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B. Tech. [MC]

Mid Semester Examination

MC-302 Database Management System

Time 1h 30 min.

Roll No.

6th Semester

(March-2018)

Max. Marks: 30

NOTE: Attempt all Questions. Assume suitable missing data if any.

Q1. a) Number of rows in a relation are called its _____.

b) Every determinant should be a candidate key is the definition for which normal form?

c) The terms in list I have been mapped to list II so that it corresponds to the mapping process of the ER model into a relational model. Represent the mapping process between the lists?

LIST I

- a) Entity type
- b) Composite attributes
- c) Multivalued attributes
- d) Value set

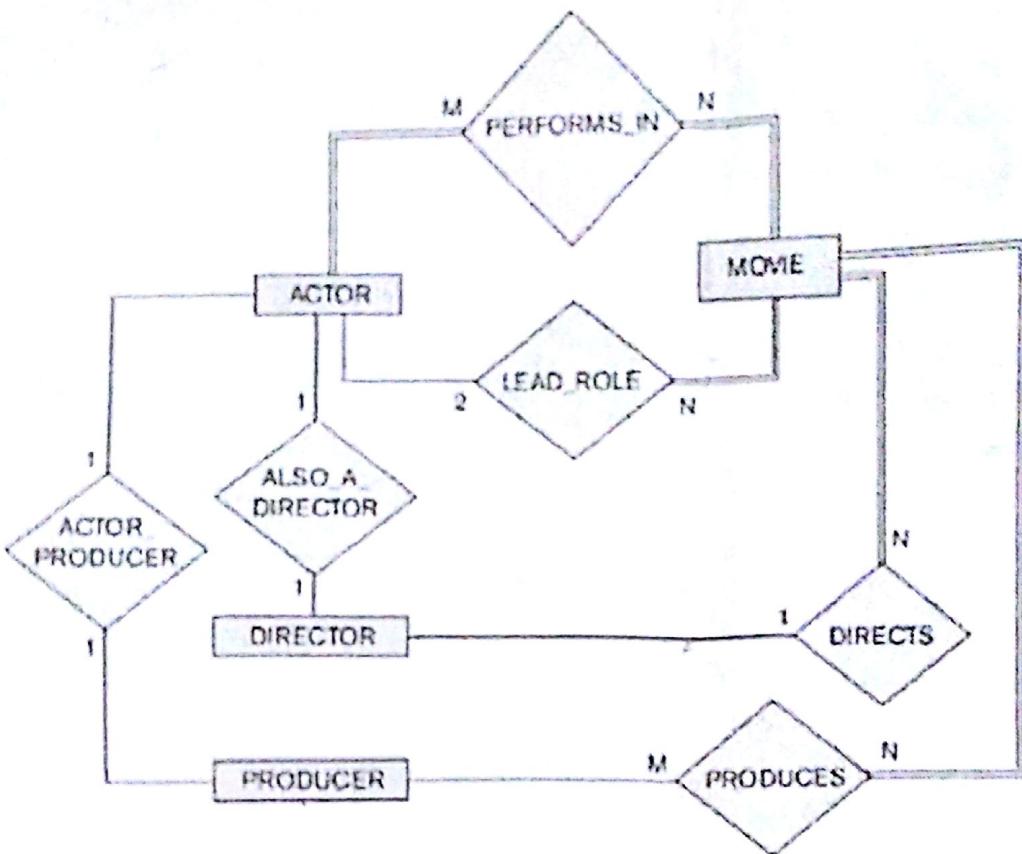
LIST II

- i) Domain
- ii) Relation and foreign key
- iii) Set of simple component attributes
- iv) Relation

Q2 a) What are the advantages of DBMS over traditional file system (any three)? [3 marks]

b) Explain different update anomalies with examples. [3 marks]

Q3. Consider the ER schema for the MOVIES database in figure. Assume that MOVIES is a populated database. ACTOR is used as a generic term and includes actresses. Given the constraints shown in the ER schema, respond to the following statements with True, False, or Maybe. Assign a response of Maybe to statements that, while not explicitly shown to be True, cannot be proven False based on the schema as shown. Briefly justify each answer. [6 marks]



- A) There are no actors in this database that have been in no movies. Y
- B) There are some actors who have acted in more than ten movies. M
- C) A movie can have only a maximum of two lead actors. Y
- D) Every director has been an actor in some movie. N
- E) There are movies with more than a dozen actors. M
- F) Some producers have been a director as well. M

Q4. a) Consider a database table T containing two columns X and Y each of type integer. After the creation of the table, one record ($X=1, Y=1$) is inserted in the table. Let MX and MY denote the respective maximum values of X and Y among all records in the table at any point in time. Using MX and MY , new records are inserted in the table 128 times with X and Y values being $MX+1$, $2*MY+1$ respectively. It may be noted that each time after the insertion, values of MX and MY change. What will be the output of the following SQL query after the steps mentioned above are carried out?

