

Total No. of Printed Pages: 08

No. of Questions: 50

**Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar**  
**PET 2024 (9036) Doctor of Philosophy (Management Science – Computer Applications)**

(To be filled by the Candidate)

Candidate Seat Number  
(As per Admit card)

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OMR Sheet Number

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Invigilator's signature with Date

Candidate's Seat No. in Words : \_\_\_\_\_

Name of the Center : \_\_\_\_\_

Paper Code & Name of Examination : **9036- Doctor of Philosophy(Management Science - Computer Applications)**Date: **03/10/2024** PET 2024 - EXAMINATIONTime: **One Hours** Total Marks: **100****Important Instructions for the candidate**

- Write your seat number and OMR Sheet number on the question paper in the earmarked space
  - This question paper carries Fifty (50) Multiple-choice type questions and each question carries 2 Marks
  - At the commencement of examination, the question paper will be given to the student.
  - Each question has four alternative responses marked (A) (B) (C) and (D). You have to darken the circle as indicated below on the correct response against each question  
Example: where (C) is correct answer
- (A)       (B)       (C)       (D)
- Your responses to the answer are to be indicated in the OMR Sheet. If you mark at any place other than in the circle in the OMR Sheet it will not be evaluated.
  - Rough work is to be done at the end of this question paper.
  - You have to return OMR answer sheet and question paper to the invigilator at the end of examination compulsorily and must not carry with you outside the examination hall.
  - Use only Black / Blue ball point pen
  - Use of any type of calculator or log table etc. is prohibited.
  - There is no negative marking for incorrect answers

**विद्यार्थ्यांसाठी महत्त्वाच्या सूचना**

- परीक्षार्थीनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात तसेच आपणास दिलेल्या उत्तर पत्रिकेचा क्रमांक त्याखाली लिहावा.
  - या प्रश्नपत्रिकेतील सर्व प्रश्न सोडवणे अनिवार्य आहे.
  - परीक्षा सुरू झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल.
  - प्रत्येक प्रश्नासाठी (A) (B) (C) (D) अशी चार विकल्प उत्तरे दिली आहेत, त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा निळा करावा.  
उदा: जर (C) हे उत्तर योग्य असेल तर
- (A)       (B)       (C)       (D)
- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओएमआर उत्तर पत्रिकेतच दर्शवावीत इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
  - प्रश्नपत्रिकाच्या शेवटी कोऱ्या जागेवरच कच्चे काम करावे
  - परीक्षा संपल्यानंतर विद्यार्थ्यांनी मूळ ओ. एम. आर उत्तरपत्रिका पर्यवेक्षकाकडे परत करणे आवश्यक आहे तथापि प्रश्नपत्रिका व ओ. एम. आर. उत्तरपत्रिका आपल्याबरोबर नेण्यास विद्यार्थ्यांला परवानगी नाही.
  - फक्त काळ्या किंवा निळ्या बॉलपेनचाच वापर करावा
  - कॅल्क्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही
  - चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही

- | <b>Q. No.</b> | <b>Question</b>   |
|---------------|---|
| 1.            | Why do you need to review the existing literature?<br>(A) To make sure you have a long list of references<br>(B) Because without it, you could never reach the required word-count<br>(C) To find out what is already known about your area of interest<br>(D) To help in your general studying   |
| 2.            | Which comes first, theory or research?<br>(A) Theory, because otherwise you are working in the dark<br>(B) Research, because that's the only way you can develop a theory<br>(C) It depends on your point of view<br>(D) The question is meaningless, because you can't have one without the other  |
| 3.            | What is a research design?<br>(A) A way of conducting research that is not grounded in theory<br>(B) The choice between using qualitative or quantitative methods<br>(C) The style in which you present your research findings, e.g. a graph<br>(D) A framework for every stage of the collection and analysis of data  |
| 4.            | If a study is "reliable", this means that:<br>(A) It was conducted by a reputable researcher who can be trusted<br>(B) The measures devised for concepts are stable on different occasions<br>(C) The findings can be generalized to other social settings<br>(D) The methods are stated clearly enough for the research to be replicated                             |
| 5.            | In an experimental design, the dependent variable is:<br>(A) The one that is not manipulated and in which any changes are observed<br>(B) The one that is manipulated in order to observe any effects on the other<br>(C) A measure of the extent to which personal values affect research<br>(D) An ambiguous concept whose meaning depends on how it is defined     |
| 6.            | Why has qualitative research been seen to have an affinity with feminism?<br>(A) It allows women's voices to be heard, rather than objectifying and exploiting them<br>(B) It has always been carried out by female sociologists<br>(C) It allows the researcher to control variables and suppress women's voices<br>(D) It claims to be value free and non-political |
| 7.            | Which of the following is a method that is commonly used in qualitative research?<br>(A) Self-completion questionnaires<br>(B) Surveys<br>(C) Ethnography<br>(D) Structured observation   |
| 8.            | A sensitizing concept is one that:<br>(A) Provides general guidance for more flexible research<br>(B) Imposes a predetermined theoretical model on the social world<br>(C) Helps the researcher to investigate sensitive issues<br>(D) Allows the researcher to measure very small changes in a variable  |

