F 2968 (Pages : 3) Reg. No................................

Name....................................

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch : Common to all Branches except CS and IT

EN 010 301-A—ENGINEERING MATHEMATICS—II

(CE, ME EE, AU, AN, EC, AI, EI, IC, PE AND PO)

[New Scheme—Regular/Improvement/Supplementary]

Time : Three Hours Maxir m : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Evaluate grad $\left(\frac{1}{r}\right)$ where $r = |\bar{r}|$ and $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$.
2. If R is a region bounded by a simple closed curve C, then using Greer theorem show that the area of R is given by $\frac{1}{2}\oint_c [xdy - ydx]$.
3. Prove that $\Delta \log f(x) = \log\{1 + \Delta f(x)\}$.
4. What is numerical differentiation ? Explain.
5. Find $Z\{\sin(3n+5)\}$.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. If $\bar{f} = xyz\bar{i} + 3x^2y\bar{j} + (xz^2 - y^2z)\bar{k}$ find div $\bar{f}$ and curl $\bar{f}$ at (1, 2, 3).
7. If $\bar{F} = (3x^2 + 6y)\bar{i} - 14yz\bar{j} + 20xz^2\bar{k}$ evaluate $\int_C \bar{F} \cdot d\bar{r}$ from (0, 0, 0) to (1, 1, 1) along the path $x = t, y = t^2$ and $z = t^3$.
8. Prove that : (a) $E^{1/2} - \frac{1}{2}f - \mu = 0$ and (b) $\Delta = \frac{1}{2}f^2 + f\sqrt{1 + \frac{f^2}{4}}$.

Turn over