

FACULTY OF ENGINEERING**B.E. (Civil) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018****Subject: Infrastructure Engineering (Elective – I)****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part – A & any five questions from Part – B.****PART – A (2x10 = 20 Marks)**

- 1 What is the importance of Infrastructure Engineering? (2)
- 2 Mention the different stages in Infrastructure projects. (2)
- 3 List the problems of Infrastructure Privatization? (2)
- 4 What do you mean by Political and Socio-Environmental Risks? (2)
- 5 Discuss about the role of water supply in Infrastructure? (2)
- 6 State the challenges in construction of Infrastructure. (2)
- 7 Mention the environmental laws. (2)
- 8 State social impacts on Assessment. (2)
- 9 Write about BOOT project? (2)
- 10 What do you mean by Infrastructure management system? (2)

PART – B (5x10 = 50 Marks)

- 11 a) Give an overview of Infrastructure projects in Power Sector. (5)
b) Describe the significance of Special Economic Zones. (5)
- 12 a) Present the historical overview of Privatization in Infrastructure Engineering. (5)
b) Discuss the challenges in Privatization in India. (5)
- 13 a) State the legal issues in Infrastructural projects. (5)
b) Write about mapping and facing the landscape. (5)
- 14 a) Mention the cultural risks in international Infrastructural projects. (5)
b) List the challenges in construction and maintenance of Infrastructure. (5)
- 15 a) What is the role of government in shaping the Infrastructural projects. (5)
b) Discuss the different stages in Infrastructure projects. (5)
- 16 a) State factors influencing a good Infrastructure planning and management. (5)
b) What are the risks involved in Infrastructure projects. (5)
17. Write a short note on: (10)
 - a) Benefits of Infrastructure Privatization.
 - b) Core Economic and Demand Risks.
 - c) Shaping and Planning Phase of Infrastructure Engineering.

FACULTY OF ENGINEERING**B.E. (Civil) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018****Subject: Soft Computing Skills in CE (Elective – I)****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part – A and any five questions from Part – B.****PART – A (20 Marks)**

- 1 Write the general standard form of L.P. Model. (2)
- 2 A L.P. Model has the following formulation. Convert it into a standard form and also state different variables of the problem. (3)

$$\begin{aligned} \text{Min } Z &= 6X_1 + 8X_2 + 5X_3 + 9X_4 \\ \text{Sub to } X_1 + 2X_2 + 4X_3 + 5X_4 &= 90 \\ 2X_1 + 6X_2 + 8X_3 - 2X_4 &= 120 \\ X_1 + 4X_2 - X_3 + 3X_4 &= 110 \\ 4X_1 + 5X_2 + 6X_3 - 3X_4 &= 160 \\ X_1, X_2, X_3, X_4 &\geq 0 \end{aligned}$$
- 3 State the Bellman's principle of optimality. (2)
- 4 Define a Neural Network model with a sketch. (3)
- 5 List out different types of defuzzification methods. (3)
- 6 Two fuzzy sets are given below. Compute Union, Intersection and complement. (4)

$$\bar{A} = \left\{ \frac{0.2}{3}, \frac{0.4}{6}, \frac{0.6}{8}, \frac{0.7}{10} \right\} \quad \tilde{B} = \left\{ \frac{0.2}{3}, \frac{0.3}{6}, \frac{0.5}{8}, \frac{0.8}{10} \right\}$$
- 7 Write binary coding for 9, 6 and 7. (3)

PART – B (5x10 = 50 Marks)

- 8 a) Solve the following L.P. problem by simplex method or graphical method. (6)

$$\begin{aligned} \text{Max } Z &= 5X_1 + 3X_2 \\ \text{Sub to } X_1 + X_2 &= 2 \\ 5X_1 + 2X_2 &= 10 \\ 3X_1 + 8X_2 &= 12 \\ X_1, X_2 &\geq 0 \end{aligned}$$
- b) Explain Simplex Algorithm and various steps involved using the same to solve L.P. problem. (4)
- 9 Allocation of water has to be done to two different irrigated regions and also the industrial water supply from a canal system. Formulate a Dynamic Programming Model for the problem. Also solve the problem using the benefits of these allocations to the users given below. Make allocation of the available resources of 40 units in steps of 10 units. (10)