9. Quantitative content analysis is an approach that aims to:
- (A) Objectively and systematically measure the content of a text
  - (B) Reach an interpretive understanding of social action
  - (C) Engage in a critical dialogue about ethical issues in research
  - (D) Provide a feminist alternative to 'male-stream' quantitative methods
10. Which one of the following is not a qualitative approach to research?
- (A) Grounded Theory
  - (B) Philanthropy
  - (C) Ethnography
  - (D) Phenomenology
11. Which of the following control techniques available to the researcher controls for both known and unknown variables?
- (A) Building the extraneous variable into the design
  - (B) Matching
  - (C) Random assignment
  - (D) Analysis of covariance
12. After formulating the problem and a hypothesis for it the researcher turns to the task of preparing the:
- (A) Research Design
  - (B) Data collection
  - (C) Data Analysis
  - (D) Report writing
13. Causal research is used to \_\_\_\_\_
- (A) Describe marketing problems or situations
  - (B) Quantify observations that produce insights unobtainable through other forms of research
  - (C) Test hypotheses about cause-and-effect relationships
  - (D) Find information at the outset in an unstructured way
14. \_\_\_\_\_ type of variable cannot be rank order in measurement scale question
- (A) Ratio
  - (B) Interval
  - (C) Ordinal
  - (D) Nominal
15. To Measure a set of \_\_\_\_\_, the Likert scale is used
- (A) Formulae
  - (B) Mean
  - (C) Mode
  - (D) Attitudes
16. Choose the correct option about the two statements given below:  
 Statement – I : If null hypothesis is rejected at the level of 5% of significance, it will be rejected at 10% level too.  
 Statement – II : If null hypothesis is not rejected at the level of 5% of significance, it will be rejected at 10% level too.
- (A) Statement I is false but statement II is true
  - (B) Both the statements are false
  - (C) Statement I is true but statement II is false
  - (D) Both statements are true
17. Type II error in hypothesis testing is \_\_\_\_\_
- (A) Accepting the null hypothesis when it is true
  - (B) Accepting the null hypothesis when it is false
  - (C) Rejecting the null hypothesis when it is true
  - (D) Rejecting the null hypothesis when it is false
18. Snowball Sampling is the process of selecting a sample based on \_\_\_\_.
- (A) Quota
  - (B) Snowball
  - (C) Groups
  - (D) Network

19. Sample is regarded as a subset of \_\_\_\_\_  
 (A) Data (B) Population  
 (C) Set (D) Distribution
20. All units aggregated to a specific study is called as \_\_\_\_\_  
 (A) Frame Set (B) Sample  
 (C) Universe or population (D) Unit
21. To test null hypothesis, researcher uses \_\_\_\_\_  
 (A) ANNOVA (B) t-test  
 (C)  $X^2$  (D) Factorial analysis
22. Which correlation coefficient best explains the relation between creativity and intelligence?  
 (A) 0.3 (B) 0.5  
 (C) 1.0 (D) 0.6
23. \_\_\_\_\_ is not a type of two-dimensional diagram  
 (A) Square diagram (B) Pie-diagram  
 (C) Histogram (D) Rectangular diagram
24. \_\_\_\_\_ Variable is considered for statistical analysis?  
 (A) Moderator variable (B) Independent variable  
 (C) Dependent variable (D) Control variable
25. \_\_\_\_\_ is a non-parametric statistics method.  
 (A) Spearman's correlation (B) Pearson's correlation  
 (C) f-statistics (D) t-statistics
26. If  $A = \{1,2,3\}$  and  $B = \{3,4,5,6\}$ . Find  $A \cup B$ .  
 (A)  $\{3\}$  (B)  $\{1,2,3\}$   
 (C)  $\{1,2,3,4,5,6\}$  (D)  $\{2,6\}$
27. If  $P(A) = 0.8$ ,  $P(B) = 0.5$  and  $P(B|A) = 0.4$ , what is the value of  $P(A \cap B)$ ?  
 (A) 0.5 (B) 0.32  
 (C) 0.27 (D) 0.12
28. A graph with no edges is known as empty graph. Empty graph is also known as-----  
 (A) Connected graph (B) Regular graph  
 (C) Trivial graph (D) Bipartite graph
29. If the  $i^{\text{th}}$  constraint of the primal (maximization) is equality, then the dual (minimization) variable ' $y_i$ ' is \_\_\_\_\_  
 (A)  $\leq 0$  (B)  $\geq 0$   
 (C) Restricted in sign (D) Un-restricted in sign
30. In DFS traversing algorithm ----- ADT is used.  
 (A) Stack (B) Queue  
 (C) Linked List (D) Tree

