Odd (Autumn) Semester Examination 2023

Paper Code: MBAUGHU01; Paper name: Industrial Economics and Management

MEN/EEN/CEN/CSE/ECE VIIth Semester

Full Marks: 80; Time: 3Hrs.

(The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as possible)

GROUP: A (Answer *all* the questions) **(1 x 10 = 10)**

1. **I. A situation, wherein a perceiver tends to see in others the traits he himself possesses, is called _____.**
   (a) Repetition (b) Contrast (c) Rejection (d) Projection
   II. A written summary of content & context of job is called _____.
   (a) Job description (b) Job specification (c) Resume (d) Job posting
   III. Inspection, scrap, and repair are examples of _____.
   (a) Internal costs (b) External costs (c) Societal costs (d) Costs of dissatisfaction
   IV. OB helps to understand behaviour of human in _____.
   (a) Work place only (b) Society only (c) Department only (d) Work place and Society
   V. Which of the following could be a strength?
   (a) Weather (c) A new international market
   (b) A price that is too high (d) The location of a business
   VI. Which of the following is the relation that the law of demand defines?
   (a) Income and price of a commodity (c) Price and quantity of a commodity
   (b) Income and quantity demanded (d) Quantity demanded and quantity supplied
   VII. Numerous forms of short-term incentives to promote trial or buying of a service product is
   (a) Sales promotion (b) Direct marketing (c) Advertising (d) Events and experiences
   VIII. _____ is the task of buying goods of the right quality, in the right quantities, at the right time and at the right price.
   (a) Supplying (b) Purchasing (c) Scrutinizing (d) None of the above
   IX. _____ is the set of forces that energize, direct, and sustain behaviour.
   (a) Motivation (b) Expectancy (c) Empowerment (d) Socialization
   X. Raju believes that men perform better in oral presentations than women. What shortcut has been used in this case?
   (a) The halo effect (b) Projection (c) The contrast effect (d) Stereotyping

GROUP: B (Answer *any five* questions) **(5 x 5 = 25)**

2. What is quality management? Describe the Cycle of 'TQM (Total Quality Management)'.
3. Describe the process of communication.
4. Elaborate the importance of economics in business world.
5. What do you mean by marketing research? What are the various steps in the marketing research process?
6. What is elasticity of demand? Consider the demand for a good. At price Rs 4, the demand for the good is 25 units. Suppose price of the good increases to Rs 5, and as a result, the demand for the good falls to 20 units. Calculate the price elasticity?

7. What is the importance of training & development?
8. What do you mean by the term performance appraisal? What are the advantages and disadvantages of performance appraisal?

GROUP: C (Answer *any three* questions) **(15 x 3 = 45)**

9. (a) What is marketing mix? Describe 4P's of marketing. (1+4)
   (b) Describe segmentation, targeting and positioning (STP) with the help of an example. (10)
10. What do you mean by law of demand? What are the factors that affect demand? What are the exceptions to law of demand? (2+5+8)
11. What are the various types of barriers to effective communication? Describe with the help of examples.
12. What is motivation? What is the process of motivation? Explain Maslow's need hierarchy theory and its limitation. (1+4+10)
13. **Differentiate between the following terms:** **(3*5=15)**
    i. Training and Development
    ii. Maslow's need hierarchy theory and Herzberg's two-factor theory
    iii. Projection and Stereotyping
    iv. Complementary and Supplementary Goods
    v. Selling and Marketing

Aliah University

Odd Semester Examination (Autumn Semester) 2023-24

(For 4th Year 7th Semester B.Tech CSE)

Paper Name: Professional Elective -III (Mobile Computing) **Full Marks: 80**

Paper Code: CSEUGPE16 **Time: 3 hours**

Group A

Answer all the questions **(10X1=10)**

1. Which of the following uses wireless as the mode of communication for transferring or exchanging data between various mobiles over a short-range?
   a. Ad hoc computing b. Mobile computing c. Bluetooth technology d. None of the above.

2. Which of the following can be considered as the advantage of using frequency reuse?
   a. The same spectrum can be allocated to the other networks
   b. Only a limited spectrum is required
   c. Increase capacity
   d. All of the above.

