No. of Printed Pages : 3

CS–601

00450

BACHELOR IN COMPUTER APPLICATIONS

Term-End Examination

December, 2010

CS–601 : DIFFERENTIAL AND INTEGRAL CALCULUS WITH APPLICATIONS

Time : 2 hours *Maximum Marks : 60*

Note : *Question number **1** is **compulsory**. Answer **any three** from the rest.*

1. (a) State any SIX basic properties of real numbers w.r.t. '+' (plus) and '.' (multiplication). **6**

(b) Find $\frac{d(5x^2+3)}{dx}$ **2**

(c) Find $\frac{d}{dx}(3 \sin x+7)$ **2**

(d) Find the value of $\int (4 \cos x+7)\, dx$ **2**

(e) Evaluate $\int \left(2x^2+3x+1\right) dx$ **2**

(f) Tell, whether the following function $f(x)$ is monotonically increasing, monotonically decreasing or neither : **4**

$f(x) = x^2+1$ on interval [0, 2]

(g) Find the area bounded by the curve $y = 16 - x^2$, the x-axis and the ordinates $x = 3$ and $x = -3$. 6

2. (a) If $|x|$ denotes modulus of x, then show that 6

(i) $|x| = |-x|$

(ii) $|x+y| \leq |x| + |y|$

(b) Evaluate each of the following : 6

(i) $\frac{d}{dx}^{(4 \tan x + 7)}$

(ii) $\frac{d}{dx}\left(3e^x + 11\right)$

3. (a) Find the maxima and minima for each of the following functions : 6

(i) $f(x) = 2x$ for $0 < x \leq 1$

(ii) $f(x) = 4x^2 - 7$ for $3 < x \leq 11$

(the symbol '$\leq$' denotes 'less than or equal to')

(b) Let $f(x) = x^3$ on $[0, 1]$. Find a point c in $]0, 1[$ as in the mean value theorem. 6

4. (a) (i) Evaluate $\int \left(2x^3 + 7x\right) dx$ 6

(ii) Evaluate $\int_0^4 e^{2x}\, dx$

(b) Evaluate 6

$$\int_0^{\pi/2} \sin^4 x \cos^6 x \, dx$$

5. (a) Use the trapezoidal rule to estimate the following integral with the given value of n : 6

$$\int_1^2 x^2 \, dx \text{ with } n=4$$

(b) Find the equations of the tangents at origin to the following curve : 6

$$16y^2 = x^2 (16 - x^2)$$