

B.TECH SEM – V (2007 COURSE) (PRODUCTION ENGG.) :
WINTER - 2017
SUBJECT: DATABASE & INFORMATION TECHNOLOGY

Day : **Thursday**
Date : **18/01/2018**

Time : **02.30 PM TO 05.30 PM**
Max. Marks : **80**

W-2017-2482

N.B.

- 1) **Q.1 and Q.5 are COMPULSORY.** Out of the remaining attempt any **TWO** questions from each Section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non-programmable calculator is allowed.

SECTION – I

- Q.1** a) Define the following terms: **(05)**
i) Data model ii) Database schema iii) Internal Schema
iv) External schema v) DDL (Data definition language)
- b) Explain the knowledge topology in terms of knowledge type conversion, structural features, purpose and application. **(05)**
- c) Compare neural network and expert system used in knowledge management. **(04)**
- Q.2** a) Sketch the typical centralized and client/server architectures for database management system. Indicate details in the diagram. **(07)**
- b) Explain the following categories of data models: **(06)**
i) Entity-relationship data model
ii) Record-based data model
iii) Physical data model
- Q.3** a) Explain the methodology for building an expert system. **(07)**
- b) Explain the knowledge architecture with the sketch and elaborate the following: **(06)**
i) Knowledge engineer ii) Domain expert
iii) Inference mechanism
- Q.4** Explain the knowledge based system for quality control with the help of following steps: **(13)**
a) Inspection method b) Total quality control
c) Statistical analysis technique d) Cause/effect model

SECTION – II

- Q.5** a) Explain the linear regression. **(05)**
- b) Derive formula for Simpson's 3/8th rule. **(05)**
- c) Distinguish between Bisection and false method. **(04)**
- Q.6** a) Find the root of equation $x^3 - x - 4 = 0$ upto 3 decimals by using Newton Raphson method. **(04)**

P.T.O.

- b)** Solve the following system of linear simultaneous equations using Gauss-Jordan-method. **(09)**
 $3x + 2y + 4z = 7$
 $2x + y + z = 7$
 $x + 3y + 5z = 2$

- Q.7 a)** From the following table find y where $x = 1.45$. Use Lagrange's interpolation method. **(06)**

x	Y
1.0	0.0
1.2	-0.112
1.4	-0.016
1.6	0.336
1.8	0.992
2.0	2.0

- b)** Derive the expression for multiple linear regressions. **(07)**

- Q.8 a)** Apply trapezoidal rule and compute the value of the integral correct upto three decimal places: **(06)**

$$I = \int_0^1 \sqrt{1-x^2} .dx$$

Take $n = 10$.

- b)** Derive formula for Simpson's 1/3 rule. **(07)**

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