CBCS SCHEME

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15EC81

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

Time: 3 hrs. Max. Marks: 80

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

1 a. Explain briefly EPC architecuture. **(08 Marks)**
b. Explain multiantenna technique which supports LTE. **(08 Marks)**

2 a. Explain in brief : i) Fading ii) Sectoring. **(08 Marks)**
b. Explain equalizers in brief. **(08 Marks)**

3 a. Explain the computational technique used in OFDM. **(08 Marks)**
b. Mention OFDMA system design consideration. Explain in brief resource allocation in cellular system. **(08 Marks)**

4 a. Explain in brief: i) Array gain ii) Diversity gain. **(08 Marks)**
b. Explain 2 × 2 SFBC approach in open-loop transmit diversity. **(08 Marks)**

5 a. Explain the basic design principles of LTE. **(08 Marks)**
b. Explain the structure of rate 1/3 turbo encoder. **(08 Marks)**

6 a. Explain DCI in channel encoding. **(08 Marks)**
b. Explain multicast channels in downlink transport channel processing. **(08 Marks)**

7 a. Explain in brief : i) Frequency hopping ii) Multiantenna transmission. **(08 Marks)**
b. Explain non-synchronized random access procedure. **(08 Marks)**

8 a. Explain CQI feedback in brief. **(08 Marks)**
b. Explain the cell search process in LTE. **(08 Marks)**

9 a. Explain main services and functions of RLC sublayer. **(08 Marks)**
b. State the main functions of RRC protocol. **(08 Marks)**

10 a. Explain mobility management over X_2 interface. **(08 Marks)**
b. Explain the basic approaches for uplink ICI mitigation. **(08 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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15EC834

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

Time: 3 hrs. Max. Marks: 80

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

1 a. Sketch important blocks of final design of a learning system and explain the same with respect to checkers learning program. **(08 Marks)**

b. Write the formal definition of specific boundary set 'S' and general boundary set 'G' considered in Candidate-Elimination algorithm. **(04 Marks)**

c. Mention the common issues that arise in machine learning. **(04 Marks)**

2 a. Table Q2 (a) represents the training dataset which is to be used to learn Enjoy sport concept. Enjoy sport will take the value 'yes', if a given day is suitable to enjoy watersport. Otherwise, it takes the value 'no'. Use Find-S algorithm to come up with hypothesis that remains consistent with the data. **(08 Marks)**

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	Enjoysport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

Table Q2 (a)

b. In the following learning problems, mention the task involved, the measure of performance and the experience obtained.
(i) A robot driving learning problem. (ii) Hand written text recognition problem. **(04 Marks)**

c. Draw a figure which indicates the summary of design choices we have in designing the checkers learning problem. **(04 Marks)**

3 a. Obtain decision trees to represent the following Boolean functions:
(i) $A \vee [B \wedge C]$ (ii) A XOR B **(06 Marks)**

b. What is a perceptron? Sketch the functional block diagram of a perceptron and write the relevant equations. **(06 Marks)**

c. Mention the need of a multilayer ANN. Why Sigmoid is preferred over Signum as activation functions? **(04 Marks)**

4 a. Consider the set of training examples given in Table Q4 (a). What is the entropy of this collection of training examples with respect to the target function classification? Also, what is the information gain of a2 relative to these training examples? **(04 Marks)**

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

Table Q4 (a)

b. Discuss reduced error pruning method to avoid overfitting of data. **(04 Marks)**

c. Derive the training rule for training weights of output unit of Artificial Neural Network. **(08 Marks)**

5 a. Discuss Brute-force concept learning and hence derive the expression of posterior probabilities of hypothesis under valid assumptions. **(08 Marks)**

b. Table Q5 (b) represents the training dataset used to learn play tennis concept. Play Tennis will take the value 'yes', if a given day is suitable to play tennis. Otherwise, it takes 'no'. Calssify the new instance which will have the following attributes using Naïve Bayer classifier, <Outlook = Sunny, Temperature = Cool, Humidity = High, Wind = Strong>.

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D_1	Sunny	Hot	High	Weak	No
D_2	Sunny	Hot	High	Strong	No
D_3	Overcast	Hot	High	Weak	Yes
D_4	Rain	Mild	High	Weak	Yes
D_5	Rain	Cool	Normal	Weak	Yes
D_6	Rain	Cool	Normal	Strong	No
D_7	Overcast	Cool	Normal	Strong	Yes
D_8	Sunny	Mild	High	Weak	No
D_9	Sunny	Cool	Normal	Weak	Yes
D_{10}	Rain	Mild	Normal	Weak	Yes
D_{11}	Sunny	Mild	Normal	Strong	Yes
D_{12}	Overcast	Mild	High	Strong	Yes
D_{13}	Overcast	Hot	Normal	Weak	Yes
D_{14}	Rain	Mild	High	Strong	No

Table Q5 (b) **(08 Marks)**

6 a. Show that under certain assumptions, maximum likelihood hypothesis is that hypothesis which minimizes squared error. **(08 Marks)**

b. Explain minimum description principle which is used to select hypothesis that can be coded in minimum length. **(08 Marks)**

7 a. Explain Radial Basis Functions (RBFs) approach used in target function approximation. **(08 Marks)**

b. Enumerate and explain sequential covering algorithm. **(08 Marks)**

8 a. What is the inductive bias considered in K-Nearest Neighbor algorithm? What are the practical issues that we should consider for implementation of K-Nearest Neighbor algorithm? **(04 Marks)**

b. Explain CADET system using case based reasoning. **(08 Marks)**

c. Mention important error criteria used to fit the local training examples in locally weighted linear regression. **(04 Marks)**

9 a. Explain the Prolog-EBG algorithm. **(10 Marks)**

b. What is reinforcement learning? Explain the reinforcement problem with a neat diagram. **(06 Marks)**

10 a. Explain the difference between analytical and inductive learning methods based on formulation of the learning problem. **(06 Marks)**

b. Discuss the FOCL algorithm by considering an example of learning a concept. **(10 Marks)**

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