Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
PCS8J002

8th Semester Regular / Back Examination 2018-19
EXPERT SYSTEMS
BRANCH : CSE
Max Marks : 100
Time : 3 Hours
Q.CODE : F016

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) How do Expert Systems work?
b) State the difference between problem domain and knowledge domain.
c) Write the main differences of procedural and non-procedural paradigms of expert systems
Development.
d) Create a semantic net to represent the predicate logic statement “All Men are Mortal”.
e) State two limitations of propositional calculus in expert system development.
f) What are the two different ways to deal with uncertainty?
g) How induction differs from deduction?
h) State one commercial application of fuzzy logic.
i) How “sufficiency” differs from “necessity” in logic system development? Write using mathematical notations.
j) Write two advantages of fuzzy logic as compared to propositional and predicate logics.

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Illustrate the Study of Knowledge, its hierarchy and representation techniques. Use diagram wherever necessary.
b) Explain some features of MYCIN and PROSPECTOR expert system from historical point of view.
c) Design state diagram of a soft drink vending machine that accepts Quarters (25) and Nickels (5). Each can of soft drink costs 55 cents. Clearly mention the state space and problem space.
d) With a suitable diagram, give overview of different methods of inferences and distinguish among them.
e) Distinguish among forward and backing chaining with suitable examples.
f) Given these facts: 1. All lecturers are determined, 2. Anyone who is determined and intelligent will give good service and 3. Mary is an intelligent lecturer. Using Principle of Resolution, deduce that “Mary will give good service”.
g) Given these facts : “Some programmers hate all failures” and “ No Programmer hates any success”, Deduce using resolution principle that “No failure is a success”
h) With a suitable example, explain how PROLOG statements can be generated from semanticnet diagram.
i) A statement is shallow reasoning is as follows:
"IF a car has a good battery,good sparkplugs, gas, good tires
THEN it can move".
Develop 4 additional rules using deep reasoning from the above statement. Show all steps.
j) Explain with examples, how odds of belief matters in expert system development.
k) Illustrate all types of error with suitable examples and block diagrams, wherever necessary.
l) Discuss with suitable examples, how probabilities are propagated while handing uncertainty.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 With a clear block diagram, discuss about Rule based Expert Systems, its components andinterconnections among the components. **(16)**

Q4 **a)** What are different developmental stages of expert system? Discuss briefly using diagrams. **(8)**

b) How Markov chain can be used with temporal reasoning in expert system development? Discuss with examples. **(8)**

Q5 Consider oil exploration under uncertainty. A subjective prior prob of oil O = .6 and that for not oil O'=.4. The conditional prob for positive outcome P(+|O)=.8 and P(-|O)=.2 , P(+|O')=.1 and P(-|O') = .9. The seismic survey costs $50000/- and Drilling expense equals $200000/- and the Net income $1000000/-. Using Bayesian decision trees calculate the expected payoffs at each node. Show all steps. **(16)**

Q6 **a)** How Dempster-Shafer theory helps in different stages of Expert System Development. Discuss. **(8)**

b) What are the different characteristic to be analyzed for selecting an appropriate problem belonging to Expert System development. **(8)**