King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

MATH 102 - Exam II - Term 133

Duration: 90 minutes

Name:_____ ID Number:_____

Section Number:_____ Serial Number:_____

Class Time: _____ Instructor's Name:_____

Instructions:

1. Calculators and Mobiles are not allowed.
2. Write neatly and eligibly. You may lose points for messy work.
3. Show all your work. No points for answers without justification.
4. Make sure that you have 7 pages of problems (Total of 8 Problems)

Page #	**Points**	**Maximum Points**
page 1		16
page 2		16
page 3		14
page 4		16
page 5		12
page 6		14
page 7		12
Total		100

1. Evaluate

A) **(8 points)** $\displaystyle\int_1^4 \frac{\log_2 x}{x}\,dx$

B) **(8 points)** $\displaystyle\int \sin^{-1} x\,dx$

2. **(8 points)** Find the equation of the tangent line to the curve $y = (4x^2 - 1)\text{csch}\,(\ln 2x)$ that passes through the point $(1, 4)$.

3. **(8 points)** Find $\int \sinh^2 x \cosh^3 x\, dx$

4. **(14 points)** Evaluate $\int e^{-2x} \sin 2x \, dx$

5. **(8 points)** Evaluate

A) $\int e^x \sec^4(e^x) \tan^3(e^x)\, dx$

B)**(8 points)** $\int x \sin^2 x\, dx$

6. **(12 points)** Evaluate
$$\int \frac{x^3}{\sqrt{x^2+4}}\,dx$$

7. **(6 points)** A) Write out the form of the partial fraction decomposition of

$$F(x) = \frac{x^3 + 11}{x(x+2)^2(x^2+3)}.$$

(Do not determine the numerical values of the coefficients)

B) **(8 points)** Evaluate $\displaystyle\int_0^1 \frac{dx}{x^4 - x^2}$

8. Test the following improper integrals for convergence. If the integral is convergent, then find its value.

A)**(6 points)** $\displaystyle\int_0^{\infty} \frac{x}{1+x^2}\,dx$

B) **(6 points)** $\displaystyle\int_{-2}^{14} \frac{dx}{\sqrt[4]{x+2}}$