



Higher Diploma
in
Information Technology

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

Mathematics for Information Technology (IT1105)

Duration: 1 Hour

Instructions to Candidates:

- ◆ This is a closed book examination.
- ◆ This paper contains 4 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) $f(x) = \frac{\sqrt{x-1}}{x^2-4}$
- ii) $f(x) = \ln(x-8)$
2. Solve the given equations for x . (5 x 2.5 marks)
- i) $\log_3(x^2 - 6x) = 3$
- ii) $\log_2(x^2) = [\log_2(x)]^2$
- iii) $\ln x + \ln 3 = \ln 24$
- iv) $\frac{1}{27} = 9^{5x-7}$
- v) $8^x = 16$
3. Differentiate the following functions. (2 x 2.5 marks)
- i) $y = \ln \left[\frac{4x+5}{2x^2} \right]^2$
- ii) $y = x^2 e^{5x-10}$
4. Use calculus to sketch the graph of $f(x) = x^4 - 2x^3 + 6$. (7.5 marks)
Find the **relative extrema** and **inflection points** if any.

End of the Question Paper.