City University

Faculty of Science & Engineering

Department of Computer Science and Engineering

Program: B.Sc. in CSE

Final Examination Semester: Fall 2017

Course Code: CSE 417 Course Title: Artificial Intelligence

Total Marks: 40 Duration: 2 hours

Answer any 4(four) questions ***4 X 10 =40***

1(a) Explain the following inference rules with proper example: *2*
(i) Modus Ponens and (ii) Chain rule

(b) Show that- *5*

i) $P \leftrightarrow Q$ is equivalent to $(P \rightarrow Q) \wedge (Q \rightarrow P)$. ii) $P \rightarrow Q$ is equivalent to $\neg P \vee Q$.

(c) Mention the differences between artificial learning and machine learning? *3*

2(a) Given the grammar and lexicon below

S → NP VP	Det → the
S → VP	Noun → run — marathon
NP → Det NP	Verb → run
NP → Proper-Noun Noun	Proper-Noun → Detroit
VP → Verb NP	

i) Show one possible top-down parsing for the following sentence using above grammar and lexicon. *3*

Run the Detroit marathon

ii) Draw a Syntactic Tree representing one parse of the above sentence. *3*

(b) Translate the following sentences in English to sentences in first order predicate logic *4*

i. All purple mushrooms are poisonous.
ii. No student likes every lecture.
iii. Not all people have a cell phone.
iv. All dogs are mortal.

3(a) First Order Predicate Logic has two quantifiers- Universal and Existential. Explain these terms with suitable examples. *2*

(b) It is no doubt that the sub-field of machine learning / artificial intelligence has increasingly gained more popularity in the past couple of years. As Big Data is the hottest trend in the tech industry at the moment, machine learning is incredibly powerful to make predictions or calculated suggestions based on large amounts of data. According to a recent study, machine learning algorithms are expected to replace 25% of the jobs across the world, in the next 10 years. Now mention some different Algorithm techniques in Machine Learning. Also explain supervised learning and unsupervised learning tecniques. *4*

(c) Currently, the Expert System (ES) is a popular topic in Computer Science. But Expert Expert systems can be distinguished from conventional computer systems. How can you distinguish them? *4*

4(a) Name and describe the steps of Genetic Algorithms (GA) for the following population. *5*

Initial population
24748552
32752411
24415124
32543213

(b) Convert the following expression into clausal form. *5*

$\exists x \forall y (\forall z P(f(x),y,z) \rightarrow (\exists u Q(x,u) \& \exists v R(y,v)))$

5(a) The knowledge acquisition component allows the expert to enter their knowledge or expertise into the expert system, and to refine it later as and when required. This process goes through some major stages. Now briefly describe these stages of knowledge acquisition with necessary diagram. *4*

(b) In dealing with natural language, a computer system needs to be able to process and manipulate language at a number of levels. Now mention the name of the levels. Why we need pragmatic analysis in natural language processing? Explain with proper example. *4*

(c) Explain 'Training set' and 'Test set' briefly in terms of machine learning. *2*