Time: (3 Hours) **Max Marks: 80**

NOTE: - Q1 is compulsory
Solve any three from remaining.

Q1. Solve any **four** from following. [20]

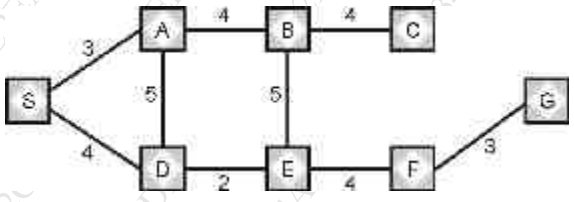
a. Compare the importance of Partial order planning over Total order planning.
b. What data is used to evaluate award and punishment of robot navigation?
c. Explain the categorization of Intelligent System.
d. How AI will help in the Robotics application.
e. Generate the parse tree for a sentence "The *cat ate the fish".*
f. What do you mean by state space representation? Explain with example the necessity of it

Q2. a. What actions would you take to prove "Some who are intelligent can't read" using prepositional logic [10]

1. Whoever can read is literate.
2. Dolphins are not literate.
3. Some dolphins are intelligent.

b. Solve the Air cargo transport problem using Planning. It involves loading and unloading cargo onto and off of planes and flying it from place. Initial State is cargo 1 and plane 1 is at Mumbai airport, cargo 2 and plane 2 is at Delhi airport. Goal State is cargo 2 should be at Mumbai airport and cargo 1 should be at Delhi airport. [10]

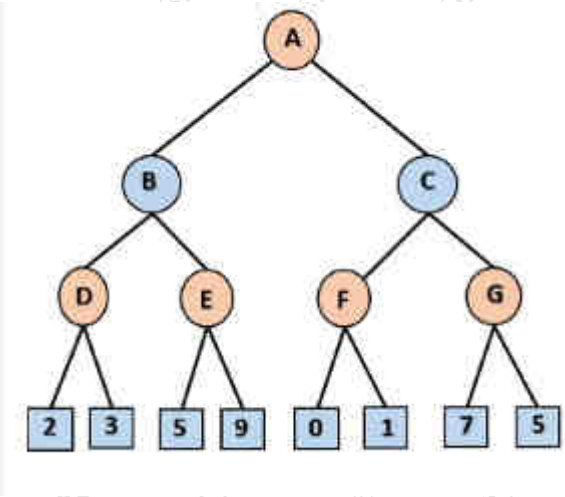
Q3. a. Apply A* algorithm on the following graph. Heuristic values are
h(S) = 15, h(A) = 14, h(D) = 12, h(B) = 10, h(E) = 10, h(C) = 8 , h(F) = 10,
h(G) = 0. [10]
S is the start node and G is the goal node.



.

b. Explain the Depth Limit search and Depth first iterative deepening search. [10]

Q4. a. Apply the alpha beta pruning on following example by considering the root node a max. [10]



b. Explain PEAS descriptors also state PEAS description for online English tutor. [10]

Q5. a. Explain Problem formulation also give the initial state, goal test, successor function, and cost function for the following.
Choose the formulation that is precise enough to be implemented.
Problem statement: A 3 foot tall monkey is in a room where some bananas are suspended from the 8 foot tall ceiling. He would like to get bananas. The room contains two stackable, movable, climbable 3 foot high crates. [10]

b. Explain the concept of PAC learning [10]

Q6 .Write detailed note on following. (**Any two**) [20]

a. Hill Climbing Algorithm and it's Limitations.
b. Forward and Backward Chaining
c. Language models of Natural Language Processing

(3 Hours) **[Total Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR **[20]**

a Explain with examples keyed and keyless transposition ciphers.

b Explain the different modes of block ciphers.

c Differentiate between SHA-1 and MD5

d What is Buffer overflow attack?

e Explain ARP spoofing.

2 a Explain Diffie Hellman key agreement algorithm. Also discuss the possible attacks on it. Consider the example where A and B decide to use the Diffie Hellman algorithm to share a key. They choose p=23 and g=5 as the public parameters. Their secret keys are 6 and 15 respectively. Compute the secret key that they share. **[10]**

b Explain AES algorithm. Highlight the difference between AES and DES. **[10]**

3 a Explain various types of firewalls. **[10]**

b Discuss various attacks on digital signatures and the methods by which they can be overcome. **[10]**

4 a Elaborate the sign and verification process of RSA as a digital signature scheme. **[10]**

b Write short notes on **[10]**

1. Packet sniffing
2. SQL injection

5 a State the rules for finding Euler's phi function. Calculate **[10]**
a. φ(10)
b. φ(49)
c. φ(343)

b Explain Kerberos as an authentication service. **[10]**

6 a Enlist the various functions of the different protocols of SSL. Explain the phases of handshake protocol. **[10]**

b How does ESP header guarantee confidentiality and integrity of packet payload? What is an authentication header (AH)? How does it protect against replay attack? **[10]**

Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any **FOUR**	**[20]**
	a	Explain different types of Antenna used in mobile communication.	**5**
	b	What is co-channel interference?	**5**
	c	What is reverse tunneling?	**5**
	d	Describe use of Cellular IP.	**5**
	e	Compare various Telecommunication Generations	**5**
2	a	Explain protocol architecture of WLAN and its different types.	**[10]**
	b	What is the use of different interfaces used in the global system for mobile communication (GSM) with appropriate diagram?	**[10]**
3	a	What are different security algorithms used in GSM?	**[10]**
	b	How is packet delivery achieved to and from mobile nodes?	**[10]**
4	a	Explain Wireless LAN threats.	**[10]**
	b	What is the responsibility of MAC management in IEEE 802.11?	**[10]**
5	a	Explain selective retransmission process at TCP.	**[10]**
	b	Explain self-organizing networks (SON) for heterogeneous Networks.	**[10]**
6	a	Explain agent registration process in mobile communication.	**[10]**
	b	What is micro mobility and its approaches?	**[10]**

