AI 2M and 3M questions for Mid-1

(1) Describe the foundations of A.I. in detail.
(2) Describe any 5 sub-fields/areas of A.I.
(3) Mention a few applications of A.I.
(4) Discuss the Modern trends of A.I.
(5) Solve the Water-Jug problem using Production System and State Space Search.
(6) Solve the Missionary-Cannibal problem using Production System and State Space Search.
(7) Describe the algo. of Depth First Search & demonstrate it with an example.
(8) Describe the algo. of Breadth First Search & demonstrate it with an example.
(9) Describe the algo. of IDDFS & demonstrate it with an example.
(10) Describe the algo. of Uniform Cost Search & demonstrate it with an example.
(11) Describe the algo. of Best First Search & demonstrate it with an example.
(12) Describe the algo. of A* Search & demonstrate it with an example.
(13) Solve the following Crypt-arithmetic problems:

1)
$$\begin{array}{r} \text{BASE} \\ +\ \text{BALL} \\ \hline \text{GAMES} \end{array}$$

2)
$$\begin{array}{r} \text{CROSS} \\ +\ \text{ROADS} \\ \hline \text{DANGER} \end{array}$$

3)
$$\begin{array}{r} \text{LOGIC} \\ +\ \text{LOGIC} \\ \hline \text{PROLOG} \end{array}$$

4)
$$\begin{array}{r} \text{SEND} \\ +\ \text{MORE} \\ \hline \text{MONEY} \end{array}$$

(14) Describe the Mini-Max algo. & demonstrate it with an example.
(15) Describe α-β pruning technique & use an example to demonstrate it.
(16) Give the 10 laws of Natural Deduction System.
(17) Using Natural Deduction System; solve the following & tell whether the inferences made are valid.

(i) $[(A \to B) \wedge A] \vdash B$ (ii) $A \vee (B \wedge C) \vdash (A \vee B) \wedge (A \vee C)$ (iii) $(A \vee B) \wedge (A \vee C) \vdash A \vee (B \wedge C)$

(iv) $[(p \wedge q), r] \vdash (q \wedge r)$ (v) $(\sim p \vee q) \vdash (p \to q)$

(18) Using Axiomatic System, solve the following: & tell whether the inferences made are valid.

(i) $\{(p \to q), (q \to r)\} \vdash (p \to r)$

(ii) $\vdash \sim p \to (p \to q)$

(19) Using Semantic Tableau Method, prove that $(A \wedge B) \wedge (B \to \sim A)$ is unsatisfiable.

(20) Find whether $\{\sim (A \vee B), (B \to C), (A \vee C)\}$ is a consistent set using Semantic Tableau Method.

(21) Using Resolution Refutation Method, solve the following:

(i) $S = \{(A \vee B), (\sim A \vee D), (C \vee \sim B)\} \vdash (C \vee D)$

(22) (ii) Prove that $(B \vee C)$ is logical consequence of $\{A \wedge B, \sim A \vee C\}$.

(iii) P.T. $(A \vee C)$ is logical consequence of $\{A, B \to C, B\}$.

(iv) P.T. $(C \to A)$ is logical consequence of $\{(B \wedge C) \to A, B\}$

(v) P.T. $(A \vee \sim B)$ is logical consequence of $\{(A \vee C), (\sim B \vee \sim C)\}$

(vi) P.T. $(\sim U \wedge S)$ is logical consequence of $\{(A \vee C), (C \to B), \sim B, (A \to S), \sim U\}$.