Department of Mathematics, College of Science

King Saud University

M-203, Midterm Examination (Badeel), Semester-1, 1441/1442H

Time: 2hours Max. Marks-30

All questions carry equal marks

Q.1 Discuss the convergence of the sequence

$$\left\{\left(1+\frac{1}{n}\right)^{2n}\right\}$$

Q.2 Determine whether the series

$$\sum_{n=1}^{\infty}(-1)^n\frac{1}{\sqrt{n}}$$

is absolutely convergent, conditionally convergent or divergent.

Q. 3 Find the interval of convergence and radius of convergence of the power series

$$\sum_{n=2}^{\infty}(-1)^n\frac{(3x+5)^n}{n\ln n}.$$

Q.4 Find the first three nonzero terms of the Taylor series for the function $f(x)=xe^x$ at $x=-1$.

Q.5 Evaluate the integral

$$\int_0^{\sqrt{\frac{\pi}{4}}}\int_x^{\sqrt{\frac{\pi}{4}}}\sin(y^2)dydx$$

Q.6 Evaluate the integral

$$\iint_{\mathbf{R}}\sqrt{x^2+y^2}dA,$$

where $\mathbf{R}$ is the region bounded by the circle

$$x^2+y^2=2x.$$