only (b) II and III only (c) III and IV only (d) II and IV only
59. Consider the following context-free grammars :
 $G1 : S \rightarrow aS | B \rightarrow b | bB$
 $G2 : S \rightarrow aA | bB, A \rightarrow aA | B | \epsilon, B \rightarrow bB | \epsilon$
 Which one of the following pairs of languages is generated by $G1$ and $G2$, respectively ?
 (a) $\{a^m b^n \mid m > 0 \text{ or } n > 0\}$ and $\{a^m b^n \mid m > 0 \text{ and } n > 0\}$
 (b) $\{a^m b^n \mid m > 0 \text{ and } n > 0\}$ and $\{a^m b^n \mid m > 0 \text{ or } n \geq 0\}$
 (c) $\{a^m b^n \mid m \geq 0 \text{ or } n > 0\}$ and $\{a^m b^n \mid m > 0 \text{ and } n > 0\}$
 (d) $\{a^m b^n \mid m \geq 0 \text{ and } n > 0\}$ and $\{a^m b^n \mid m > 0 \text{ or } n > 0\}$
60. Consider the following Syntax Directed Translation Scheme (SDTS), with non-terminals $\{S, A\}$ and terminals $\{a, b\}$.
 $S \rightarrow aA$ {print 1}
 $S \rightarrow a$ {print 2}
 $A \rightarrow Sb$ {print 3}
 Using the above SDTS, the output printed by a bottom-up parser, for the input aab is :
 (a) 1 3 2 (b) 2 2 3 (c) 2 3 1 (d) Syntax error



Space for rough work



TEST SERIES-(B)

ANSWER KEY

1. (a)	2. (d)	3. (a)	4. (d)	5. (c)	6. (b)	7. (b)
8. (a)	9. (a)	10. (b)	11. (d)	12. (b)	13. (c)	14. (c)
15. (a)	16. (c)	17. (b)	18. (d)	19. (d)	20. (d)	21. (a)
22. (a)	23. (a)	24. (d)	25. (d)	26. (c)	27. (c)	28. (c)
29. (b)	30. (d)	31. (a)	32. (d)	33. (c)	34. (c)	35. (b)
36. (b)	37. (d)	38. (b)	39. (a)	40. (d)	41. (a)	42. (c)
43. (d)	44. (d)	45. (d)	46. (b)	47. (d)	48. (c)	49. (a)
50. (d)	51. (d)	52. (b)	53. (b)	54. (a)	55. (c)	56. (c)
57. (b)	58. (c)	59. (d)	60. (c)			