Quantity Units	Irrigated Region 1	Irrigated Region 2	Industrial Supply
10	03	02	04
20	05	04	06
30	08	09	09
40	12	11	10

- 10 a) Explain briefly various architectures for Neural Network model. (6)
 b) Learning factors in back propagation Neural Networks. (4)

- 11 a) Consider two fuzzy sets given below. Compute Algebraic Sum, Algebraic Products, Bounded Sum and Bounded Differences. (7)

$$\tilde{A} = \left\{ \frac{0.1}{1}, \frac{0.2}{3}, \frac{0.3}{5}, \frac{1.0}{7} \right\} \quad \tilde{B} = \left\{ \frac{0.3}{1}, \frac{0.5}{3}, \frac{0.7}{5}, \frac{1.1}{7} \right\}$$

- b) Explain briefly membership function in fuzzy logic. (3)
- 12 a) Explain the basic concept of Genetic Algorithm model. (3)
 b) What do you understand by cross-over operation in Genetic Algorithm? Explain two dimensional cross-over in Genetic Algorithm. (7)

- 13 a) Solve the following L.P. Problem by simplex method or graphical method. (7)

$$\begin{aligned} \text{Max } Z &= 4X_1 + 5X_2 + 9X_3 + 11X_4 \\ \text{Sub to } X_1 + 2X_2 + 4X_3 + 6X_4 &= 15 \\ 7X_1 + 5X_2 + 3X_3 + 2X_4 &= 120 \\ 3X_1 + 5X_2 + 10X_3 + 15X_4 &= 100 \\ X_1, X_2, X_3, X_4 &\geq 0 \end{aligned}$$

- b) Compare Linear Programming and Dynamic Programming methods. (3)
- 14 Write short note on the following:
- a) Procedure of solving L.P. Model using Big M method and two phase method. (4)
 b) Formulation of Dynamic Programming. (3)
 c) Supervised Learning in Neural Networks. (3)

FACULTY OF ENGINEERING**B.E. (Inst.) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018****Subject: Advanced Sensors****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part – A and any five questions from Part – B.****PART – A (10x2 = 20 Marks)**

- 1 Define:
 - a) Transfer Function
 - b) Bandwidth in sensors
- 2 What are the limitations of sensor measurements in resistance?
- 3 What is biosensor and draw its configuration diagram?
- 4 What is NANO sensor and MEMS?
- 5 What are Chemical Sensors?
- 6 State the working principle of Magnetic field sensor.
- 7 What is the working principle of photo sensors?
- 8 What is fiber optic sensors?
- 9 What is robotic vision?
- 10 State the working principle of proximity sensor.

PART – B (5x10 = 50 Marks)

- 11 Mention the important characteristics of Sensor. Explain each of them in detail with suitable example of Analog Devices ADXL 150. (10)
- 12 a) What are the considerations in Biosensor development? Also write short notes on transduction mechanism in biosensor. (5)
b) Write short notes on Carbon Nano tubes. (5)
- 13 a) Explain the principle of electromagnetism with suitable diagrams. (5)
b) Write short notes on application of smart sensors. (5)
- 14 a) What are CHEMFETs? Explain with suitable diagram how it works. (5)
b) Write short notes on Infrared pyrometry with suitable diagram. (5)
- 15 a) Write short notes on proximity sensor. (5)
b) Write short notes on Tactile sensor. (5)
- 16 a) Mention the classification of sensors in detail. (5)
b) What are the micromachining? Explain biomedical applications of MEMS. (5)
- 17 Write short notes on the following: (10)
 - a) Mass Sensors
 - b) Instrument Selection.

FACULTY OF ENGINEERING

B.E. (CSE) V – Semester (CBCS)(Main)Examination, Nov./Dec. 2018

Subject: Artificial Intelligence (Elective-I)

Time: 3 Hours

Max. Marks: 70

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (10X2=20 Marks)

- 1 Prove the following theorem using natural deduction system $[(A \rightarrow B) \wedge (B \rightarrow C)] \rightarrow A \rightarrow C$
- 2 Define Artificial Intelligence. List the Applications of AI
- 3 Represent in predicate calculus the knowledge contained in the following sentence:
"Every city has a dog catcher who has been bitten by every dog in town"
- 4 Define a frame in knowledge representation. Give an example.
- 5 What are the capabilities of an expert system?
- 6 In robot block lifting problem we know the following wff's
{BAT_OK, MOVES', BAT_OK LIFTABLE \rightarrow MOVES}
Use resolution refutation to prove \neg LIFTABLE and draw the resolution refutation tree
- 7 Illustrate a two-layer feed-forward network with two inputs, two hidden nodes and one output node.
- 8 Define entropy
- 9 What is meant by parsing?
- 10 What are the different levels for natural language understanding?

