

# CBCS SCHEME

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17EC81

## Eighth Semester B.E. Degree Examination, July/August 2021 Wireless Cellular and LTE 4G Broadband

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Explain the advantages of OFDM leading to its selection for LTE. (08 Marks)  
b. Explain adaptive modulating and coding with neat block diagram. (08 Marks)  
c. Explain briefly path loss. (04 Marks)
- 2 a. Explain with neat block diagram flat LTE SAE architecture. (08 Marks)  
b. Explain delay spread and coherence bandwidth. (08 Marks)  
c. Mention advantages and disadvantages of cell sectoring in cellular wireless communications. (04 Marks)
- 3 a. Explain the basic multicarriers transmitter and receiver with neat block diagram. (08 Marks)  
b. Explain the principle of operation of OFDM downlink transmitter with neat sketch. (08 Marks)  
c. Mention the differences between V-BLAST and D-BLAST encoding techniques. (04 Marks)
- 4 a. Explain peak to average power ratio (RAR). (08 Marks)  
b. Explain SC-FDMA uplink transmitter and receiver with neat block diagram. (08 Marks)  
c. Compare OFDM and SCFDE. (04 Marks)
- 5 a. Explain uplink and downlink transport channels. (08 Marks)  
b. Explain frame structures used in LTE. (08 Marks)  
c. Explain Broadcast channel used in LTE. (04 Marks)
- 6 a. Explain LTE end to end network architecture with neat block diagram. (08 Marks)  
b. With neat block diagram explain radio interface protocols stack. (08 Marks)  
c. Explain uplink transport channels. (04 Marks)
- 7 a. Explain the types of uplink reference signals. (08 Marks)  
b. With neat block diagram, explain the uplink transport channel processing. (08 Marks)  
c. Explain buffer status reporting in uplink. (04 Marks)
- 8 a. Explain with neat sketch cell search procedure used in LTE. (08 Marks)  
b. Explain random access procedure used in LTE. (08 Marks)  
c. What is meant by periodic and aperiodic reporting in CQI feedback? (04 Marks)
- 9 a. Explain RRC states and function with neat sketch. (08 Marks)  
b. Explain mobility management over X2 mobility with neat sketch. (04 Marks)  
c. Explain data transfer modes. (08 Marks)
- 10 a. Explain RAN procedure for mobility. (08 Marks)  
b. Explain the main services and function of RLC and MAC layers. (08 Marks)  
c. Explain paging used in RRC protocol. (04 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



# CBCS SCHEME

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17EC834

## Eighth Semester B.E. Degree Examination, July/August 2021 Machine Learning

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions.**

- 1 a. Mention five applications of machine learning. (05 Marks)  
 b. Explain List-Then-Eliminate algorithm. (05 Marks)  
 c. Analyze the given instances in Table Q.1(c) and find the version space using candidate-elimination algorithm. (10 Marks)

Instances	Citations	Size	In library	Price	Editions	Buy
1	Some	Small	No	Affordable	One	No
2	Many	Big	No	Expensive	Many	Yes
3	Many	Medium	No	Expensive	Few	Yes
4	Many	Small	No	Affordable	Many	Yes

Table Q.1(c)

- 2 a. Explain different perspectives and issues in machine learning. (05 Marks)  
 b. Enumerate the steps in designing a learning system. (05 Marks)  
 c. Write the Find-S algorithm. Analyze the given instances in Table Q.2(c) and find maximally specific hypothesis using Find-S. (10 Marks)

Instances	Citations	Size	In Library	Price	Editions	Buy
1	Some	Small	No	Affordable	Many	No
2	Many	Big	No	Expensive	One	Yes
3	Some	Big	Always	Expensive	Few	No
4	Many	Medium	No	Expensive	Many	Yes
5	Many	Small	No	Affordable	Many	Yes

Table Q.2(c)

- 3 a. Given  $W_1 = W_2 = 0.5$ , show that how a single-layer perceptron can solve the following linearly separable problem.  
 i) A AND B with bias = -0.75  
 ii) A OR B with bias = -0.25 (08 Marks)  
 b. Construct decision tree using ID3 algorithm considering the training examples given in Table Q.3(b). (12 Marks)

Instance	a1	a2	a3	Classification
1	True	Hot	High	No
2	True	Hot	High	No
3	False	Hot	High	Yes
4	False	Cool	Normal	Yes
5	False	Cool	Normal	Yes
6	True	Cool	High	No
7	True	Hot	High	No
8	True	Hot	Normal	Yes
9	False	Cool	Normal	Yes
10	False	Cool	High	Yes

Table Q.3(b)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 4 a. List the appropriate problems for neural network learning. (05 Marks)  
 b. Define perceptron and discuss its training rule. (05 Marks)  
 c. Define entropy and information gain. For the transactions shown in the Table Q.4(c) compute the following:  
 i) Entropy of the collection of transaction records of the table with respect to classification.  
 ii) What are the information gain of a1 and a2 relative to the transactions of the table?

Instance	1	2	3	4	5	6	7	8	9
a1	T	T	T	F	F	F	F	T	F
a2	T	T	F	F	T	T	F	F	T
Target class	+	+	-	+	-	-	-	+	-

Table Q.4(c)

(10 Marks)

- 5 a. Explain Baye's theorem, MAP hypothesis and ML hypothesis. (09 Marks)  
 b. Classify the dataset: <sunny, cool, high, strong> using Naïve Bayes classifier for the dataset shown in Table Q.5(b). Also find conditional probabilities of each attribute. (11 Marks)

Day	Outlook	Temperature	Humidity	Wind	Play Tennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

Table Q.5(b)

- 6 a. Prove that minimizing the squared error between the output hypothesis predictions and the training data will output a maximum likelihood hypothesis. (07 Marks)  
 b. Consider a football game between two rival teams, say team A and team B. Suppose team A wins 65% of the time and team B wins the remaining matches. Among the games won by team A, only 35% of them comes from playing at team B's foot ball field. On the otherhand, 75% of the victories for team B are obtained while playing at home. If team B is to host the next match between the two teams, who will emerge as the winner? (07 Marks)  
 c. Given that the test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Also, 0.008 of the entire population have this cancer. Suppose a new patient is observed for whom the lab test returns a negative (-) result. Should we diagnose the patient as having cancer or not? (06 Marks)
- 7 a. Explain K-nearest neighbor algorithm with example plots. List out its advantages and disadvantages. (10 Marks)  
 b. Explain locally-weighted linear regression with example plots. List out its advantages and disadvantages. (10 Marks)

- 8 a. Explain sequential covering algorithm for learning disjunctive set of rules with example. (06 Marks)  
b. Define literal, ground literal, negative literal and positive literal. (04 Marks)  
c. Explain the basic FOIL algorithm with example and describe how to handle noisy data. (10 Marks)
- 9 a. Explain an analytical learning problem with example. (10 Marks)  
b. Discuss the explanation based learning algorithm  $P_{ROLOG} = EBG$ . (10 Marks)
- 10 a. Discuss inductive learning versus analytical learning. (08 Marks)  
b. Explain the FOCL algorithm with example. (12 Marks)

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