**SAHRDAYA COLLEGE OF ENGINEERING AND TECHNOLOGY**

**COMBINED I&II SEMESTER B.TECH DEGREE MODEL EXAMINATION 2012-13**

**EN09 101 ENGINEERING MATHEMATICS I**

**Time:3hours**  **Total marks:70**

**(EC&CS)**

**Part A**

**(Answer all questions: 5x2 marks=10 marks)**

1. Write the formula for finding the radius of curvature in Cartesian form.
2. Evaluate 
3. Find the sum and product of eigen vales of 2A + I, where A = 
4. Examine the following series for convergence: .
5. Find a0 if f(x) = x 2 , (-l,l) (5\*2=10marks)

**Part B**

**(Answer any four: 4x5 marks=20 marks)**

1. The area of a triangle is calculated from the angles A and C and the side b. If dA is the error in measuring A, Show that the relative error in the area is approximately
2. Using Taylors theorem express the polynomial 2x3 + 7x2 +x – 6 in powers of x – 1.
3. Express sinh(ax) in Fourier series which is of period 2π, defined by -π< x <π.
4. Find the eigenvalues and the eigenvector corresponding to the smallest eigen value of the matrix A =
5. Test the convergence of the series 
6. If y = sin(msin-1x) , prove that (1-x2)yn+2 – (2n+1)x yn+1 + (m2-n2)yn = 0 **(4\*5 = 20 marks)**

**Part C**

**(Answer section (a) or section (b) of each question: 4x10 marks=40 marks)**

12. (a) If ρ1 and ρ2 are the radii of curvature at the extremities of the focal chord of a parabola y2=4ax,

prove that ρ1–2/3 + ρ2-2/3 =(2a)-2/3

 OR

 (b) Define Evolute . Find the evolute of the ellipse

13. (a) Discuss the convergence of hyper harmonic series

 OR

 (b) Examine the convergence of the following series :-





14. (a) Reduce 3x2 + 5y2 + 3z2 – 2xy – 2yz + 2zx into a canonical form by an orthogonal transformation

 OR

 (b) Diagonalize the matrix A = 3 -1 1 &hence find A4

 -1 5 -1

 1 -1 3

15. (a) Obtain the Fourier series for f(x) = x cosx in (0, 2π).

 OR

(b)Find the first five nonzero terms in the Fourier series expansion of the function f(t)



(4\*10=40marks)