Roll No

BE-401

B.E. IV Semester

Examination, December 2016

Mathematics - III

(Common for all Branches)

Time : Three Hours

Maximum Marks :70

Note: i) Answer any five questions.
ii) All questions carry equal marks.

1. a) Show that the function $e^x\{\cos y + i\sin y\}$ is an analytic function.
   b) Determine the analytic function $w = u + iv$ if $v = \log\left(x^2+y^2\right)+(x-2y)$

2. a) Evaluate $\int_0^{1+i}\left(x^2 - iy\right)dz$ along the path $y = x$.
   b) Determine the poles of the following function and residue at each pole $f(z) = \dfrac{z^2}{(z-1)(z-2)^2}$.

3. a) Find a real root of the equation $x^3 - 2x - 5 = 0$, by the method of false position, correct to three decimal places.
   b) Solve by Gauss-Seidel method the equations
   $10x + y + z = 12$
   $x + 10y + z = 12$
   $x + y + 10z = 12$

4. a) Solve the following system of equations by Gauss elimination method the equations are
   $2x + y + z = 12$
   $3x + 2y + 3z = 18$
   $x + 4y + 9z = 16$

   b) If 0.333 is the approximate value of $\frac{1}{3}$, find the absolute, relative and percentage errors.

5. a) Given that : $\sin 45° = 0.7071, \sin 50° = 0.7660, \sin 55° = 0.8192$, $\sin 60° = 0.8660$, find the value of $\sin 52°$.
   b) The probability that an evening college student will graduate is 0.4. Determine the probability that out of 5 students.
   i) None
   ii) One and
   iii) Atleast one will graduate.

6. a) Use Trapezoidal rule to evaluate $\int_0^1 x^3 dx$ considering give sub-intervals.
   b) Find $\frac{dy}{dx}$ at $x = 0.1$ from the following table:

x	:	0.1	0.2	0.3	0.4
y	:	0.9975	0.9900	0.9776	0.9604

7. a) Using Picards method of successive approximations, obtain a solution upto fifth approximation of the equation $\frac{dy}{dx} = y + x$, such that $y = 1$, when $x = 0$.
   b) Use Runge-Kutta method to fourth order to approximate y, when $x = 0.1$, given that $y = 1$ at $x = 0$ and $\frac{dy}{dx} = 3x + y^2$.

8. a) Find the mean and variance of the Binomial distribution.
   b) A lot has 10% defective items. Ten items are chosen randomly from this lot. Find the probability that exactly 2 of the chosen items are defective.

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