**SOUTH EASTERN UNIVERSITY OF SRI LANKA**

**SECOND EXAMINATION IN APPLIED SCIENCES – 2017 / 2018**

**SEMESTER II, MARCH / APRIL – 2020**

**MTM 22031 / MTM 22031 R(N) ELEMENTARY DIFFERENTIAL EQUATIONS**

**MARKING SCHEME**

1.

Thus,

Hence

Solving, we get

 Separating the variables, we have

 Integrating, we get

 where is an integrating constant. Simplifying, we get

, or

Using , we get or

Thus,

If .

Thus, .

Hence .

Therefore,

1. When we have

Thus, . which gives

Thus,

 Almost 3 years.

1. When , . Thus, Maximum weight is 650 kg.

2.

 Let . Then,

 Substituting these into the given equation, we have

 On simplification, we get

 Integrating, we get

 where is an arbitrary constant. Thus,

 or replacing by , we have

 Integrating factor is

 Thus, on multiplication of the integrating factor, the differential equation becomes

 Integrating, we get

 where is an arbitrary constant.

 Using , we have

 Thus,

 Now, using , we have

 and hence

 Let and . Then,

 Thus, the equation is exact.

Thus, the required solution is

 where is an arbitrary constant.

**END OF THE PAPER**