BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

CLASS: IMSC **SEMESTER : V**
BRANCH: MATHEMATICS **SESSION : MO/2023**

SUBJECT: MA305 GRAPH THEORY

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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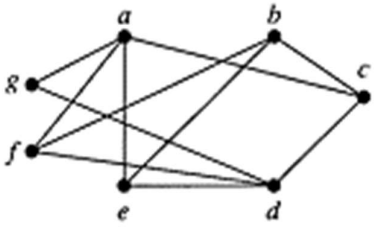
Q.1(a) Check whether the graph is bipartite or not. If yes, write down the two partite [2]



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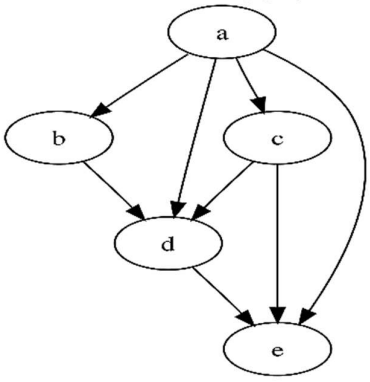
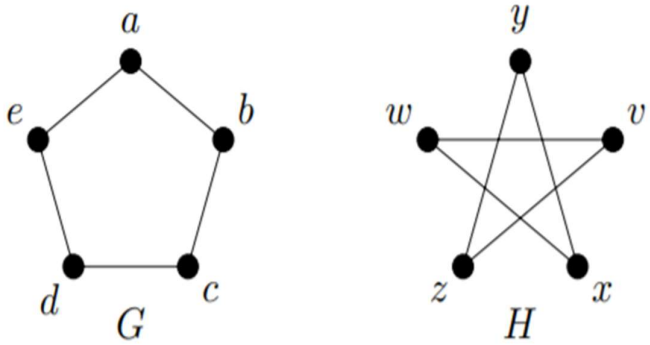
Q.1(b) Find the adjacency matrix of the following graph [3]



Q.2(a) Check whether the following two graphs are isomorphic or not. Verify necessary and sufficient conditions. [5]



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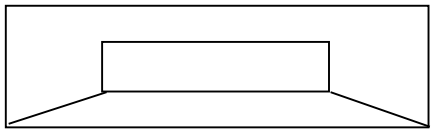
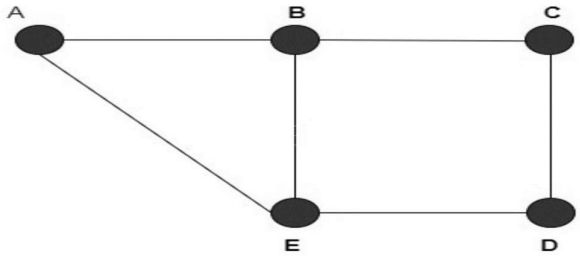
Q.3(a) Define Hamiltonian graph and given an example of a Hamiltonian graph which is not Eulerian. [2]

Q.3(b) Decompose the following graph into copies of $K_{1,3}$ [3]



Q. 4(a) Is there a connected planar graph with an odd number of faces where every vertex has degree 6? Prove your answer. [5]

Q.5(a) Find the independence number, minimum vertex cover and minimum edge cover for the following graph [5]



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