

TEST SERIES UGC-NET/JRF Jan. 2017

BOOKLET SERIES **C**

Paper Code **87**

Test Type: **TEST SERIES**

COMPUTER SCIENCE & APPLICATIONS

Duration: 02:00 Hours

Date: 31-12-2016

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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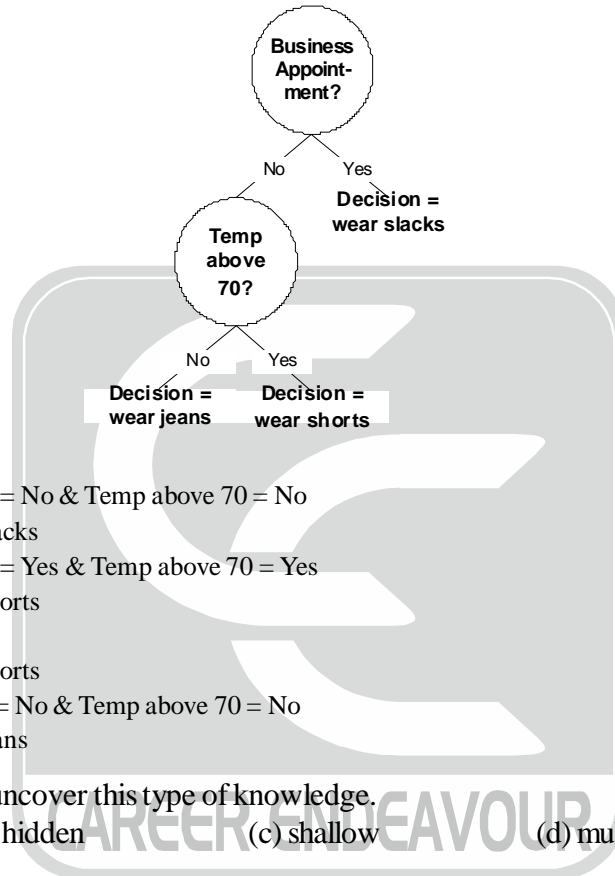
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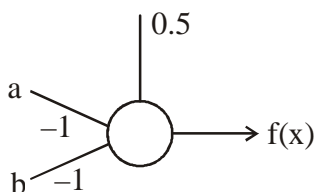
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1. Let $h(A)$ denote the height of a fuzzy set A . A is called a normal fuzzy set if
 - (a) $h(A) = 0$
 - (b) $h(A) = 1$
 - (c) $h(A) < 1$
 - (d) $h(A) > 1$
2. Let A be a fuzzy set. Then 1-cut of A is usually called
 - (a) Support of A
 - (b) Height of A
 - (c) Core of A
 - (d) α cut of A
3. The α cut of the complement of a fuzzy set A is always same as the complement of the
 - (a) strong α cut of A
 - (b) strong of α cut of A^c
 - (c) strong $(1 - \alpha)$ cut of A
 - (d) strong $(1 - \alpha)$ cut of A^c
4. What is the perspective projection matrix onto the view plane $z = \lambda$, where the center of projection is the origin $(0, 0, 0)$
 - (a) $\begin{bmatrix} d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
 - (b) $\begin{bmatrix} d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$
 - (c) $\begin{bmatrix} d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$
 - (d) None of these
5. Involutive property of the standard fuzzy complement c , for each $a \in [0, 1]$ is _____
 - (a) $c(c(a)) = c(a)$
 - (b) $c(c(a)) = 1$
 - (c) $c(c(a)) = 0$
 - (d) $c(c(a)) = a$
6. Which problem required minimum criterion
 - (a) AND
 - (b) OR
 - (c) NOT
 - (d) none of these
7. Yager Class of Fuzzy complement is defined as
 - (a) $C_w(a) = (1 - a^w)^{1/2}$
 - (b) $C_w(a) = (1 - a^w)^{1/a}$
 - (c) $C_w(a) = (1 - a^w)^{1/w}$
 - (d) none of these
8. Equilibrium of a fuzzy complement (c) is a solution of the equation
 - (a) $c(a) - a = 1$
 - (b) $c(a) - a = 2$
 - (c) $c(a) = 2a$
 - (d) $c(a) - a = 0$
9. For $a \in [0, 1]$, the boundary condition for the t-norm function i is
 - (a) $i(a, 1) = 0$
 - (b) $i(a, 0) = a$
 - (c) $i(a, 1) = a$
 - (d) $i(a, 0) = 1$
10. For standard fuzzy intersection, which of the following hold?
 - (a) $i(a, b) = \min(a, b)$
 - (b) $i(a, b) = ab$
 - (c) $i(a, b) = a - b$
 - (d) none of these
11. The process of forming general concept definitions from examples of concepts to be learned.
 - (a) deduction
 - (b) abduction
 - (c) induction
 - (d) conjunction
12. Data mining is best described as the process of
 - (a) identifying patterns in data.
 - (b) deducing relationships in data.
 - (c) representing data.
 - (d) simulating trends in data.
13. Which of the following is correct regarding entropy ?
 - (a) Entropy is always nonnegative.
 - (b) $H(x^{100}) = 100 H(x)$
 - (c) $H(x, y) = H(x) + H(y/x)$
 - (d) All of the above
14. Like the probabilistic view, the _____ view allows us to associate a probability of membership with each classification.
 - (a) exemplar
 - (b) deductive
 - (c) classical
 - (d) inductive

