KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

Major Exam 1

Math 260
(Introduction to Differential Equations and Linear Algebra)

Time Allowed: 1 ¼ Hour

Student Name: _______________  Id. No. _______________

Section: _______________

Note

No programmable calculators and mobile phones allowed in the examination hall. For all questions show calculations in support of your answers.

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Instructor Name
Ashfaque H. Bokhari
Q1. Solve the exact differential equation 

\[(3 + y + 2y^2 \sin^2 x) dx + (x + 2xy - y \sin 2x) dy = 0\]
Q2. Solve \((1 + \cos x) \frac{dy}{dx} + (\sin x)y = (1 + \cos x)\sin^2 x\)
Q3. Solve \( \frac{dx}{dy} = \frac{1 + y^2}{y \cos x} \) subject to \( y(0) = 1 \)
Q4 Solve the homogeneous differential equation \( xy \frac{dy}{dx} - 2x^2 = 2y^2 \)
Q5 Solve the ode \( \frac{dy}{dx} + \frac{1}{3} y = e^x y^4 \)
Q6. Use reduction of order method to solve the ode \( y'' + 2xy' = 1 \)
Q7 Use row reduced echelon method to solve the system

\[
\begin{align*}
2x + 3y + 4z &= 1 \\
x + y - 2z &= 2 \\
4x + 6y + 8z &= 2
\end{align*}
\]