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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Expert System   Semester: VII
Programme: B.Tech(CSE-BAO)   CSIB496
Time: 03 hrs.   Max. Marks: 100
Instructions: Use Illustrations and examples wherever applicable

SECTION A

S. No.	All questions of Section A are compulsory	Marks	CO
Q1.	Differentiate between knowledge, Intelligence and Wisdom, using an example.	4	CO1
Q2.	Give two examples each of (a). Heuristic Knowledge. (b). Expert System Shell	2+2	CO2; CO4
Q3.	Define 'Uncertainty'. Identify any two real world situations, where inferencing may involve 'uncertain data'.	4	CO2
Q4.	In context of frame-based expert systems, define the following: 'frames', 'facets', 'demons' and 'methods'	4	CO3
Q5.	Draw neat illustration of a neural network and compare it with structure of a biological neuron. Label their parts and identify their functionality.	4	CO5

SECTION B
Section B has 5 questions. All are compulsory. Q9 and Q10 have internal choice

Q6.	Define Knowledge Engineering and detail the steps involved in Knowledge Engineering.	8	CO2
Q7.	Write a note on 'Scripts'? List advantages and disadvantages. Which kind of knowledge do you think is suitable for representation through 'scripts' and why?	8	CO2
Q8.	(a). Differentiate between Bayesian Reasoning and Certainity Theory? (b). Identify and comment on different roles in Expert System Development team?	4+4	CO2; CO4
Q9.	Name components of a typical 'Rule-based Expert System'. Use suitable illustrations and briefly discuss function of each component. Or What do you mean by 'inferencing'? Compare different types of inferencing strategies. How does one decide which strategy is to be chosen? Support your answers with justifications.	8	CO3
Q10.	Describe in detail, the various tools and methods available to build knowledge-based systems. Or Analyze and discuss what is 'Conflict Resolution'? Interpret its role in inferencing process. List any two Conflict Resolution Strategies and comment on their use.	8	CO4

SECTION-C
Section C has 2 questions. All are compulsory. Q12 has internal choice.

Q11.	Answer the following: (a). How does a Hopfield Network work? What limitations does it have and how are these overcome in BAM? (b).What are key differences between supervised and unsupervised neural networks. (c).What are significant advantages of building hybrid expert systems. (d). Briefly explain 'Semantic Network' using example of your own?	5+5+5 +5	CO5; CO2;
Q12.	Using an example of your own discuss a Fuzzy-rule based expert system. Relate terms such as fuzzy values, membership functions, fuzzy rules, linguistic variables and fuzzy sets. Or In what way a fuzzy expert system is different from a traditional rule-based expert system. Explain its working with suitable example and illustrations.	20	CO3

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SECTION A

S. No.	All questions of Section A are compulsory	Marks	CO
Q1.	Discuss any two characteristics that differentiate an AI problem from a conventional problem. Use suitable example.	4	CO1
Q2.	Differentiate between binary logic and fuzzy logic. Indicate difference with real-world examples.	4	CO3
Q3.	Define terms, 'Aggregation', 'Generalization' and 'Association', in a frame-based system? Use illustrations to support your answer.	4	CO3
Q4.	Justify 'Genetic Algorithm' as an Evolutionary Computation Technique	4	CO5
Q5.	Write a brief note on 'ANFIS'? Identify its merits.	4	CO5

SECTION B
Section B has 5 questions. All are compulsory. Q9 and Q10 have internal choice.

Q6.	In context of 'Certainty Theory', explain and derive terms, 'Measures of belief', 'Measures of disbelief' and 'Evidential Reasoning?	8	CO2
Q7.	Compare structured representation scheme with network scheme. Discuss merits and demits of each.	8	CO2
Q8.	What do you mean by 'demons' and 'methods'? Compare and contrast them with examples? List their different types.	8	CO3
Q9.	Describe 'Production Rule'. Discuss its structure in detail? Give different examples to indicate how a 'consequent' may serve different purposes. Or How is functioning of a 'Knowledge-Base' and 'Inference Engine' related? With an example show how does an inference cycle work?	8	CO1
Q10.	Write a detailed note on various areas where AI applications exist in real world. In what way is AI a challenging and interesting field. Give your views. Or Detail your views on origin of AI. Discuss significance of early AI experiments.	8	CO1

	Compare AI with natural intelligence. Give your justifications as applicable.		

SECTION-C
Section C has 2 questions. All are compulsory. Q12 has internal choice.

Q11.	Discuss structure of a frame-based expert system, detailing all relevant terms. Describe the inferencing process. Use suitable illustrations to support your explanation.	**20**	**CO3**
Q12.	'An Artificial Neural Network is a mathematical model representing functioning of a biological neuron'. Justify this statement by elaborating on structure and working of ANN as compared with biological neurons. Or (a).Define Self-Organizing Neural Nets. Discuss their popular types and detail their working. **[10]** (b).'Self-Organizing Neural Nets are effective in handling unexpected and changing conditions'. Justify this statement. **[10]**	**20**	**CO5**