

Instructions to candidates

Duration: One(01) hour

Number of questions: Two(02) Essay Questions

Mark allocation: 50 mark

Use standard symbols without definition.

Scientific calculators are allowed.

Answer all questions

1.

a) Find each of the following limits.

i. $\lim_{x \rightarrow 2} (6x + 2)$ (02 mark)

ii. $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4}$ (03 mark)

iii. $\lim_{x \rightarrow \infty} \frac{2017x^5 - 2x^3 + 7x + 1}{x^5 - x^2 + 2x - 7}$ (03 mark)

iv. $\lim_{x \rightarrow -3} \frac{x + 3}{\sqrt{x + 7} - 2}$ (03 mark)

v. $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$ (04 mark)

b) Differentiate the following functions with respect to x .

i. $y = 6x^{10} + 2x^8 + 3x^7 - x^5 + 2x^2 - 5$ (02 mark)

ii. $y = (2x + 3)(x + 1)$ (02 mark)

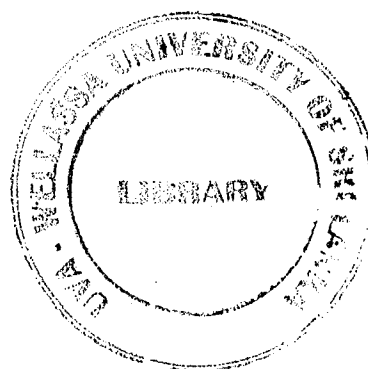
iii. $y = e^x \ln 3x$ (02 mark)

iv. $y = \frac{3x^3 - 2x^2 - 1}{x^3 + 1}$ (04 mark)

2.

a. Integrate the following functions with respect to x .

i. $\int (6x^{2016} + 4x^{2005} + 2x^{1995} + 1985) dx$ (04 mark)



ii. $\int \left(\frac{2x - 5x^7}{x^2} \right) dx$ (04 mark)

iii. $\int \frac{x + 2}{x^2 + 4x - 7} dx$ (04 mark)

iv. $\int \cos 3x dx$ (04 mark)

b. Find the value of the following integrals.

i. $\int_0^4 (1 - x) dx$ (04 mark)

ii. $\int_1^e x \ln x dx$ (05 mark)
