Code No: R21016 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov - 2016
MATHEMATICS - III
(Com. to CE, CHEM, BT, PE)

Time: 3 hours Max. Marks: 75

Answer any FIVE Questions
All Questions carry Equal Marks
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1. a) State and prove orthogonal property of Bessel's function (8M)
   b) Express $x-\frac{5}{3}x^3$ as Legendre's polynomial (7M)

2. a) Find 'k' such that f(x, y) = x^3+3kxy^2 is harmonic and find its harmonic conjugate (8M)
   b) Prove that f(z)= sinz is analytic everywhere in the complex plane and also find $f^1(z)$ (7M)

3. a) Find all the roots of cosz = ½ (8M)
   b) Find real and imaginary parts of tanz (7M)

4. a) Evaluate $\int_{(1,1)}^{(2,4)} z^2 dz$ along the parabola x = t , y = t^2 (8M)
   b) Evaluate $\int_c \frac{z^2-1}{(z^2+1)} dz \ along \ c:|z-i|=1$ (7M)

5. a) Expand $f(z)=\frac{z}{z^2+1}$ about $|z-3i|>2$ by Laurent's series (8M)
   b) Find the zeros and poles of (i) $f(z)=e^{\tan z}$ (ii) f(z) = $(z-1)^3$ (7M)

6. a) Evaluate $\int_c \frac{2z-1}{z(z+2)(2z+1)} dz$ around $c:|z|=2$ by Residue theorem (8M)
   b) Evaluate $\int_0^{2\pi} \frac{d\theta}{(a+b\cos\theta)}$ by Residue theorem (7M)

7. a) State and prove Maximum Modulus principle. (8M)
   b) Use Rouche's theorem, find the number of zero's of $z^{10}-6z^7+3z^3+1$ (7M)

8. a) Discuss the transformation w = coshz (8M)
   b) Find the image of the strip 0 < y< ½ under the transformation w = 1/z (7M)

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