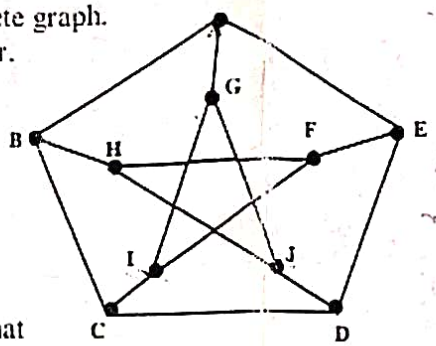
DEPARTMENT OF MATHEMATICS

NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

B.Tech. Semester-III (CS, IT)	**Mid Term Examination-II**
Discrete Mathematical and Statistical methods	**M.M. 20**
Course Code: MAIC 201	**Time: 6:30 p.m.-7:20 p.m.**

Note: Attempt all the Questions. Each question carries equal marks.

1. Prove that there is always a Hamiltonian path in a directed complete graph.
2. Check the planarity of the following graph and justify your answer.



3. Let R be a binary relation on the set of all positive integer such that R= {(a, b) | a-b is an odd integer}. Is R reflexive? Symmetric? Antisymmetric? Transitive? An equivalence relation? A partial ordering relation?
4. Show that the relation R on A= {1,2,3,4,5} given by the following relation matrix is a linear ordering relation. Also, draw the Hasse diagram. (3+2)

$$M_R = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$