SELECT Y FROM T WHERE X= 7; [2 marks]

b) Consider the given relations: Employee (FirstName, MidNameInitial, LastName, Ssn, DOB, Address, Sal, DepartmentNo) and Department (Dname, Dnumber, MgrSsn, MgrStartDate). [4 marks]

- i) Retrieve the birth date and address of the employee whose name is 'John B. Smith'.
- ii) Retrieve the name and address of all the employees who work for the 'Research' department.

Q5. Consider the relation REFRIG(Model#, Year, Price, Manuf_plant, color). Which is abbreviated as REFRIG(M, Y, P, MP, C), and the following set F of functional dependencies: $F = \{M \rightarrow MP, \{M, Y\} \rightarrow P, MP \rightarrow C\}$

- a) Evaluate each of the following as candidate key for REFRIG, giving reasons why it cannot be a key: {M}, {M, Y}, {M, C}.
- b) Based on the above key determination, state whether the relation REFRIG is in 3NF and BCNF, and provide proper reasons.
- c) Consider the decomposition of REFRIG into $D = \{R_1(M, Y, P), R_2(M, MP, C)\}$. Is this decomposition lossless? Show why. [6 marks]

END

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SIXTH SEMESTER

Roll No.....2K15MC005
B.TECH (MC)

MID SEMESTER EXAMINATION

MARCH- 2018

MC 304 THEORY OF COMPUTATION

Time: 1.30 Hours

Max. Marks: 25

Note: Answer ALL.

- \Q1. Construct an NDFA accepting the set of all strings over $\{a, b\}$ ending in aba . Use it to construct a DFA accepting the same set of strings.
- Q2. Construct a grammar which generates all even integers up to 998.
- Q3. Show that the class of context free languages is closed under concatenation and union.
- \Q4. Show that $L = \{0^i 1^i : i \geq 1\}$ is not regular.
- \Q5. Construct a transition system corresponding to the regular expressions
(i) $(ab + c^*)^*b$ (ii) $a + bb + bab^*a$

-END-

MC - 306 Financial Engineering

Time : 90 Mins

Max. Marks: 25

Note: Attempt all questions. All question carry equal marks.

Assume missing data , if any.

1. Let $B(0) = \text{Rs. } 100, B(1) = \text{Rs. } 110$ and $S(0) = \text{Rs. } 80$. Also, let
 $S(1) = \begin{cases} \text{Rs. } 100, & \text{with probability } p = 0.80 \\ \text{Rs. } 60, & \text{with probability } p = 0.20. \end{cases}$
 Design a portfolio with initial wealth of Rs.10,000, split in the ratio of 3:2 between stock and bond. Compute the expected return and the risk of the portfolio so constructed.
2. Let $S(0) = \text{Rs. } 120, u = 1.2, d = 0.9$ and $r = 1\%$. Consider a call option with strike price $K = \text{Rs. } 120$ and $T = 2$. Find the option price and the replicating strategy.
3. If $S(0)$ is the price of asset at $t = 0$, then prove that the forward price will be $F(0, T) = \frac{S(0)}{d(0, T)}$, $d(0, T)$ is the discount factor between at $t = 0$ to $t = T$.
4. A non-dividend paying stock is currently selling at Rs. 150 with annual volatility 20%. Assume the continuously compounded risk free interest rate is 4%. Using a two period CRR binomial option pricing model find the price of one European call option on this stock with a strike price of Rs. 170 and time to expiration 3 years.
5. The stock price is Rs. 100. The annual continuously compounded risk free interest rate is 5% and the annual volatility relevant for the Black-Scholes formula is 19%. Call options are written with a strike price of Rs. 90 and time to expiration of 5 years. Use Black-Scholes formula to find the price of one such call option.

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6th Semester
Mid Semester Examination

Roll No. MC/40
B. Tech.
(March-2018)

MC 310: Software Engineering

Time: 1:30 Hours

Max. Marks: 25

Note: All questions are compulsory.

