The Open University of Sri Lanka
Department of Mathematics
B. Sc/ B. Ed Degree Programme
No Book Test (NBT) - 2019/2020
Applied Mathematics– Level 05
ADU5308 – Graph Theory

DURATION: ONE HOUR

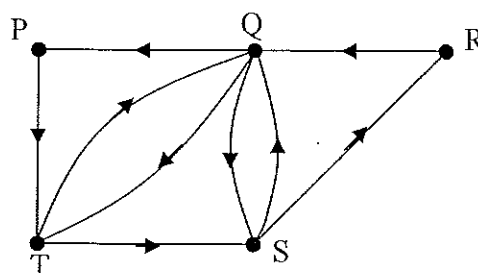Date: 18 – 08 – 2020   Time: 4.15 p.m. – 5.15 p.m.

ANSWER ALL QUESTIONS. THE TOTAL MAXIMUM MARK ATTAINABLE IS 150 AND THE FINAL MARK WILL BE CONVERTED TO 100%.

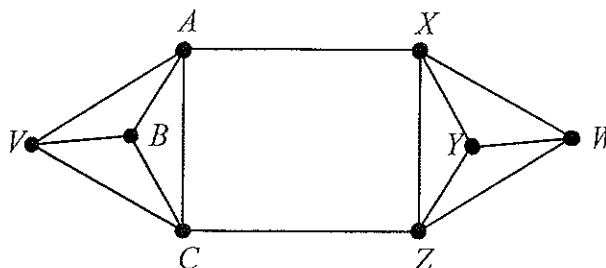01. By drawing an appropriate graph, justify the results of each of the following statements:

(a)   A connected graph is *isomorphic* to its *line graph*.   [15 Marks]

(b)   *Eulerian* graph is *orientable*.   [15 Marks]

(c)   If v is a *cut point* of a graph G then it is not a *cut point* of its *complement*.   [20 Marks]

02. Let D be the following digraph.

(a)   Verify the *Handshaking Dilemma* for D.   [20 Marks]
(b)   Show that D is *strong*.   [30 Marks]
(c)   Is D a *tournament*? Justify your answer.   [10 Marks]

03. Let G be the following graph.

(a)   Write down all the *edge-disjoint paths* and *vertex- disjoint paths* from V to W in the graph G.   [20 Marks]

(b)   Find a *minimal VW - disconnecting* set and *VW - separating sets* in the graph G.   [10 Marks]
        Hence, verify the *Menger's theorems*.   [10 Marks]