15. Data used to build a data mining model.
 (a) validation data (b) training data (c) test data (d) hidden data
16. Supervised learning and unsupervised clustering both require at least one
 (a) hidden attribute. (b) output attribute.
 (c) input attribute. (d) categorical attribute.
17. Supervised learning differs from unsupervised clustering in that supervised learning requires
 (a) at least one input attribute. (b) input attributes to be categorical.
 (c) at least one output attribute. (d) output attributes to be categorical.
18. Which of the following is a valid production rule for the decision tree below?



- (a) IF Business Appointment = No & Temp above 70 = No
 THEN Decision = wear slacks
- (b) IF Business Appointment = Yes & Temp above 70 = Yes
 THEN Decision = wear shorts
- (c) IF Temp above 70 = No
 THEN Decision = wear shorts
- (d) IF Business Appointment = No & Temp above 70 = No
 THEN Decision = wear jeans
19. Database query is used to uncover this type of knowledge.
 (a) deep (b) hidden (c) shallow (d) multidimensional
20. A statement to be tested.
 (a) theory (b) procedure (c) principle (d) hypothesis
21. Figure

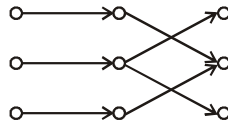


$$\text{where } f(x) = \begin{cases} 0 & x < 0 \\ 1 & x \geq 0 \end{cases}$$

The above perceptron can solve

- (a) NOR problem (b) XOR problem (c) Both (a) and (b) (d) None of above

22. How many of node in hidden layer in the figger _____



- (a) 9 (b) 6 (c) 3 (d) 0

23. Identify the function _____

$$b(x) = \frac{1 - \exp(-\lambda x)}{1 + \exp(-\lambda x)}$$

- (a) Threshold function (b) Bipolar function
(c) Bipolar sigmoidal function (d) Binary sigmoidal function

24. A perceptron is:

- (a) a single layer feed-forward neural network with preprocessing
(b) an autoassociative neural network
(c) a double layer autoassociative neural network
(d) none of these

25. An autoassociative network is:

- (a) a neural network that contains no loops (b) a neural network that contains feedback
(c) a neural network that has only one loop (d) none of these

26. A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. The output will be:

- (a) 238 (b) 76 (c) 119 (d) none of these

27. Consider a source which generates six symbols $S = \langle S_1, S_2, S_3, S_4, S_5, S_6 \rangle$ with corresponding probability

$\langle \frac{1}{3}, \frac{1}{4}, \frac{1}{8}, \frac{1}{12}, \frac{1}{12} \rangle$. What is the average codeword length if binary Huffman encoding is used ?

