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CS - 60

BACHELOR IN COMPUTER APPLICATIONS

Term-End Examination

June, 2011

12274

CS-60 : FOUNDATION COURSE IN MATHEMATICS IN COMPUTING

Time : 3 hours *Maximum Marks : 75*

Note : *Question **No. 1** is **compulsory**. Attempt **any three** questions from questions **No. 2 to 6**. Use of calculator is permitted.*

1. (a) If $\frac{x}{y} = \frac{3}{4}$, find $\frac{5x-3y}{7x+2y}$. **15x3=45**

(b) If α and β are the roots of the equation $x^2 - 7x + 7 = 0$, then

find $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)\alpha\beta$

(c) Simplify $\frac{\sqrt{5} - 1}{\sqrt{5} + 1}$

(d) Find the middle term in the expression of

$$\left(3x-\frac{x^3}{6}\right)^8$$

(e) Find the term independent of x in the expression of $\left(6x+\frac{1}{x}\right)^{12}$

(f) Determine the equation of a line passing through the point (2, 3) and with slope 3/4.

(g) Determine the equation of a circle if its centre is (4, 6) and radius is 6.

(h) Find the positive value of k for which the given equation has real and equal roots.

$$4x^2-3kx+1=0$$

(i) Find the number of terms in an AP in which the first term = 5, the common difference = 3 and the last term = 83.

(j) Find the positive value of k for which the distance between the points A (k, −5) and B (2, 7) is 13 units.

(k) Find the equation of a line passing through the point (3, 4) and sum of the intercepts of the axes is 14.

(l) Compute the inverse of the matrix

$$A=\begin{bmatrix}4 & 3\\ -7 & 1\end{bmatrix}$$

(m) Evaluate $\int_1^2 (x^2-1)\, dx$

(n) Evaluate $\lim_{x \to -3} \frac{x^2-9}{x+3}$

(o) Express the z in the form $x+iy$ $z = \frac{3-i}{3+i}$

2. (a) Find the co-ordinates of the centre and radius of the circle **3+3+4**

$$x^2+y^2+6x+8y-56=0$$

(b) Find the equation of the straight line that is perpendicular to the line $7x+2y=9$ and passes through the point $(-1, -3)$.

(c) Evaluate any one of the following :

(i) $\lim_{x \to 1} \frac{x^3+x^2-x-1}{x^2+2x-8}$

(ii) $\lim_{x \to 1} \left(\frac{x-1}{x^2-1} \right)$

3. (a) Express $\frac{2+i}{(3-i)(1+2i)}$ in the form of a+ib **3+3+4**
where a and b are real.

(b) For what value of 'k' is the following function continuous at $x=1$?

$$f(x) = \begin{cases} \frac{x^2-1}{x-1}, & x \neq 1 \\ k & x=1 \end{cases}$$

(c) Solve the following equations by Cramer's rule :

$$3x - y + z = 6$$

$$4x - y + 2z = 7$$

$$2x - y + z = 4$$

4. (a) Using the properties of the determinants show that $x = 4$ is a solution of the following. 3+3+4

$$\begin{vmatrix} 15-2x & 11 & 10 \\ 11-3x & 17 & 16 \\ 7-x & 14 & 13 \end{vmatrix} = 0$$

(b) Evaluate $\int \sin(2x+3)\, dx$

(c) Find the equation of the tangent and normal to the curve $y^2 = 3x^2 + 1$ at the point (1, 2).

5. (a) Find $\frac{d}{dx}\left(\frac{x+3}{x-3}\right)$ 3+3+4

(b) Use trapoziodal rule to find the value of the following integral with the given value of x.

$$\int_1^2 x^2\, dx, \quad n=4$$

(c) Find the complex conjugate of $(3+4i)^2$.

6. (a) Determine two positive numbers whose sum is 15 and the sum of whose squares is mini.

3+3+4

(b) Evaluate $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$

(c) Find the equation of the ellipse, whose length of the major axis is 20 and foci are $(0, +5)$.