3. In which one of the following, the slow and fast hopping is used?
   a. GSM b. GPRS c. FHSS d. None of the above

4. Mobile Computing allows transmission of data from one wireless-enabled device to another
   a. Any device b. Wired device c. Wireless-enabled device d. one of the above

5. Which of the following is a fundamental principle of wireless communication?
   a. Electromagnetic waves b. Microwaves c. Both A and B d. None of the above

6. Which of the following statements is correct about the FHSS?
   a. FHSS is a type of narrowband signal
   b. It uses the 78 frequency in the 2.4 GHz
   c. It is referred as Frequency Hopping Spread Spectrum
   d. All of the above

7. Which of the following is required to transmit the digital information using a certain frequency by translating it into an analog signal?
   a. Demodulation b. Modulation c. QPSK d. BSPK

8. In which of the following, the single-channel has the ability to carry all transmissions simultaneously?
   a. CDMA b. TDMA c. FDMA d. None of the above

9. In which one of the following times is specifically divided into several time slots that are in the fixed patterns?
   a. CDMA b. TDMA c. FDMA d. All of the above .

10. The term _____ refers to transporting a mobile station from one base station to another base station.
    a. Roamer b. Forward channel c. Handoff or hand over d. MIN

Group B

Answer any 5 questions **(5X6=30)**

1. What is a signal? What are the different characteristics of signal? [3+3]
2. Explain non-persistant CSMA, persistant CSMA and p-persistant CSMA. [2x3]
3. Compare with diagram, infrastructure and adhoc networks. [3+3]
4. What are the parameters for controlling the waiting time of the medium?
5. State some advantages of using wireless LANs over wired LANs. What are the disadvantages of using wireless LANs? [3+3]
6. Explain the problem of hidden and exposed terminals. [3+3]

Group C

Answer any 4 questions **(4X10=40)**

1. What are the benefits of reservation schemes? How are collisions avoided during data transmission? Why is the probability of collisions lower compared to classical Aloha? What are the disadvantages of reservation systems? [2+3+3+2]
2. Why are antennas needed? Describe the different types of antennas. Is a directional antenna useful for mobile phones? Why? How can the gain of an antenna be improved? [2+3+2+3]
3. Describe the process of DFWMAC-DCF with an example. What is the advantage of using RTS/CTS extension with DFWMAC-DCF? [7+3]
4. What are the basic requisites for applying FDMA? How does this factor increase complexity compared to TDMA systems? [6+4]
5. Explain the term interference in the space, time, frequency and code domain. What are the countermeasures in SDMA, TDMA, FDMA and CDMA systems? [5+5]

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AUTUMN SEMESTER EXAMINATION 2023

FOR BTECH CSE 4TH YEAR / 7TH SEMESTER

Course: Professional Elective -II (Natural Language Processing), Code: CSEUGPE11

Time: 3:00 Hours | Full Marks: 80

Answer Question No. 1 and any FOUR questions from the rest.

8 × 2

1. (a) N-gram technique is used for
   - A. Spelling correction
   - B. Parsing
   - C. Word prediction
   - D. None of these

(b) A language is regular if and only if it is
   - A. accepted by DFA
   - B. accepted by PDA
   - C. accepted by LBA
   - D. accepted by Turing machine

(c) The study of the meaning of words, phrases, and sentences is referred to as
   - A. Homonyms
   - B. Syntax
   - C. Semantics
   - D. None of these

(d) If P(Computer) = 0.25 and P(Computer Science) = 0.15, then P(Science | Computer) = ?
   - A. 0.6
   - B. 0.4
   - C. 0.1
   - D. None of the above

(e) A user has typed "computar" instead of "computer". This error is a
   - A. real-world error
   - B. non-word error
   - C. both the above
   - D. none of the above

(f) In the equation $\hat{W} = argmax_{w \in V} P(W)\, P(W)$, the term $P(W)$ is called
   - A. the prior probability
   - B. the likelihood
   - C. the prior likelihood
   - D. none of the above

(g) Bayesian noisy channel model can be applied for
- A. spelling correction but not speech recognition
- B. speech recognition but not spelling correction
- C. both spelling correction and speech recognition
- D. neither spelling correction nor speech recognition