- (a) 2.4167 bits/symbols (b) 2.80 bits/symbols
(c) 1.41 bits/symbols (d) None of these

28. Which of the following is true for neural networks?

- (i) The training time depends on the size of the network.
(ii) Neural networks can be simulated on a conventional computer.
(iii) Artificial neurons are identical in operation to biological ones.
(a) all of them are true (b) (ii) is true (c) (i) and (ii) are true (d) none of these

29. What are the advantages of neural networks over conventional computers?

- (i) they have the ability to learn by example
(ii) They are more fault tolerant
(iii) They are more suited for real time operation due to their high 'computational' rates
(a) (i) and (ii) are true (b) (i) and (iii) are true (c) all of them are true (d) none of these

30. Which of the following is true?

Single layer associative neural networks do not have the ability to:

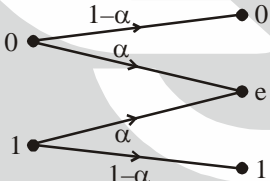
- (i) perform pattern recognition (ii) find the parity of a picture
(iii) determine whether two or more shapes in a picture are connected or not
(a) (ii) and (iii) are true (b) (ii) is true (c) all of them are true (d) none of these

31. For the given relation $R(ABCDEF)$, let the functional dependency set $F = \{ A \rightarrow C, C \rightarrow D, E \rightarrow B \}$, the non prime attributes are:

- (a) A, B, F (b) C, D, E (c) A, B, C, D (d) A, E, F



32. For the given relation R(XYZ) is decomposed into R1(XY) and R2(YZ) with the functional dependency set $F = \{X \rightarrow Y, Y \rightarrow Z, Z \rightarrow X\}$.
- The decomposition is loss less and dependency preserving
 - The decomposition is loss less and not dependency preserving
 - The decomposition is lossy and dependency preserving
 - The decomposition is lossy and not dependency preserving
33. Consider the following relation schema pertaining to a students database:
 Student (rollno, name, address)
 Enroll (rollno, courseno, coursename)
 where the primary keys are shown underlined. The number of tuples in the student and Enroll tables are 10 and 8 respectively. What are the maximum and minimum number of tuples that can be present in (Student * Enroll), where '*' denotes natural join?
- 80, 10
 - 10, 8
 - 80, 8,
 - 8, 0
34. Find the suitable match for the following:
- | List – I | List – II |
|-------------------------------|--------------------------------|
| A. DDL | i. Rename |
| B. DML | ii. Select |
| C. BASIC Operation | iii. Intersection |
| D. Additional Operation | iv. Alter |
| (a) A- ii, B-I, C- iii, D- iv | (b) A- i, B- ii, C- iv, D- iii |
| (c) A-iv, B- ii, C- iii, D- i | (d) A- iv, B- ii, C- i, D- iii |
35. Which one of the following is not true for a view:
- View is derived from other tables.
 - View is a virtual table.
 - A view definition is permanently stored as part of the database.
 - View never contains derived columns.
36. Find the suitable match.
- | List 1 | List2 |
|-------------------------------|--------------------------------|
| A. B tree | i. Secondary Index |
| B. Outer Join | ii. Missing Information |
| C. Conflict Serializable | iii. Precedence graph |
| D. Candidate Key | iv. Clustered Index |
| (a) A- ii, B-I, C- iii, D- iv | (b) A- i, B- ii, C- iii, D- iv |
| (c) A-iv, B- ii, C- iii, D- i | (d) A- iv, B- ii, C- i, D- iii |
37. The normalization of 2 NF relations to 3 NF involves
- Removal of full dependencies
 - Removal of multi-valued dependencies
 - Removal of partial dependencies
 - Removal of transitive dependencies
38. In a Hierarchical model records are organized as
- Graph.
 - List.
 - Links.
 - Tree.
39. Amongst the ACID properties of a transaction, the 'Atomicity' property requires:
- Modifications must persist within database
 - The database must be in consistent form at all times
 - Either all statements of transactions are executed or none.
 - All of the above.

