BAS24	Roll No.										

B. Tech. (1ˢᵗ Year)
EVEN SEMESTER
MAJOR EXAMINATION 2014 - 2015

APPLIED COMPUTATIONAL METHODS

Time: 3 Hrs.   Max. Marks: 40

Note: Attempt all questions.

Q.1   Attempt any three parts of the followings. Question 1(a) is compulsory.

(a) Using Newton-Raphson's method solve: $x^3 - 2x - 5 = 0$ to find one root between 2 and 3   **4**
correct up to 4 decimal places.

(b) Solve $x^3 - 9x + 1 = 0$ using Regula-Falsi method to find a root between 2 and 3 correct up   **3**
to 4 decimal places.

(c) Solve the following system of equations by Gauss-Siedel method: **3**

$$x + 8y + 2z = 6;$$
$$6x + y + z = 7;$$
$$3x + 2y + 10z = 9.$$

(d) Solve the following system by Crout's method: **3**

$$x + y + z = 1;$$
$$3x + y - 3z = 5;$$
$$x - 2y - 5z = 10.$$

Q.2   Attempt any three parts of the followings. Question 2(a) is compulsory.

(a) Use Newton's divided difference method to determine $f(x)$ as a polynomial in x from table   **4**
given below:

x	-4	-1	0	2	5
$f(x)$	1245	33	5	9	1335

(b) Estimate the missing term from table given below and then find value of $f(0.5)$.   **3**

x	0	1	2	3	4
$f(x)$	1	3	9	-	81

(c) $Evaluate \int_0^5 \dfrac{dx}{4x + 5}$ by Simpson's one $-$ third rule by taking $h = 0.5$ and hence find   **3**

$value\ of\ \log_e 5\ correct\ upto\ four\ decimal\ places.$

(d) $Use\ Simpson's\ three - eight\ rule\ to\ evaluate \int_0^2 \dfrac{dx}{1 + x + x^2}$ by taking $h = 0.2$.   **3**

Q.3   Attempt any three parts of the followings. Question 3(a) is compulsory.

(a) $Use\ Picard's\ method\ to\ solve \dfrac{dy}{dx} = \dfrac{y - x}{y + x};\ y(0) = 1\ and\ find\ y(0.1).$ **4**

(b) Apply $Runge-Kutta$ method to solve $\frac{dy}{dx} = x + y^2$; $y(0) = 1$ and find $y(0.2)$ in steps of 0.1. **3**

(c) Solve $\frac{dy}{dx} = x - y^2$; $y(0) = 0$ by Euler's method to find the value of $y(0.2)$. **3**

(d) Solve the difference equation: $(E^2 - 4E + 4)u_n = 2^n$. **3**

Q.4 **Attempt any three parts of the followings. Question 4(a) is compulsory.**

(a) Calculate Bowley's coefficient of skewness from following table: **4**

$C.I.$	0-10	10-20	20-30	30-40	40-50	50-60	60-70
$frequency$	3	6	11	15	11	4	2

Also, find Kurtosis of the table given below:

$C.I.$	0-10	10-20	20-30	30-40
$frequency$	1	3	4	2

(b) Two regression lines are $20x - 9y = 107$ and $4x - 5y = -33$. Variance of x is 9. Calculate $\bar{x}$, correlation coefficient r and σ_y. **3**

(c) An urn contains 5 white, 7 red and 8 blue balls. If 4 balls are drawn one by one with replacement then find the probability that (i) none is white; (ii) all are white; (iii) at least one is white; and (iv) at most 3 are white. **3**

(d) In a sample of 1000 students, mean of a test is 14 and S.D. is 2. Assuming Normal Distribution, find (i) how many students score between 12 and 15; (ii) how many students score above 18; (iii) how many students score below 8; and (iv) how many students score 16. **3**

Given following data:

z	0.50	0.75	1.00	1.25	2.00	3.00
$Area$	0.1915	0.2734	0.3413	0.3944	0.4772	0.4987