PART – B (5x10 = 50 Marks)

- 11 Dr. Somebody, Dr. Anybody, and Dr. Nobody are computer scientists. 10
We know the following facts about them:
 1. Dr. Somebody is an associate professor.
 2. Dr. Nobody is an assistant professor and has published papers with Dr. Anybody.
 3. Dr. Anybody is either an associate or an assistant professor (but not both) and has published papers with Dr. Somebody.
 Use resolution refutation to prove that an assistant professor has published papers with an associate professor; that is, prove

$$\exists x, y [Assistant(x) \wedge Associate(y) \wedge PPW(x, y)]$$
- 12 Explain how values are propagated in the game tree using MINIMAX and ALPHA-BETA pruning. Show the nodes that will be pruned. 10

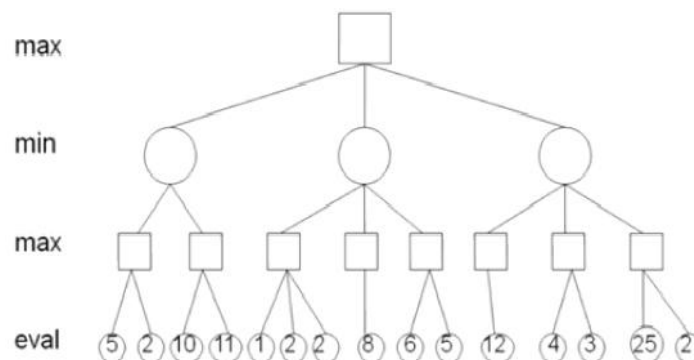
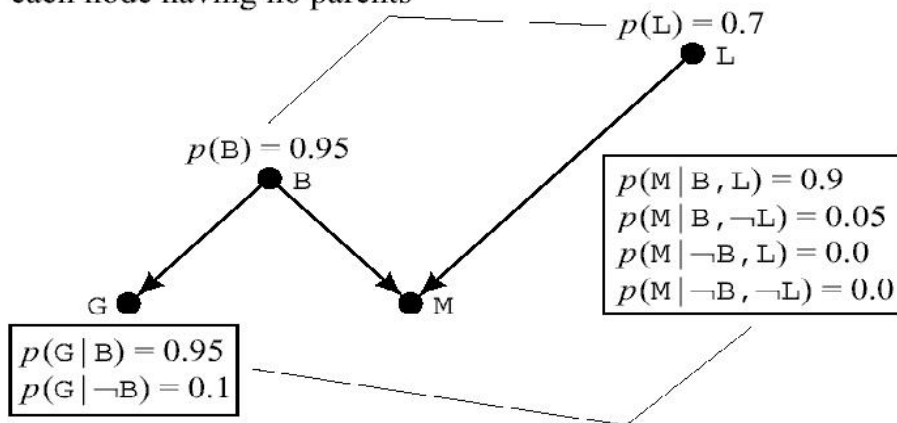


Fig.1: Game Tree

- 13 Calculate $P(M|L)$ i.e., the probability that the arm moves given that the block is liftable

10

Prior probabilities associated with each node having no parents



Conditional probability tables associated with each child node and its parents

$$p(G, B, M, L) = p(G|B)p(M|B, L)p(B)p(L)$$

- 14 Discuss the architecture of expert systems and explain the main components of an expert system 10
- 15 Explain the importance of Natural Language Processing? Enumerate the various phases in NLP. 10
- 16 Assume a domain with three attributes A, B, and C. Each attribute has two possible values T and F. Given below is a set of instances.

A	B	C	Target
T	T	T	YES
T	T	F	NO
T	F	T	YES
F	T	T	YES
F	T	F	NO
F	F	F	YES

Calculate the information gain for the attributes A, B and C. Which attribute would be selected by the standard ID3 algorithm?

