(b) Find the derivative of 7½

$$\frac{x^2}{(x-1)^2(x+2)}.$$

Unit-III

6. (a) Evaluate : $\int \frac{x^8}{(1-x^3)^{1/3}}\,dx$. 5

(b) Evaluate : $\int \sqrt{\frac{a+x}{a-x}}\,dx$. 5

(c) Evaluate : $\int x \tan^{-1} x\,dx$. 5

OR

7. (a) Evaluate 7½

$$\int \sec x.\tan x \sqrt{\tan^2 x - 4}\,dx$$

(b) Prove $\int_0^{\pi/4} \log \sin 2\theta\, d\theta = -\frac{\pi}{4}\log 2$ 7½

Unit-IV

8. (a) Solve $x^2dy + y(x+y)\,dx = 0$ 7½

(b) Solve $y \log y \frac{dy}{dx} + x - \log y = 0$ 7½

OR

9. (a) Solve $(3y - 2xy^3)\,dx + (4x - 3x^2y^2)dy = 0$ 7½

(b) Solve $x\,dx + y\,dy = \frac{a^2(xdy - y\,dx)}{x^2+y^2}$. 7½

A (Printed Pages 4)

Roll No. _____

SFS-4694

B.C.A. (Second Semester)

Examination, 2015

(Old Course)

Foundation Course in Mathematics

for Computing

(BCA-202)

Time Allowed : Three Hours] [Maximum Marks :100

Note : Attempt five questions in all. Question No. 1 is compulsory. Attempt one question from each unit.

1. Attempt all parts : 4×10

(a) Find A^{-1} if :

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \\ 8 & 9 & 1 \end{bmatrix}$$ 4

(b) Define Hermitian Matrix and give an example. 4

(c) Define Symmetric and Antisymmetric Matrix with help of appropriate example. 4

(d) If $y = (ax+b)^{p/q}$, find $\frac{d^2y}{dx^2}$. 4

(e) Find differential coefficient of $\cot^{-1} x$ by first principle. 4

(f) Find differential coefficient of sin [cos(tanx)]. 4

(g) Integrate $\int \frac{1}{1-\cos 2x}\, dx$. 4

(h) Integrate : $\int \frac{\tan^{-1} x}{(1+x^2)^{3/2}} dx$ 4

(i) Find the solution of differential equation

$$\frac{dy}{dx} - x \tan(y-x) = 1$$ 4

(j) Solve $\frac{dy}{dx} = \frac{x^3+y^3}{xy^2}$ 4

Unit-I

2. (a) Write the following matrix sum of Symmetric and Skew-Symmetric Matrix.

$$A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$$ 7½

(b) Find the value of K for which the following system of equation is consistent.
$3x_1 - 2x_2 + 2x_3 = 3$, $x_1 + kx_2 - 3x_3 = 0$,
$4x_1 + x_2 + 2x_3 = 7$ 7½

OR

3. (a) $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 0 & 3 \\ 0 & 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -1 & 1 \\ 0 & 0 & 2 \\ 4 & -3 & 2 \end{bmatrix}$, 7½

verify that $(A+B)^2 \neq A^2 + 2AB + B^2$

(b) If x, y, z all are different and if

$$\begin{bmatrix} x & x^2 & 1+x^3 \\ y & x^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{bmatrix} = 0 ;$$ 7½

Prove that xyz = –1.

Unit-II

4. (a) Differentiate $\sqrt{\cot x}$ from first principle. 7½

(b) Find $\frac{dy}{dx}$ if $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$ 7½

OR

5. (a) Find differential coefficient of $\tan\sqrt{x}$. 7½