Roll No. | | | | | | | | | | | | |

Total No. of Pages: 02
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B.Tech. (Sem.-5th)

NUMERICALS METHODS AND SIMULATION IN ENGINEERING

Subject Code: AE-309
Paper ID: [A-0717]

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATE:

1. **Section –A, is Compulsory.**
2. **Attempt any five questions from Section-B.**
3. **Attempt any two questions from Section-C.**

Section –A (10x2=20)

Q.1.

(a) What is the order of convergence of Newton-Raphson method?

(b) What is meant by relative error?

(c) What is the order of interpolating polynomial could be constructed. if n sets of are given?

(d) Define the curl operator.

(e) Give principle of least square curve fitting.

(f) Write the Simpson's (1/3) rule for numerical integration

(g) What is geometrical meaning of trapezoidal rule?

(h) What are non linear regressions?

(i) Define the modeling.

(j) Differentiate between Event and activity.

Section –B (4x5=20)

Q.2. Evaluate the following integral using the Simpsons (3/8) rule h=0.1

$$I= \int_1^{1.6} e^{x^2}\, dx$$

Q.3. Find a real root of the equation f(x)= x+logx-2 using Newton Rap son method:

Q.4. Using Gauss Jordon method, solve the system of algebraic equations

$4x_1+x_2+x_3=4$, $x_1+4x_2-2x_3=4$, $3x_1+2x_2-4x_3=6$,

Q.5. How simulations help in production and operation management

Q.6. Briefly explain what Monte- Carlo simulation.

Section-C

Q.7. Using method of least square, fit a relation in form $y=ab^x$ to the following data. Also estimate y(3,5).

x	2	3	4	5	6
y	144.	172.8	207.8	248.8	298.5

Q.8. Differentiate between static mathematical and dynamic mathematical model.Take suitable examples to illustrate the use of these models.

Q.9. What do you understand the term “Model validation and verification”? Explain

**********END**********