10

- 17 What is a neural network? What are different types of neural network? Illustrate each with an example. 10

FACULTY OF ENGINEERING**B.E. (IT) V-Semester (CBCS) (Main) Examination, November / December 2018****Subject : Artificial Intelligence (Elective-I)****Time : 3 hours****Max. Marks : 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (20 Marks)**

- 1 Define AI. List a few applications of AI.
- 2 Distinguish between un-informed search and heuristic search.
- 3 Convert the following expression into clausal form :
 $(\forall x (\exists Y(\text{person}(x) \rightarrow \text{eats}(x, y) \wedge \text{Icecrean}(y))))$.
- 4 Show that $A \rightarrow (B \vee \sim C) \rightarrow D$ is a tautology or not.
- 5 Define joint probability and conditional probability.
- 6 What is expert system?
- 7 What are the advantages of neural networks over conventional computers?
- 8 What is Artificial neural network?
- 9 Differentiate supervised learning and unsupervised learning.
- 10 What are the approaches to knowledge representation?

PART – B (5 x 10 = 50 Marks)

- 11 a) Explain Hill climbing and its limitations. 3
- b) We have 3 jugs of capacities 3, 5 and 8 litres. There is no scale on the jugs, so its only their capacities that we certainly know. 7

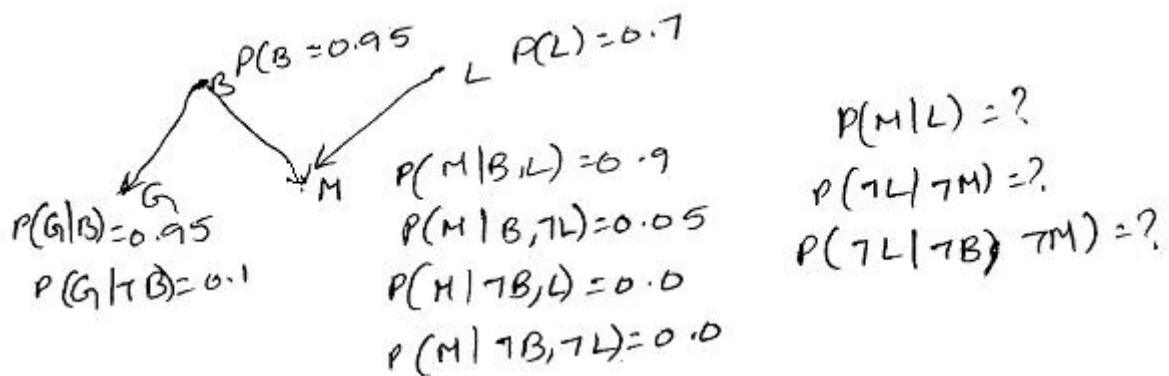
Initially, the 8 liters jug is full of water the other two are empty (there is no endless supply of water from the tap) we can pour water from one jug to another and the goal is to have exactly 4 litres of water in any on the just. The amount of water in the other two just at the end is irrelevant use state space approach to solve the problem.

- 12 a) Illustrate a possible results of heuristic search procedure by defining a suitable heuristic function for an 8-puzzle problem. 5
- b) Describe the behaviour of A* search terms of optimality completeness and complexity. 5
- 13 “Anything anyone eats is called food. Mita likes all kinds of food. Mango is a food, John eats Pizza. John eats everything Mita eats”.

Translate these sentences into formulae in predicate logic and then to program clauses. Use resolution algorithm to answer the following goals. 10

- a) What food does John eat?
- b) Does Mita likes Pizza
- c) Which food does John like?
- d) Who likes what food?
- e) Mita likes Pizza and Burger

- 14 a) Write short notes on Bayesian Belief Networks. 5
 b) Determine whether the formula $(A \vee B) \wedge (\sim A \wedge \sim B)$ is consistent or inconsistent using table method. 5
- 15 a) Draw and explain the architecture of expert system. 5
 b) For the given Bayes network, find out the following probabilities using the three patterns of inference. 5



- 16 a) Write back propagation algorithm. Explain its working with the help of an example. 5
 b) Discuss briefly about the applications of Neural Networks. Describe the architecture and learning scale of per cent. 5
- 17 a) What is a frame in situation calculus? Define the frame problem. 5
 b) Explain semantic Network. 5

