Kingdom of Saudi Arabia
Ministry of Education
Final Exam
Degree: B.Sc.
Year/Level: 2
Subject: Differential and Integral Calculus(II)
Title Code: MATH 102

جامعة الجوف
Aljouf University

Aljouf University
College of Engineering
Department of Mathematics
First Semester
Date: Sun 17/4/1438 (15/1/2017)
Exam Duration: 2 hours
No. of Pages:2
Total Marks: 60 Marks

Question 1: (15 marks: 3 for each part) Evaluate the following integrals.

$$\int \left(5x^3 + \text{Sin}(6x)\right) dx \,, \int \frac{dx}{\sqrt{49x^2+25}} \,, \int \frac{1}{9x^2+5} dx, \int 6^x dx \,, \int_{-2}^{3} |5x+2| \, dx.$$

Question 2: (18 marks: 6+6+6)

a) **Use integration by-parts to evaluate the following integral:**

$$\int_1^t x \ln(x) dx.$$

b) **Use method of substitution to evaluate the following integrals:**

$$\int x \, \text{Cos}(x^2) \, dx, \quad \int \frac{\tan(\ln(x))}{x} dx, \quad \int x\,(2x^2+3) dx \,.$$

c) **If, $f(x) = a + bx + cx^2$, $(a, b, c) \in \Re$, show that:**

$$\int_0^1 f(x)\, dx = \frac{1}{6}\left(f(0) + 4f(\tfrac{1}{2}) + f(1)\right).$$

Question 3: (15 marks: 8+7) Solve {1) and 2)} OR {3) and 4)}

1) **Find the area of the region bounded by the graphs of the functions:**

$$f(x) = -x^2 + 4 \,, g(x) = 2x + 4.$$

2) **Evaluate :** $\int \frac{x+4}{x(x^2-3x+2)} dx.$

3) **Express in term of "n"** $\sum_{k=1}^{n} \left(k^2 - 3k + 2\right).$

4) **Find the Area between the Curve, bounded the Graphs**

$$y = \sqrt{x} \quad \text{and} \quad y = x^2 \quad \text{between the Lines } x = 0 \text{ and } x = 1.$$

Question 4 : (12 marks:3+3+3+3) Determine whether the Integral Converges or

Diverges: $\int_{10}^{+\infty} \frac{1}{x^6} dx, \quad \int_0^9 \frac{1}{t^8} dt, \quad \int_2^6 \frac{1}{\sqrt{x-2}} dx, \int_{-\infty}^{\infty} \frac{1}{1+x^2} dx \,.$

********* *Good Luck* *********