SLIIT
ACADEMY

Higher Diploma
in
Information Technology

Midterm Examination
Year 1, Semester 1 (2019)
June Intake

Mathematics for Information Technology (IT1105)

Duration: 1 Hour

Instructions to Candidates:

- This is a closed book examination.
- This paper contains 5 questions on 1 page without the cover page.
- Answer all questions in the WORKBOOK provided.
- Read all questions before answering.
- The total marks obtainable for this examination is 30.

1. Specify the domain of the given functions. (2 x 2.5 marks)

   i) $f(x) = \frac{x-5}{\sqrt[3]{x^2-4}}$

   ii) $f(x) = \frac{\ln(x)}{\sqrt{|x-2|}}$

2. Solve the given equations for x. (4 x 2 marks)

   i) $2\log_b(x) = \log_b(4) + \log_b(x-1)$

   ii) $4^{3x+2} = 2^{2x-1}$

   iii) $5 = 1 + 4e^{-6x}$

   iv) $\ln(e^x) = \ln(e^3) + \ln(e^5)$

3. Differentiate the following functions. (2 x 2.5 marks)

   i) $y = ln\left[\frac{2x-2}{x^2}\right]^2$

   ii) $y = (1 - 3e^{2x})^2$

4. Use calculus to sketch the graph of $f(x) = x^3 - 3x^2$ (7 marks)
   Find the **relative extrema** and **inflection points** if any.

5. A postal clerk spends 4 hours each afternoon [12pm -4pm] sorting mail. (5 marks)
   During that time, the clerk can sort approximately $f(t) = -t^2 + 6t$ letters in t hours. At what time during this period is the clerk performing at peak efficiency?

End of the Question Paper.