1. (a) Define the term Software Engineering. (1 Mark)
(b) Write two disadvantages of waterfall model. (2 Marks)
(c) Differentiate between functional and non-functional requirements. (2 Marks)
2. (a) Describe the difference between conceptual design and technical design. (1 Mark)
(b) Briefly explain data flow diagrams and give an example of level-0 DFD (2 Marks)
(c) Describe the relationship between cohesion and coupling. (2 Marks)
3. Explain the spiral model of software development. What are the limitations of such a model? (5 Marks)
4. (a) Describe the various steps of requirements engineering. Is it essential to follow these steps? (2.5 Marks)
(b) What is the degree of a relationship? Give an example of each of the relationship degree. (2.5 Marks)
5. Define module coupling and explain different types of coupling. (5 Marks)

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6th SEMESTER
MID SEMESTER EXAMINATION

Roll No. MC / ...
B. Tech.
(MARCH-2018)

MC 320: Web Technology

Time: 1:30 Hours

Max. Marks: 25

Note: All questions are compulsory. Assume suitable missing data, if any.

- Q1. What are the different layers in the TCP/IP networking Model?
Explain with a diagram. Differentiate between TCP & UDP. (6)
- Q2. a) What are the differences between LAN and WAN? (3)
b) What is the role and significance of the Data Link Layer of the OSI model? (2)
- Q3. Explain Packet switching technology. (4)
- Q4. Describe the role of following network components:
Hub, router, repeater, bridge and switch. (5)
- Q5. Briefly explain the characteristics and limitations of Web 2.0 and how it is different from Web 1.0? (5)

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SIXTH SEMESTER

MID- SEMESTER EXAMINATION

Roll No.

B.Tech.

Mar-2018

HU-304 Professional Ethics & Human Values

Time: 1.5 Hours

Max. Marks : 25

Note : There are two sections in this question paper.

Section A is compulsory question. Attempt both the questions (1.a and 1.b)

Attempt any four questions from Section B.

SECTION-A

(2X 2.5=5 Marks)

Q1. Study the given case carefully and answer the following questions:

The Blue Whale game is a 50-day online challenge which demands that players complete tasks given by an anonymous "handler". The "handler" instruct the players to cause self-harm, leading up to suicide. The lethal trend in the country came to light when a 14-year-old boy jumped from the fifth floor of a building in Mumbai earlier this month. To ensure safety of people on the internet, especially of children, the Indian government has asked social media and internet giants like Facebook, Google, WhatsApp, Instagram among others to get rid of the links to the 'Blue Whale' suicide game.

"If governments think that the *Blue Whale Challenge* is the only danger around, they are horribly mistaken! There are so many others and something or the other keeps popping up. How many can the government track and how many will they ban? For teenagers, trying something that is banned definitely ups the thrill-level and further feeds on their curiosity," says Mumbai-based counselor and psychotherapist, Divya Srivastava.

P.T.O.

(a): What are your views on Divya Srivastava's opinion? Identify stakeholders and their responsibilities in addressing this particular issue of internet abuse. (50-70 words)

(b): If you were tasked to draft a national policy on suicide prevention, what'll be your major policy prescriptions? (50-70 words)

SECTION- B

(Attempt any four questions)

(4x5=20 Marks)

Q.2 What is professionalism? Explain the characteristics and responsibilities of a professional?

Q.3 What are codes of ethics for Engineers? Explain the importance of following these codes.

Q.4 What is ethics? What is the practical relevance of ethics in today's scenario?

Q.5 Explain the various segments(personal,social,family,nature) of harmony in life?

Q.6 What is value education? Why there is a need of value education in society?

Q.7 Explain and compare major ethical theories (utilitarianism, deontology, virtue ethics)?

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FIFTH SEMESTER
MID- SEMESTER EXAMINATION

B.Tech. (Mrng)
September -2017

HU-303 Professional Ethics & Human Values

Time: 1.5 Hours

Max. Marks : 25

Note : There are two sections in this question paper.

Attempt any 5 questions from Section A.

Attempt any 3 questions from Section B.

SECTION-A (2x5=10Marks)

Q 1.Explain the following (Do any five)

- (a) Values,
- (b) Honesty- Integrity,
- (c) Empathy-Sympathy,
- (d) Respect for Others,
- (e) Caring & Sharing,
- (f) Virtue, Valuing Time,
- (g) Engineering Ethics ,
- (h) Courage & Cooperation

SECTION- B

(Attempt any three questions) (5x3=15 Marks)

Q.2 What is Ethics? Why Ethics is relevant in today's society?

Q.3 What is Value Education? Why there is a need of Value Education?

Q.4 What is Professional Ethics? Discuss the types of Professional ethics?

Q.5 What is happiness and prosperity? How are they related to each other?

Q.6 Discuss the various segments (personal social, family, nature) of harmony in life?

Q.7 What is professionalism? Explain the characteristics and responsibility of a professional?

Q.8 What is ethical codes/codes of ethics? Explain the need of ethical codes/ codes of ethics for professionals?