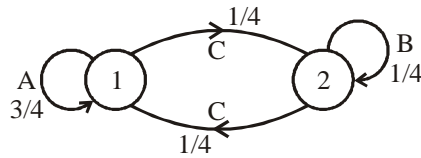
40. A pilot can fly three types of planes and a plane can piloted by any qualified pilot. The pilot plane type relationship is
 (a) N:3 (b) 3:N (c) 1:3 (d) 3:1
41. Consider a source which generates four symbols s_0, s_1, s_2 and s_3 with following probabilities. Which of the following has maximum entropy?
 $P(s_0)$ $P(s_1)$ $P(s_2)$ $P(s_3)$
 (a) $1/8$ $1/2$ $1/8$ $2/8$
 (b) $1/7$ $2/7$ $3/7$ $1/7$
 (c) $1/4$ $1/4$ $1/4$ $1/4$
 (d) None of these
42. Which of the following pixel pattern of an image has maximum entropy?
 (a) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
43. Which of the following correctly represents the capacity of binary symmetric channel?
 (a) $C = 1 - P \log P - (1 - P) \log (1 - P)$ (b) $C = 1 + P \log P + (1 - P) \log (1 - P)$
 (c) $C = 1 - P \log P + (1 - P) \log (1 - P)$ (d) $C = 1 + P \log P - (1 - P) \log (1 - P)$
44. If $1 + x + x^3$ is the generator polynomial for $(7, 4)$ cyclic code then what is the parity check polynomial for this code
 (a) $1 + x + x^2 + x^3 + x^4$ (b) $1 + x + x^2 + x^4$
 (c) $1 + x + x^2 + x^3 + x^4 + x^5$ (d) $1 + x + x^3 + x^5$
45. What is the capacity of the channel given below

 (a) $1 - \alpha$ bits (b) α bit (c) $(1 - \alpha)\alpha$ bits (d) α^2 bits
46. Let $S = \{s_0, s_1, s_2\}$ with $P_0 = \frac{1}{4}, P_1 = \frac{1}{4}, P_2 = \frac{1}{2}$ then what is $H(s^{10})$
 (a) 10 bits (b) 15 bits (c) 20 bits (d) none of these
47. Consider the following channel transition matrix

$$\begin{bmatrix} 0.1 & a & 0.2 & 0.4 \\ 0.3 & 0.1 & b & 0.5 \\ c & 0.4 & 0.1 & 0.3 \\ 0.2 & 0.2 & 0.1 & d \end{bmatrix}$$

 what is the value of a, b, c, d respectively
 (a) .1, .2, .3, .4 (b) .5, .2, .1, .3 (c) .5, .4, .1, .2 (d) .3, .1, .2, .5

