R09

Code: 9A21501

B.Tech III Year I Semester (R09) Supplementary Examinations June 2017
MATHEMATICS FOR AEROSPACE ENGINEERS
(Aeronautical Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Express the following integral in terms of beta function $\int_0^3 \frac{dx}{\sqrt{9-x^2}}$.
   (b) State and prove Rodrigue's formula.

2 (a) Show that $f(z) = xy + iy$ is everywhere continuous but is not analytic.
   (b) Find the conjugate harmonic function of $u = x^2 - y^2$.

3 (a) Evaluate $\int_0^{1+i}(x - y^2 + ix^3)dz$ along the real axis from z = 0 to z = 1.
   (b) Using Cauchy's integral formula, evaluate $\int_c \frac{z}{(z-1)(z-2)^2}\,dz$ where $C: |z - 2| = 1/2$

4 (a) Expand ze^z by Taylor's series about z = 1.
   (b) Find the poles and residues of $\frac{3z+1}{(z+1)(2z-1)}$.

5 (a) Find the image of the circle $|z| = 2$, under the transformation $w = z + 3 + 2i$.
   (b) Find the bilinear transformation which maps the points (-1, 0, 1) in to the points (0, i, 3i).

6   Explain the following:
   (a) Summation to convention.
   (b) Variant and contravariant tensors.

7 (a) Give the classical definition of probability.
   (b) State and prove the multiplication theorem on probability.

8 (a) Derive mean of binomial distribution.
   (b) The mean and variance of a binomial variable X with parameters n and p are 16 and 8 then find $p(x \geq 1)$ and $p(x > 2)$.

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