Ponce	Martin	10371381	Date 16/10/2014
Family name	Given name	Student number	

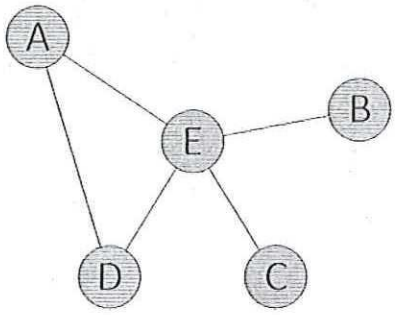
ENS1161 Computer Fundamentals

Test 10

10/10

(a) Join the vertices to create a graph that corresponds to the adjacency matrix given:

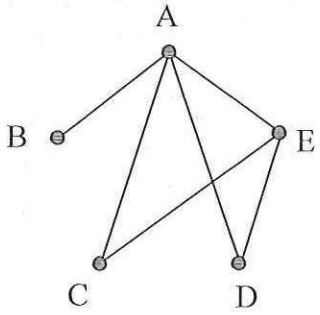
	A	B	C	D	E
A	0	0	0	1	1
B	0	0	0	0	1
C	0	0	0	0	1
D	1	0	0	0	1
E	1	1	1	1	0

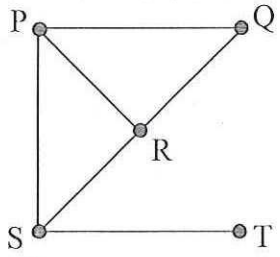


✓ 1.

(b) For each of parts (i) and (ii), determine whether the given pair of graphs is isomorphic. If so, find a function f : {A, B, C, D, E} → {P, Q, R, S, T} that shows the isomorphism. If not, explain why not.

(i)

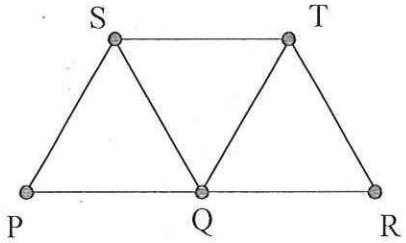




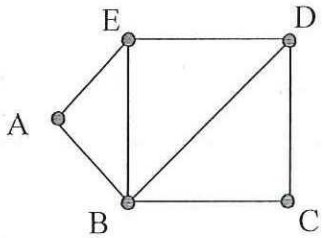
✓ 3

These graphs are not isomorphic. The first graph contains one vertex that is degree 4, while the second graph does not have such a vertex.

(ii)



✓



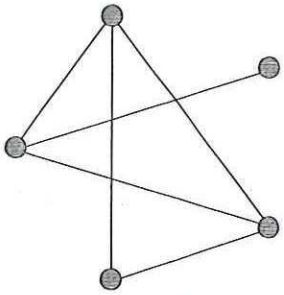
These graphs are isomorphic. P → A, Q → B, R → C, S → E, T → D.

(c) For each of the following graphs, state whether the graph has:

- no Eulerian path (N)
- an Eulerian path but no Eulerian circuit (P)
- an Eulerian circuit (C)

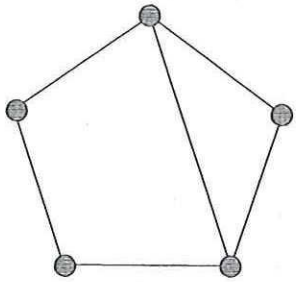
Indicate your answers by writing N, P or C in the spaces provided.

(i)



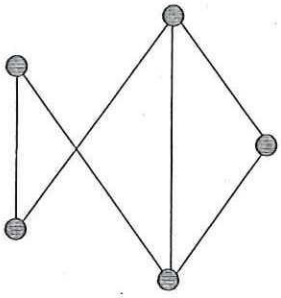
N: > 2 odd vertices

(ii)



P: 2 odd vertices

(iii)

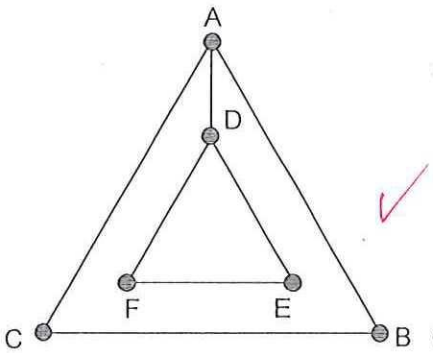


P: 2 odd vertices

3

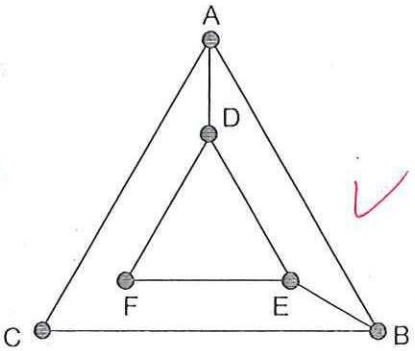
(d) Find an Eulerian path in graph (i), a Hamiltonian circuit in graph (ii), and a Hamiltonian path in graph (iii). Give your answers by listing the vertices in order along the path or circuit, **and also** by sketching clearly the path or circuit.

(i)



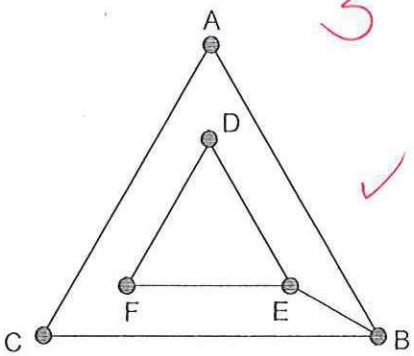
DEFDACBA

(ii)



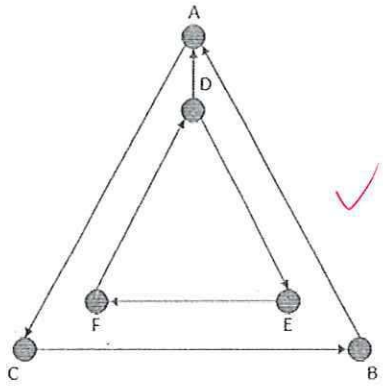
ADFEBCA

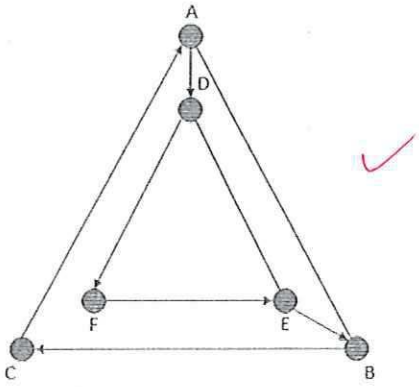
(iii)

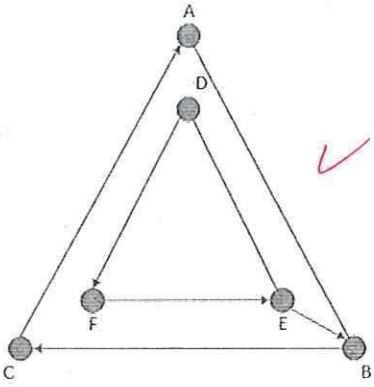


DFEBCA

3







[1 + 3 + 3 + 3 = 10 marks]