KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ENGINEERING

2019/2020- ACADEMIC YEAR SECOND SEMESTER

MID-SEMESTER

Q1. Suppose that $f(x,t) = 2e^{\frac{-t}{6}}$ is the monthly rate of change of the price per barrel of oil. If x is the number of millions of barrels and t is the number of months since January, 2016, find

$$\int_0^{10}\int_0^4 f(x,t)dtdx.$$

Interpret your answer.

(b) Find the sum of monthly rate of change of price per barrel of oil from January, 2016 to March, 2016 if the quantum of oil increases from 2 million barrels to 8 million barrels.

Q2. If R is the total resistance of the two resistors, connected in parallel, with resistance $R_{1,} and\ R_{2,}$ then

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}.$$

If the resistance are measured in ohms as $R_1 = 10\Omega$ and $R_2 = 20\Omega$ with an error 0.2 in each case, calculate the maximum error in R.

Q3. Explain the following theorems in your own words and state two applications of each theorem in your field of study.

(a) Divergence theorem
(b) Stokes' theorem