48. Beautiful images are created using mandelbort set. What is the transformation for mandelbort set
- (a) $x_{n+1} = x_n^2 + z$; x and z both are complex #
 (b) $x_{n+1} = x_n^3 + z$; x and z both are complex #
 (c) $x_{n+1} = x_n^2 + z$; x and z both are integer
 (d) $x_{n+1} = x_n^3 + z$; x and z both are integer
49. If we want to cut 256×256 subimage out from the center of an 800×400 image. What are the coordinate of the pixels in the image that is at lower left corner of the small image ?
- (a) (272, 70) (b) (272, 72) (c) (272, 272) (d) None of these
50. What are the new coordinate of a ΔABC with $A(0, 0)$, $B(1, 1)$ and $C(5, 2)$ by magnifying it twice its size while keeping $C(5, 2)$ fixed.
- (a) $(-5, 2), (-3, 0), (5, 2)$ (b) $(-5, -2), (3, 0), (5, 2)$
 (c) $(-5, -2), (-3, 0), (5, 2)$ (d) $(5, -2), (-3, 0), (5, 2)$
51. Using the origin as a center of projection. What is the perspective projection matrix on the passing through the point $R_0(x_0, y_0, z_0)$ and having a normal vector $N = n_x I + n_y J + n_z K$.
- (a) $\begin{bmatrix} d_0 & 0 & 0 & n_1 \\ 0 & d_0 & 0 & n_2 \\ 0 & 0 & d_0 & n_3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 0 & 0 & n_1 \\ 0 & d_0 & 0 & n_2 \\ 0 & 0 & d_0 & n_3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$
 (c) $\begin{bmatrix} d_0 & 0 & 0 & 0 \\ 0 & d_0 & 0 & n_1 \\ 0 & 0 & d_0 & n_2 \\ 0 & 0 & 0 & n_3 \end{bmatrix}$ (d) None of these
52. The color of an object is largely decided by its diffuse reflection co-efficient if $k_d = (-8, -4, 0)$ and the light is blue. What is the color of the object ?
- (a) Red (b) Green (c) Blue (d) Black
53. Three dimensional matrix transformation for rotation with an angle θ with respect to y -axis in the positive direction is
- (a) $\begin{bmatrix} \cos \theta & 0 & -\sin \theta & 0 \\ \sin \theta & 0 & \cos \theta & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} \cos \theta & 0 & \sin \theta & 0 \\ \sin \theta & 0 & -\cos \theta & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
 (c) $\begin{bmatrix} \cos \theta & 0 & \sin \theta & 0 \\ -\sin \theta & 0 & \cos \theta & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} \cos \theta & 0 & \sin \theta & 0 \\ -\sin \theta & 0 & \cos \theta & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

58. Consider the following Markoff process



$$P(1) = \frac{1}{2} \text{ and } P(2) = \frac{1}{2}$$

What is the probability of the message AA.

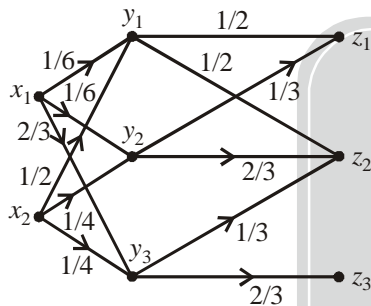
- (a) $\frac{2}{32}$ (b) $\frac{3}{32}$ (c) $\frac{9}{32}$ (d) None of these

59. 17. What is the resolvent of the following :

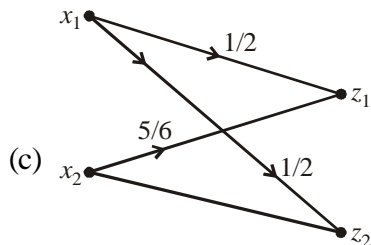
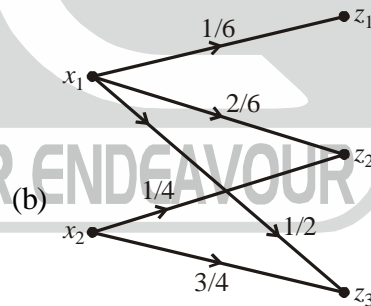
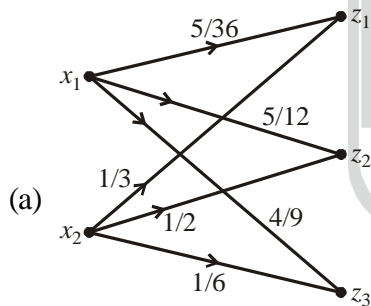
$$L = \langle \neg A \vee B, \neg B \vee C, \neg C \vee D, A \vee E \rangle$$

- (a) $D \vee E$ (b) $\neg D \vee E$ (c) $D \vee \neg E$ (d) None of these

60. Consider two noisy channels



Which of the following BSC is equivalent to the above channel ?



(d) None of these



Space for rough work



TEST SERIES-(C)

ANSWER KEY

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

