B.E.Eighth Semester (Electronics & Telecommunication / Electronics & Communication Engineering) (C.B.S.)

Elective - III : Robotics & Automation

_____

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) List the three key ingredients of an intelligent robot and explain end effectors in detail. **7**

   b) The diagram in figure below is called a network. Suppose this network represents a map of roads between cities A and B. List all possible routes that could be used to get from city A to city B and indicate the total mileage for each route. Do not visit any city more than once. **4**
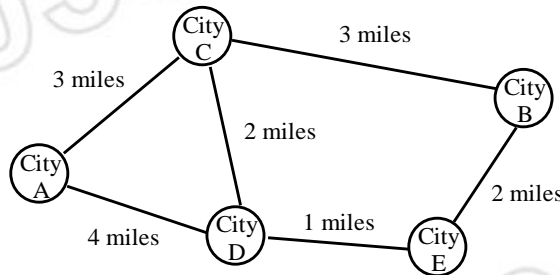

Fig. 1 (b)

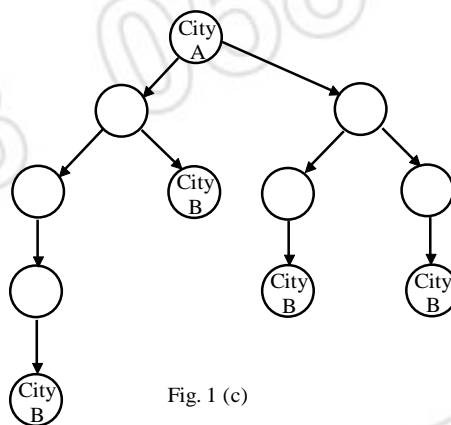   c) Using your solution from 1(b), Fill in the circles in figure below for each A to B route. **2**

Fig. 1 (c)

OR

www.solveout.in

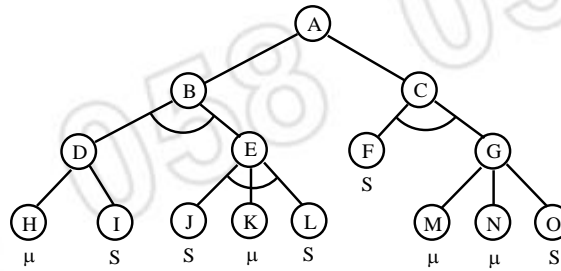| **2.**	a)	Explain Blind searches in detail.	**9**
	b)	Given the AND/ OR tree shown in figure below. The letter S beneath a primitive node means that the node is solved, while the letter μ means that the node is unsolvable. Does a solution path (s) exist? If so, sketch the solution subgraph (s).	**4**

Fig. 2 (b)

3.	a)	What do you mean by rule of inference? Explain all in relation to propositional calculus.	**7**
	b)	Prove that $\overline{A} \vee B \equiv A \rightarrow B$.	**6**

OR

4.	a)	What are the three major parts of production system? Explain each in detail.	**7**
	b)	Explain in detail the three major operating modes of an expert system.	**6**

5.	a)	Explain the Linear predictive coding method for frequency domain analysis synthesis.	**7**
	b)	Describe the fundamental difference between PCM, delta modulation, DPCM and ADPCM.	**6**

OR

6.	a)	Explain the function of a control strategy in a speech understanding system. Also explain all control strategies.	**7**
	b)	What design criteria must be considered when designing a speech recognition or speech understanding system?	**6**

7.	a)	i)	Construct 8x8 picture matrix for letter A using a 4bit gray- scale code.	**9**
		ii)	Smooth the matrix you constructed in part (i) using the local averaging technique and a 3x3 pixel window.	
		iii)	Generate a binary matrix form your smoothed gray- scale matrix in part (ii). Use Roberts operator thresholding technique with a threshold value of 4.	
	b)		Explain how region splitting differs from region growing.	**5**

OR

8.	a)	Describe the three levels of design difficulty that apply to industrial vision system.	**7**

2

www.solveout.in

	b)	What do you mean by trihedral world? Explain in detail.	**7**
9.	a)	Name at least three forms of active triangulation and explain any two in detail.	**7**
	b)	i) A burst of ultrasound takes 5ms to reach and return from an object. What is the range, is feet, of the object?	**6**
		ii) What is the range of the object if laser light is substituted for ultrasound in part (i).	

OR

10.	a)	Explain optical position and proximity sensor.	**7**
	b)	List and explain the properties of tactile sensor.	**6**
11.	a)	What are the three different phases of task planning? Explain each in detail.	**10**
	b)	Give the characteristics of AL & AML robot programing languages.	**4**

OR

12.	a)	List and explain the characteristics of robot- oriented programming.	**10**
	b)	Give the comparison between AL, AML and AUTOPASS.	**4**

****