FACULTY OF ENGINEERING**B.E. (IT) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018****Subject: Multimedia Technologies (Elective – I)****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part – A & any five questions from Part – B.****PART – A (10x2 = 20 Marks)**

- 1 What do you mean by “multimedia”? Is multimedia simply a collection of different types of media? (2)
- 2 What is VRML? (2)
- 3 What do we need to do to adaptively transform 24-bit color values to 8-bit ones? (2)
4. What color is outdoor light? Around what wavelength would you guess the peak power is for a red sunset? (2)
5. Assume that we wish to develop a new Internet service, for doctors. Medical ultrasound is in the range 2–10MHz; what should our sampling rate be chosen as? (2)
- 6 What is the need for quantization during transmission of audio? (2)
7. List the advantages of Arithmetic Coding as compared to Huffman Coding? (2)
8. How many principal modes does JPEG have? What are their names? (2)
9. When should RTP be used and when should RTSP be used? (2)
- 10 What is the difference between GSM/GPRS and WCDMA? (2)

PART – B (5x10 = 50 Marks)

- 11 a) What is involved in developing and using hypertext systems? (5)
- b) Describe the good desirable features of image-editing tools with examples (5)
- 12 a) What are bitmap images? How are they made? (5)
- b) Discuss palette flashing and dithering. (5)
- 13 a) Write about various digital video recording formats. (5)
- b) How would you use digital audio to enhance a graphic or text based presentation (5)
- 14 Is the JPEG2000 bit stream SNR scalable? If so, explain how it is achieved using the EBCOT algorithm. (10)
- 15 a) Describe the functionalities of each layer in the OSI model and their relations to multimedia communications. (5)
- b) Discuss the role of users in interactive CBIR systems. (5)
- 16 a) Explain how you can create an animated scene with an example. (5)
- b) Describe YUV Color Model. (5)
- 17 Write short notes on the following:
 - a) CCIR Standards for Digital Video (4)
 - b) Internet QoS (3)
 - c) Multimedia over IP (3)

FACULTY OF ENGINEERING**B.E. V – Semester (EEE) (CBCS)(Main) Examination, Nov./ Dec. 2018****Subject: FACTS DEVICES****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part A & any Five questions from Part B.****PART – A (20 Marks)**

- 1) Why depending upon loading, there could be voltage swell or sag as we move towards the midpoint of transmission line? 3
- 2) What do you infer from the impedance vs. delay angle characteristics of TCSC? 3
- 3) What is the function of phase angle regulator? 2
- 4) Why the STATCOM absorb the small amount of real power from the AC system? 2
- 5) Why is flexible AC transmission system needed? 3
- 6) What are the limitations of reactive power support using passive elements? 2
- 7) Mention merits and demerits of series compensation with respect to shunt compensation. 2
- 8) Compare TCSC and TSSC in improving transient stability. 3

PART – B (5x1 = 50 Marks)

- 9) a) For a simple two machines system, obtain the expression for active and reactive power at both ends with suitable phasor diagram and power angle curve for different values of impedances. 5
- b) Explain basic concept of Current-Sourced converter (self or line commutated) 5
- 10) a) Explain the basic operating principle of TCR and its operating V-I characteristics. 5
- b) Explain the basic principle and different modes of operation of Fixed Capacitor, Thyristor-Controlled Reactor Type VAR Generator (FC_TCR). 5
11. a) Explain the basic principle and different modes of operation in TCSC? 5
- b) "Injecting the voltage into transmission line perpendicular to the line current mostly changes the active power". Justify with the help of phasor diagram. 5
12. a) Deduce that a UPFC can perform all the functions of the traditional compensating devices used in a power system. 5
- b) Explain the capability of the UPFC to control independent real and reactive power flow in the transmission line. 5

contd....2

13. a) Give in detail, the important parameters and their role in maintaining stability of power system. 5
- b) How can series compensation method can achieve power oscillation damping and improving transient stability? 5
14. a) Explain how shunt compensation can be achieved with ideal midpoint reactive compensators. What is the effect of multi point segmentation on line performance? 5
- b) Name and explain different types of stability issues that limit transmission capability. 5
15. a) Explain the basic principle and control capability of SSSC with phasor diagrams. Why with series compensation the effective X/R ratio of transmission line decreases? 5
- b) How the reactive power compensation is done using STATCOM? What is the importance of V-I characteristics of STATCOM? 5