(h) Which one of the following is a homophone of the word "aliah"?
- A. ailah
- B. alaih
- C. aliyah
- D. none of the above

2. (a) Assuming cost of insertion and deletion as 1 and that of substitution as 2, find out the Levenstein distance between *access* and *excess*. 4+4+8
(b) How is this distance measure useful?
(c) Say, in a corpus of 45000 words, "white rabbit" occurs 90 times and "white cat" occurs 125 times. If the word 'white' occurs 250 times, then in a searching, what would be the next probable word after the word 'white'? Assume that all other words followed by 'white' occur less than 50 times. Justify your answer with proper calculation.

3. (a) Mention the different types of errors. 4+4+4+4
(b) Briefly explain non-word error detection and correction technique.
(c) What is meant by dynamic programming?
(d) Give an example of dynamic programming problem in NLP and state its time and space complexity.

4. (a) What is confusion matrix? 4+8+4
(b) How is it prepared and used for spelling correction?
(c) Is it suitable for correcting spelling errors of two or more characters? If not, why?

5. (a) What is Mell Frequency Ceptral Coefficients (MFCC)? 3+3+10
(b) What is windowing? How are frames extracted from a window?
(c) Discuss how MFCC features are extracted from a given acoustic signal.

6. (a) What is meant by word tokenization and stemming? Give examples. 4+4+8
(b) Briefly mention the relationship among Regular Expression, Regular Language and FSA.
(c) Discuss the n-gram approach for word prediction.

7. Write short notes in the context of NLP (any two): 8+8
(a) HMM
(b) Indexing and Retrieval
(c) Text Classification

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Even-Semester (Spring) Examination - 2023

(For 6th Semester BTech. CSE)

Paper Name: Data Science & Big Data

Paper Code: CSEUGPE02

Full Marks:80

Time: 3 Hrs

Group A

1. Can decision trees be used for performing clustering?
   A. True B. False

2. What is the minimum no. of variables/ features required to perform clustering?
   A. 0 B. 1 C. 2 D. 3

3. Data that sits outside the trend is referred to as a _____
   A. Outlier B. Trend C. Spike D. Both 1 & 2

4. What is Big Data?
   A. Data with the word 'big' in it B. Data about people who are big
   C. Data with a large size D. Data made with a big purpose

5. Which of the following things can be accomplished with linear model?
   A. Flexibly fit complicated functions B. Uncover complex multivariate relationships
   C. Build accurate prediction models D. All of the mentioned

6. Which of the following algorithm is most sensitive to outliers?
   A. K-means clustering algorithm B. K-medians clustering algorithm
   C. K-modes clustering algorithm D. K-medoids clustering algorithm

7. Which of the following metrics do we have for finding dissimilarity between two clusters in hierarchical clustering?
   1. Single-link 2. Complete-link 3. Average-link
   A. 1 and 2, B. 1 and 3 C. 2 and 3 D. 1, 2 and 3

8. What is unsupervised learning?
   A. features of group explicitly stated B. number of groups may be known
   C. neither feature & nor number of groups is known D. none of the mentioned

9. Which of the following model has ability to learn?
   A. pitts model B. rosenblatt perceptron model C. both rosenblatt and pitts model D. neither rosenblatt nor pitts

10. Which of the following statement is False in the case of the KNN Algorithm?

(A) For a very large value of K, points from other classes may be included in the neighborhood.

(B) For the very small value of K, the algorithm is very sensitive to noise.

(C) KNN is used only for classification problem statements.

(D) KNN is a lazy learner.

