

MID TERM EXAM. SUMMER SEM. 1432-1433

Department of Mathematics

King Saud University

MATH: 203 Time: 2 H Full Marks: 30

Question # 1. Marks: 3

Determine whether the sequence $\{\frac{\sin n}{5^n}\}$ is convergent or divergent.

Question # 2. Marks: 4

Use limit comparison test to decide whether the series

$$\sum_{n=1}^{\infty} \frac{5n+\sqrt{n}}{3+n^2+n^{7/2}}$$

converges or diverges.

Question # 3. Marks: 6

Find the interval of convergence of the power series

$$\sum_{n=1}^{\infty} (-1)^n \frac{1}{n6^n} (2x-1)^n$$

Question # 4. Marks: 7

Find Maclaurin series for $f(x) = \ln(1+x)$ and use it to approximate the improper integral

$$\int_0^{\frac{1}{2}} \frac{\ln(1+x)}{x} dx$$

to four decimal places.

Question # 5. Marks: 5

Reverse the order of integration and evaluate the resulting integral

$$\int_0^1 \int_{2x}^2 e^{y^2} dy dx.$$

Question # 6. Marks: 5

Find the surface area of the hemisphere $z = \sqrt{25 - x^2 - y^2}$ that lies above the circle $x^2 + y^2 = 9$.