31. //What is the output of below C++ program?

```
#include <iostream>

int main()
{
  if(0)
  {
    std::cout<<"Hi";
  }
  else
  {
    std::cout<<"Bye";
  }
  return 0;
}
```

- (A) Hi (B) Bye  
(C) HiBye (D) Compilation Error

32. What will be the output of the following Java code?

```
class String_demo
{
  public static void main(String args[])
  {
    char chars[] = {'a', 'b', 'c'};
    String s = new String(chars);
    System.out.println(s);
  }
}
```

- (A) abc (B) a  
(C) b (D) c

33. What will be the output of the following Python code snippet?

```
a = [1, 2, 3, 4]
b = [3, 4, 5, 6]
c = [x for x in a if x not in b]
print(c)
```

- (A) [1,2] (B) [5,6]  
(C) [1,2,5,6] (D) [3,4]

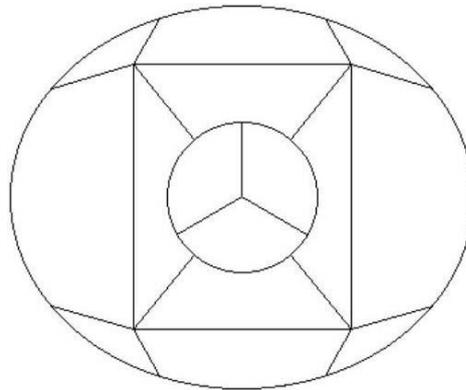
34. The file organization that provides very fast access to any arbitrary record of a file is

- (A) Ordered file (B) Unordered file  
(C) Hashed file (D) B-tree

35. Count function in SQL returns the number of

- (A) Values (B) Distinct values  
(C) Groups (D) Columns

36. What type of scheduling is round-robin scheduling?  
 (A) Linear data scheduling (B) Non-linear data scheduling  
 (C) Preemptive scheduling (D) Non-preemptive scheduling
37. Which of the following component does not belong to PCB (Process Control Block)?  
 (A) CPU registers (B) CPU scheduling information  
 (C) Operating System information (D) Accounting information
38. When a process is in a “Blocked” state waiting for some I/O service. When the service is completed, it goes to the \_\_\_\_\_  
 (A) Terminated state (B) Suspended state  
 (C) Running state (D) Ready state
39. Which of the communication modes support two way traffic but in only once direction of a time?  
 (A) Simplex (B) Half-duplex  
 (C) Three - quarter's duplex (D) Full duplex
40. Find out the OSI layer, which performs token management.  
 (A) Network Layer (B) Transport Layer  
 (C) Session Layer (D) Presentation Layer
41. The 15 parts of the given figure are to be painted such that no two adjacent parts with shared boundaries (excluding comers) have the same color. The minimum number of colors required is



- (A) 4 (B) 3  
 (C) 5 (D) 6
42. the dataset with six datapoints:  $\{(X_1, Y_1), (X_2, Y_2), \dots, (X_6, Y_6)\}$ , where  $x_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ ,  $x_2 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ ,  $x_3 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ ,  $x_4 = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$ ,  $x_5 = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$ ,  $x_6 = \begin{bmatrix} -2 \\ -2 \end{bmatrix}$ , and the labels are given by  $Y_1 = Y_2 = Y_5 = 1$ , and  $Y_3 = Y_4 = Y_6 = -1$ . A hard margin linear support vector machine is trained on the above dataset.

Which **ONE** of the following sets is a possible set of support vectors?