Group - B

Answer any five question 5 x 6 =30

1. Describe k-NN classification technique. What do you understand by training and testing set of a classifier?
2. Write down and explain the Hunt's algorithm for decision tree learning.
3. For the following one dimensional data calculate the cost function of k-means after 2 iterations [18, 5, 10, 20, 4, 8, 19].
4. Explain cross validation technique. What is stratified sampling?
5. Explain what will be the minimum and maximum value of GINI index form its definition. Write Bayes classification rule.
6. Write down the algorithm for agglomerative hierarchical clustering. What are the limitations of K-means?
7. Explain the differences between regression and classification. Differentiate supervised, unsupervised and semi-supervised model

Group -C

Answer any four questions 4 x 10 = 40

1. For the one dimensional dataset in question no. 3 in Group-B, perform hierarchical clustering (single linkage) and draw the dendrogram. Write down the advantage of hierarchical clustering. What is 'k' in K-means? 6+ 2 +2 =10

2. What do you understand by training and testing set of a classifier? How you measure the performance of a classifier. Give an example/scenario where accuracy measure is misleading. 3 + 4 + 3 =10

3. Write the Hunt's algorithm for decision tree learning. Given the following data set, which attribute will be chosen first to be split using GINI measure? Data= (feature1, feature2 ,feature3, class: <1, W, 10, P>, <1, X, 20, P>, <2, Y, 10, P>, <3, Y, 10, N>, <1, X, 20, N>) 4+6=10

4. Explain the basic assumption of Bayes classification. Consider the following data set which explain different conditions that are associated with accidents.:

SNo.	Weather condition	Road condition	Traffic condition	Engine problem	Accident
1	Rain	bad	high	no	yes
2	snow	average	normal	yes	yes
3	clear	bad	light	no	no
4	clear	good	light	yes	yes
5	snow	good	normal	no	no
6	rain	average	light	no	no
7	rain	good	normal	no	no
8	snow	bad	high	no	yes
9	clear	good	high	yes	no
10	clear	bad	high	yes	yes

In this dataset, the target variable accident is a binary categorical variable with yes/no values. There are 4 categorical features: weather condition, road condition, traffic condition, and engine problem. We are interested in building a system which will enable us to decide whether or not road accident occurs. Consider a new data instance X = (Rain, good, normal, no). How would the Naiive Bayes classifier classifies X? 2 + 8 = 10

5. Define ROC curve. Explain the significance of the points (0,0), (0,1), (1,0) in ROC space. Assume there are four prediction results from 100 positive and 100 negative instances. The confusion matrices are given as follows: (TP, FN, FP, TN)= (63, 37, 28, 72) for classifier A, (77, 23, 77, 23) for classifier B, (24, 76, 88, 12) for classifier C, (76, 24, 12, 88) for classifier D. Which signify the best prediction result and why? Plot the points in a ROC space. 2+ 2+ 4+2=10
6. Consider the dataset in question no 2 in Group-B. Assume the label of the seven instances are: [0 1 1 0 1 1 0]. For a sample x=25, find out the label of x using K-NN classification (consider k=3). Differentiate partitional and hierarchical clustering. What signify 'k' in K-NN classification? 6 + 2 + 2 =10
7. Explain dependent and independent variable in linear regression. What is multivariate regression. For the following dataset find out the best fit line using the linear regression model.

X	2	4	6	8
y	3	7	5	10

3 + 2 + 5 =10

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Autumn Semester Examination - 2023

B.Tech 4th year, 7th semester Examination

Paper Name: Machine Learning and Soft Computing **Full Marks: 80**

Paper Code: CSEUGPC24 **Time: 3 hrs**

Group-A **Answer any five** **(2x5=10)**

1. What is an artificial neuron? 2
2. Describe the multipoint crossover operation for a GA probelm. 2
3. Differentiate the fuzzy sets for the triangular, and trapezoidal membership functions. 2
4. Compare the fuzzifier and defuzzifier component of a Fuzzy inference system. 2
5. Write the basic steps for a Genetic Algorithm problem. 2
6. What is Reinforcement Training? 2

Group-B **Answer any four** **(5x4=20)**

7. Maximize the function $f(x) = 4x^2 + 9x + 1$, where x = 9, 11, 13, 15 with (Chromosome size = 4) such that (i) selection operation (Rank Selection), (ii) Uniform crossover, (iii) Up to two iterations. 5
8. Establish a mamdani fuzzy inference system with proper examples. 5
9. Explain the terms "Chromosome, Gene, Allele, Locus, Genotype, Phenotype" with proper examples for a GA problem. 5
10. Establish a minimum distance classifier (MDC) for a 3-class classification problem. 5
11. Calculate specificity and f1-score from the given confusion matrix.