****

Total Marks 80

(3 Hours)

NB

1) Question **number 1** is compulsory
2) Attempt **any three** out of the remaining **five questions**.
3) Assume suitable data if **necessary** and justify the assumptions.
4) Figures to the **right** indicate full marks

Q1 **20**

a) Explain Bar chart with following example:
Ex. The following table shows the number of books of different subject in library.

Subject	Phy.	Chem.	Bio.	Hist.	Gio.	Eng.	Math.	Comp
No. of Books	100	125	75	75	50	200	250	175

b) Equations of the two lines of regression are: $x + 6y = 6$ and $3x + 2y = 10$
Find :
i) mean of x and mean of y
ii) regression coefficients b_{yx} and b_{xy}
iii) Correlation coefficient between x and y

c) In a certain trivariate distribution: $r_{12} = 0.7$, $r_{23} = r_{31} = 0.6$ find The partial correlation coefficient $r_{12.3}$

d) A survey conducted over the last 25 years indicated that in 10 years the winter was mild, in 8 years it was cold and in the remaining 7 years it was very cold. A company sells 1000 woollen coats in a mild year, 1300 in a cold year and 2000 in a very cold year. You are required to find the yearly expected profit of the company if a woollen coat costs Rs. 1730 and it is sold to stores for Rs. 2480.

Q2 a) Define the term "Statistics" and discuss its use in business and trade. Also point out its limitations. **10**

b) What are the various methods of collecting statistical data? Which of these is most reliable and why? **10**

Q3 a) Find the Mean Deviation From the Median for the following data **10**

Age of Workers	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of Workers	120	125	175	160	150	140	100	30

b) A survey of 370 students from Commerce Faculty and 130 students from Science Faculty revealed that 180 students were studying for only C.A. Examinations, 140 for only Costing Examinations and 80 for both C.A. and Costing Examinations. The rest had offered part-time Management Courses. Of those studying for Costing only, 13 were girls and 90 boys belonged to Commerce Faculty. Out of 80 studying for both C.A. and Costing, 72 were from Commerce Faculty amongst which 70 were boys. Amongst those who offered part-time Management Courses, 50 boys were from Science Faculty and 30 boys and 10 girls from Commerce Faculty. In all there were 110 boys **10**

in Science Faculty. Present the above information in a tabular form. Find the number of students from Science Faculty studying for part-time Management Courses.

Q4 a) A departmental store gives in-service training to its salesmen which is followed by a test. It is considering whether it should terminate the service of any salesman who does not do well in the test. The following data give the test scores and sales made by nine salesmen during a certain period : **10**

Test scores	14	19	24	21	26	22	15	20	19
Sales ('000 Rs.)	31	36	48	37	50	45	33	41	39

Calculate the coefficient of correlation between the test scores and the sales. Does it indicate that the termination of services of low test scores is justified? If the firm wants a minimum sales volume of Rs. 30,000, what is the minimum test score that will ensure continuation of service ? Also estimate the most probable sales volume of a salesman making a score of 28.

b) Define a random variable and its mathematical expectation. **10**

Q5 a) Write a detailed note on least square regression. **10**

b) What are the test of skewness? **10**

Q6

a) Explain the following point Estimation Properties with Example **10**
   i) Consistency
   ii) Unbiasedness

b) What is Hypothesis testing? For large samples explain **10**
   i) Test of significance for a single mean
   ii) Test of significance of difference between two means

****

(3 Hours) **Total Marks: 80**

N.B: (1) Question No. 1 is compulsory.
(2) Attempt any three questions out of the remaining five questions.
(3) Figures to the right indicate full marks.
(4) Make suitable assumptions wherever necessary.

==========

Q.1.	A.	Differentiate between Application Software and System Software.	**5**
	B.	What are the functions of a Loader? Enlist the loader schemes.	**5**
	C.	Explain Macro and Macro Expansion with example.	**5**
	D.	Compare Bottom-Up and Top-Down Parser.	**5**
Q.2.	A.	Explain with flowchart design of two pass assembler.	**10**

	B.	Construct Three address code for the following program
		For(i=0;i<10;i++)
		{
		If (i<5)
		a=b+c*3;
		else
		x=y+z;
		}
			10

Q.3.	A.	Explain different features of macros with suitable example.	**10**
	B.	Design LL(1) parsing table for the given grammar: $S \rightarrow Ad$ $A \rightarrow aB \mid BC$ $B \rightarrow b$ $C \rightarrow e \mid \varepsilon$ Also state that whether the given grammar is LL(1) or not.	**10**
Q.4.	A.	Explain the working of a Single-pass macro processor with neat flowchart.	**10**
	B.	What are the different ways of representing Intermediate code? Explain with suitable example.	**10**
Q.5.	A.	Explain different issues in code generation phase of compiler.	**10**
	B.	Construct DAG for the following expression **x= m+p/q – t+ p/q *y**	**10**
Q.6.	A.	Explain Direct Linking Loader in Detail.	**10**
	B.	Explain the different phases of a compiler with suitable example.	**10**