- (A)  $\{X_1, X_2, X_5\}$  (B)  $\{X_3, X_4, X_5\}$   
 (C)  $\{X_4, X_5\}$  (D)  $\{X_1, X_2, X_3, X_4\}$

43. Match the items in **Column 1** with the items in **Column 2** in the following table:

Column 1	Column 2
(p) Principal Component Analysis	(i) Discriminative Model
(q) Naïve Bayes Classification	(ii) Dimensionality Reduction
(r) Logistics Regression	(iii) Generative Model

- (A) (p) – (iii), (q) – (i), (r) – (ii)                      (B) (p) – (ii), (q) – (i), (r) – (iii)  
 (C) (p) – (ii), (q) – (iii), (r) – (i)                      (D) (p) – (iii), (q) – (ii), (r) – (i)

44. Let the minimum, maximum, mean, and standard deviation values for the attributed income of data scientists be Rs. 46000, Rs. 170000, Rs. 96000, and Rs. 21000, respectively. The z-score normalized income value of Rs. 106000 is closest to which ONE of the following options?

- (A) 0.217                      (B) 0.476  
 (C) 0.623                      (D) 2.304

45. Consider the two neural networks (NNs) shown in Figures 1 and 2, with ReLU activation ( $\text{ReLU}(z) = \max\{0, z\}$ ,  $\forall z \in \mathbb{R}$ ).  $\mathbb{R}$  denotes the set of real numbers. The connections and their corresponding weights are shown in the Figures. The biases at every neuron are set to 0. For what values of p, q, r in Figure 2 are the two NNs equivalent, when  $X_1, X_2, X_3$  are positive?

Figure 1

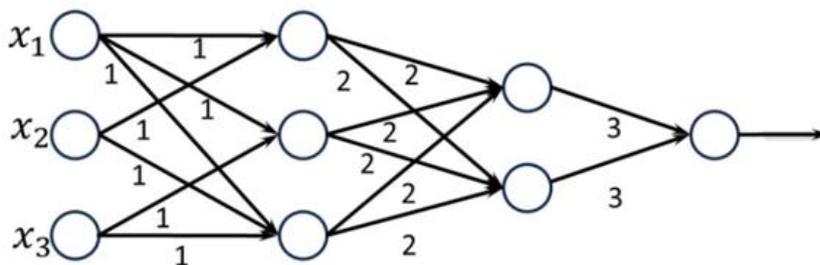
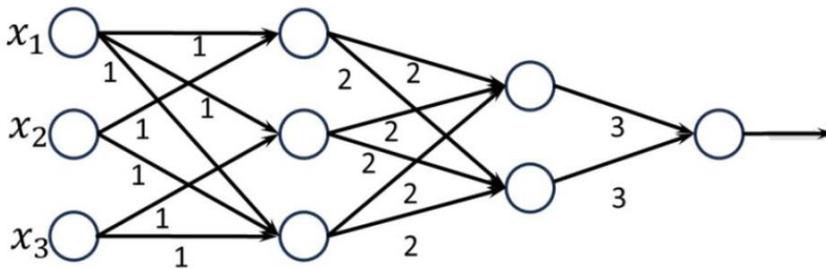
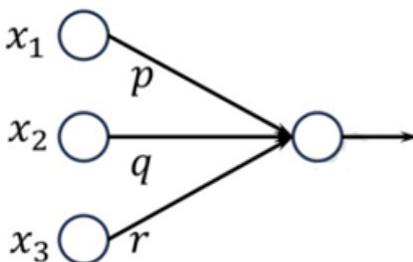


Figure 2



- (A)  $p = 36, q = 24, r = 24$                       (B)  $p = 24, q = 24, r = 36$   
 (C)  $p = 18, q = 36, r = 24$                       (D)  $p = 36, q = 36, r = 36$

46. State which of the statement given below is not true
- (A) Quality Assurance (QA) prevents software defects or minimizes the number of defects in software before delivery by making sure that proper methods and processes are followed during the software development process.
  - (B) Quality Control (QC) identifies and fixes the defects or errors that exist after development.
  - (C) Quality Control is a proactive process and is preventive in nature
  - (D) Quality Assurance is completed before Quality Control.
47. \_\_\_\_\_ refers to the degree to which elements within a module work together to fulfill a single, well-defined purpose.
- (A) Cohesion
  - (B) Coupling
  - (C) Neither A nor B
  - (D) Both A and B
48. What is the first step in BPR?
- (A) Define the scope
  - (B) Identify the need for change
  - (C) Redesign the process
  - (D) Both A and B
49. Which one of the following is not a type of model of e-business?
- (A) C2C
  - (B) B2C
  - (C) B2E
  - (D) Both B and C
50. Which of the following statements given below is true?
- (A) Data is not same as information; Information is processed data.
  - (B) Data should be comprehensive and irrelevant.
  - (C) Both A and B
  - (D) Neither A nor B

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