Department of Higher Education
University of Computer Studies, Yangon
First Year(B.C.Sc. / B.C.Tech.)
Final Examination
Mathematics of Computing I (CST-102)
September, 2018

Answer ALL questions. **Time allowed : 3 hours.**

1(a) Find the length of the curve $x = \frac{y^3}{6} + \frac{1}{2y}$ from y = 2 to y = 3.

(b) Find the area of the surface generated by revolving the curve y= $\frac{x^3}{9}$ $0 \leq x \leq 2$ about the y-axis.

(c) Use mathematical induction to show that

$$1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$ for all n is positive integer.

2(a) Let $f(x) = x^3 - 2$. Find the value of $\frac{df^{-1}}{dx}$ at the point x = 6 = f(2). Find $f^{-1}(x)$.

(b) Find the derivatives of y given below.

(i) $y = e^{(cost + \ln t)}$ (ii) $y = \ln\left(\frac{\sqrt{\theta}}{1+\sqrt{\theta}}\right)$

(iii) $y = (x^2 - 2x + 2)\, e^x$ (iv) $y = 6 \sinh\frac{x}{3}$

3. Evaluate the following integrals.

(i) $\int e^x \cos x \, dx$(using by parts) (ii) $\int \sin^2 x \, \cos^4 x \, dx$

(iii) $\int \frac{8}{w^2\sqrt{4-w^2}} \, dw$ (iv) $\int \frac{2x+1}{x^2-7x+12} \, dx$

4(a) Show that $p \vee (q \wedge r)$ *and* $(p \wedge q) \vee (p \wedge r)$ are logically equivalent by using truth table.

(b) Show that if A, B and C are sets, then $A \cup (B \cup C) = (A \cup B) \cup C$

(c) Show that $\neg(p \rightarrow q) \rightarrow p$ is a tautology by using truth table.

5(a) Find gcd(100, 750) and lcm (120, 500).

(b) Find the greatest common divisor of 34 and 55 using Euclidean algorithm.

(c) Find inverse of 17 modulo 19.

(d) If $\begin{bmatrix} 0 & 2 & 3 \\ 4 & 1 & 4 \\ 5 & 2 & 1 \end{bmatrix}$ A = $\begin{bmatrix} 21 & 26 \\ 27 & 36 \\ 16 & 24 \end{bmatrix}$, find A.

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