		Actual			
Predicted	12	1	3	5
	7	45	4	6
	0	2	23	4
	1	5	7	6

Group-C **Answer any five** **(10x5=50)**

12. Consider the fuzzy sets *small={0/0 + 0/2 + 1/3 + 0/4}* and *negative={0/1 + 0.7/2 + 1/3 + 0.7/4 + 0/5}*, and the following fuzzy rule: "Rule 1: If x is small and y is negative Then z is low". Find the firing strength of Rule 1 when x = 3 and y = 2 where fuzzy "AND" operation is the minimum operator. What is ELITISM? 8+2=10

13. What is Gradient-Descent? Draw a very clear 4-3-2 ANN architecture with explaining all its components. What is a Self-organizing Feature Map? 3+5+2=10

14. What is clustering? What are the main parameters for a good clustering technique? What are Conventional and fuzzy sets theories? Define uniform crossover and single point crossover in Genetic Algorithm. 1+2+3+4=10

15. What is PCA and why is it important? Describe each step of PCA by considering a proper example. Give Some Real Time Applications of Neural Networks. 3+5+2=10

16. Describe Generative and Discriminative Machine Learning techniques. Suppose a genetic algorithm uses chromosomes of the form x = abcdefgh with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as: f(x) = (a + b) * (c + d) + (e + f) − (g + h). Let the initial population consist of four individuals with the following chromosomes: x1 = 7 2 4 1 3 5 3 2; x2 = 9 7 1 2 1 6 0 1; x3 = 5 3 2 2 1 2 8 5; x4 = 7 1 8 5 2 4 9 4. Use the following (i) Evaluate the fitness of each individual, (ii) Cross the fittest two individuals using one–point crossover at the middle point, (iii) Evaluate the fitness of the new population with the best four chromosomes (two-old and two-new) (iv) Perform (ii) to (iii) up to three iterations. 3+7=10

17. (a) Why is naive Bayes so 'naive'? (b) You came to know that your model is suffering from low bias and high variance. Which algorithm should you use to tackle it? Why? (c) What do you understand about Type I & Type II errors? (d) What is non linear classification of supervised learning? Explain with an example. 2+3+2+3=10

Aliah University

End-Semester Examination - 2023

(BTech, CSE 6th Semester)

Paper Name: Compiler Design
Paper Code: CSEUGPC18

Full Marks: 80
Time: 3 Hrs

Group – A

(5X2=10)

1. Answer the following questions –

a) Write name of some cousins of compiler.
b) How Top-down parsers are different from Bottom-up parsers?
c) "Any grammar with ambiguity can't be considered as a Parser"-why?
d) What is left-recursion? How is it removed from a grammar?
e) Determine the strings generated by this regular expression: **a(bc)?d**

Group – B

(Answer any 6 questions)

(6X5=30)

2. Write a note on various compiler construction tools. Discuss structure of a lex code. 3+2

3. What are the regular expressions of valid identifiers, integers and floating constants? Construct Finite Automata to accept valid identifiers, integers and floats. 3+2

4. Define Operator grammar. Briefly explain the parsing concept of operator precedence parser. 1+4

5. What's the role of Semantic rules in parsing? Differentiate between S -Attributed and L -Attributed Syntax Directed Definitions. Give examples. 1+4

6. Calculate LR(1) item sets of the grammar given below – 5

S→aAd | bBd | aBe | bAe
A→g
B→g
Here N={S,A,B} and S is starting symbol

7. What is Directed Acyclic Graph (DAG)? How is it different from Abstract Syntax Tree (AST)? Form AST and DAG for following statement: **x=a+(b*c)/d+(b-c)*d+(b*c)%s** 1+2+2

8. Mention some Peephole optimization techniques with example. Why is it called as Peephole optimization? 4+1

Group – C

(Answer any 4 questions)

(10X4=40)

9. a) Calculate FIRST() and FOLLOW() of all the Non-terminals in the following grammar – 3+3

S→ADB | DbB | Ba
A→da | BD
B→g | ε
D→h | ε
Here N={S,A,B,D} and S is start symbol

b) What is the second L in LL(k) parsers? Conclude whether the following grammar could be considered as LL(1) parser or not. 1+3

A→rB | Ds
B→AtD
D→tB | ε
Here N={A,B,D} and A is start symbol

10. a) Mention different roles of Lexical Analyzer. Explain Buffer pair concept, used for Tokenization.
b) What is sentinel? How sentinel is better than buffer-pair concept?
c) Write a Syntax Directed Translation to perform binary to decimal conversion. Consider any grammar suitable for the same. (2+3)+2+3

11. a) What are various ways to optimize a loop? Briefly explain other machine independent code optimization techniques. 3+4
b) Consider the Syntax Directed Definitions given below. Using the SDTs, what will be the output printed by a bottom-up parser for the input: **2*3+5**? 3

S→ER {}
R→*E {printf("*");}
R→ ε {}
E→F+E {printf("+");}
E→F {}
F→(S) {}
F→ id {printf("%d", id.lexval);}
Here N={S,E,F,R} and S is start symbol

12. a) Find all LR(0) item sets for the following grammar - 4

S→AA
A→aA
A→b
Here N={S,A} and S is start symbol

b) Construct SLR(1) parsing table and state whether the grammar is SLR(1) or not. 3
c) Explain full parsing mechanism for an input: **abab**. Is it accepted or not? 3

13. a) Design a 3-Address code for following line of code and represent them into quadruple and triples format. 3+2+2

```
while(n>0)
{
if(a>5 ||b<6)
    p++;
else
    q++;
n--;
}
```

b) Show the Basic blocks in above 3-address code and draw the flow graph to explain flow of control. 3

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End Semester Examination (Spring Semester)2023

(B. Tech 3rd Year 6th Semester)

SubjectName: Software Engineering **FullMarks**: 80

SubjectCode: CSEUGPC17 **Time:** 3 Hours

Group A **Answer all *10* questions** **10x1=10**

1. Fill in the blanks with one word
   a) Full form of COCOMO is_____.
   b) A GUI interface is a type of ___ software.
   c) Full form of PERT is ____.
   d) Beta test is performed by___ users.
   e) A design solution is said to be ___ modular, if the different modules in the solution have high cohesion and their inter- module couplings are low.
   f) ___ between two modules is a measure of degree of interaction between the two modules.
   g) ___ is a measure of the functional strength of a module.
   h) Empirical estimation, Heuristic techniques and ____ estimation techniques are the three main project estimation techniques.
   i) The formula for computation of Cyclomatic complexity of a program from an inspection of CFG is ___.
   j) The formula to calculate the Slack Time is ___.

Group- B **Answer *any 6* questions** **6x5=30**

2. Explain why spiral model is also called a Meta model.
3. Describe the limitations of Classical Waterfall Model and how do we overcome it using Iterative model.
4. Explain Chief Programmer Team, Democratic Team and Mixed Control Team Organisation.
5. What are the two main approaches to design black box test cases?
6. What is the type of projects in which you will use prototyping model, evolutionary model and spiral model?
7. Describe Iterative Waterfall Model with a diagram.
8. Suppose the estimated development time and cost using Putnam's expression has come out to be 1 Year and ₹ 100,000 respectively. What will be the new cost if we have to develop it within 3 months?

Group- B **Answer *any 4* questions** **4x10=40**

9. Write a short code to find whether a number is odd or even. Draw a CFG and hence find the cyclomatic complexity. **2+8=10**
10. Using black box testing approach find the probable test cases for a software that computes the square root of an input integer which can assume values in the range of 0 to 10000.
11. Explain in details the different classification of cohesiveness. **10**
12. Explain the two popular Empirical Estimation Techniques.What is the main shortcoming of Basic and Intermediate COCOMO models? How can it be solved? ***6+1+3***
13.
    a) Describe the shortcomings of LOC as metric for project size estimation.
    b) Assume that the size of an organic type software product has been estimated to be 60,000 lines of source code. Assume that the average salary of software developers is Rs. 80,000 per month. Determine the effort required to develop the software product, the nominal development time, and the cost to develop the product. **4+6**