

Total No. of Page(s): 02

SIXTH SEMESTER

Roll No.....

B.E. (IT)

B.E. END SEM. EXAMINATION, MAY-2015

IT-311 Multimedia & Applications

Time: 3:00 Hrs.

Max. Marks: 70

Note: Attempt any 5 questions.

Question 1 is compulsory.

Assume missing data, if any.

All questions carry equal marks.

Q1. Reason out the following:

- a. 'Persistence of vision' is related to seeing images on screen. (2)
- b. 'Viewing angle' is less for an LCD display than for a CRT display. (3)
- c. RGB is an additive model. (3)
- d. Advantages of YC color model over RGB color model. (3)
- e. Multimedia is a 'digital show'. (3)

Q2. a. What are the various media that are normally incorporated in multimedia presentations? Give examples how information may be conveyed through each of these media components. (8)

b. What is meant by 'static' and 'dynamic' elements? Illustrate with examples. (6)

Q3. a. Explain diagrammatically the information flow within a video adapter card. (8)

b. Differentiate between the Unicode Transformation Formats UTF-32, UTF-16 and UTF-8. (6)

Q4. a. How can the code-words produced after compression, achieve the Shannon value? Consider a message comprising a string of characters with probabilities of : 'A'=0.2, 'B'=0.4, 'C'=0.1, 'D'=0.2 and '.'=0.1. Show the encoded version of the string using Arithmetic Coding. (6)

Total No. of Page(s):

Roll No.....

SIXTH SEMESTER

B.E. (IT)

B.E. END SEM. EXAMINATION, MAY-2015

IT-312 Software Engineering

Time: 3:00 Hrs.

Max. Marks: 70

Note: Attempt ANY FIVE questions. All questions carry equal marks

Q1 (a)

A University is characterised by a name and a town, and has relation with two types of Person: Staff, that the University employs, and Students, that study at the University. Each Person has a DNI and a name. There are two types of Staff: PDI and PAS. Each member of Staff has a start_date of their contract. PDI also have a category while PAS have a post. The PDI may, or may not, be Docentes. The activities carried out by the PDI are: research and teach, while the activity carried out by the PAS is: administer. A University is composed of several Departments, each of which has a name and an attached set of members of Staff. A member of staff cannot be attached to more than one department. A PDI must be attached to a Department while a PAS may, or may not, be. Each Department is managed by a head of Department who is a Doctor. A Student is either an Undergraduate, studying on a given degree program, or a Postgraduate, studying on a given PhD program. An Undergraduate may have collaboration relation with a Department and may be writing a PFC supervised by a PDI. A postgraduate must be writing a thesis supervised by a Doctor. You may assume that a Student can only study at one University and that a member of Staff can only be employed by one University .

Provide a model of this description in the form of a UML class diagram.

(b) Explain what is meant by software product metrics and give three examples of Product metrics relating to OO software.

(c) Explain what is meant by process metrics and give examples of three such metrics relevant to a software company's process improvement?

(d) What is Software quality Assurance and various quality standards

(6+3+3+2)

Q2.

(a)

Discuss what is meant by a functional model of a system and a behavioral model of a system. Explain why it is useful to use models when discussing requirements with potential users of a new software system.

(b) Define the term software maintenance and distinguish between corrective, adaptive, perfective, and preventive maintenance activities

(c) Explain in detail the various Software Complexity Measures and their need?

(d) Differentiate between software process capability and software process performance

(3+3+6+2)

Q3.

a. A client wishes to set up an internet shopping application. Requirements include the ability of a customer to register with a name, address, payment details and be assigned a unique customer identification number. A customer should be allowed to order any item from the site. When an order is completed by the customer, the items are either

dispatched from the stock or placed on back order from a supplier, in either case the customer is notified. Items dispatched from the stock are debited to the customer. Items on back order are debited when they are actually dispatched

Identify the dynamic organization of objects and messages within the system and draw a UML sequence diagram

- b. Identify and describe the roles that upper and lower CASE tools have in various phases of software life cycle
c. What is software reengineering? What is the need of software reengineering? Draw a block diagram to illustrate the reengineering process

Q4.

(5+4+5)

- a Differentiate between coupling and cohesion metrics with regard to a class. How does coupling between object classes affect reusability?
b. Explain static and dynamic quality attributes
c. List the key differences between procedure oriented and object oriented paradigms
d Which metric is used for measuring the complexity of a class hierarchy and how?

(4+4+3+3)

Q5. a. What is configuration management. How is a change request handled

- b Differentiate between volatile and enduring requirements
c. Inheritance is a potentially error prone construct and its use should be avoided when developing critical systems in object oriented languages. Comment
d. Differentiate between a package, component diagram and deployment diagram

(4+3+4+3)

Q6.

- a. Write a function to check whether a given triangle is scalene, isosceles, equilateral, not a triangle for which lengths of three sides are given to you. Draw its flow graph. Find its cyclomatic complexity using McCabe's metric
b. Briefly describe the various levels of CMM. What advantages are there for a company to move up to the top level
c. Define an event. How does it influence state of an object

(7+4+3)

Q7 Write Short notes on any three of the following

(14)

- a. object oriented metrics
b. Software quality models
c. Software reuse
d. state chart diagram

BE (Information Technology) VI SEMESTER
B.E END SEMESTER EXAMINATION May, 2015
IT-313: INFORMATION THEORY AND CODING

Time: 3.0 Hours

Max.Marks:70

Note: Attempt any Five questions. Q.1 is compulsory. All questions carry equal Marks. Assume suitable missing data, if any.

Q.1 a) What is the relation between uncertainty and information? Explain why logarithmic function is used in defining the information. (2)

b) Jo has a test for a nasty disease. Let's denote Jo's state of health by a variable a and the test result by variable b .

$a=1$ indicate Jo has the disease

$a=0$ indicate Jo does not have the disease

The result of the test is either 'positive' ($b=1$) or 'negative' ($b=0$); the test is 95% reliable. In 95% of cases of people who really have the disease, a positive result is returned and in 95% of cases of people who do not have the disease, a negative result is obtained. The final information is that 1% of people of Jo's age have the disease.

Ok- Jo has the test and the result is positive. What is probability that Jo has the disease? (3)

c) Explain Markov source. Consider a source $S=\{S_1, S_2, S_3\}$ with probabilities $P(S_1)=1/2$, $P(S_2)=P(S_3)=1/4$, Calculate the entropy of the second extension of S . (3)

d) Explain reduction of information channels. (4)

e) Explain Deterministic and noiseless channel with the amount of information transmitted. (2)

Q.2 a) A binary Channel Matrix is given by

$$\begin{bmatrix} 2/3 & 1/3 \\ 1/10 & 9/10 \end{bmatrix}$$

The probabilities of the two symbols being transmitted are $1/3$ and $2/3$, respectively.

i) Draw the Channel diagram (1)

ii) Determine the probabilities of the two symbols being received at the destination. (2)

iii) Determine $H(x)$, $H(x/y)$ and $I(x;y)$ (4)

b) Explain Binary erasure Channel. Derive the expression to find the capacity of Binary erasure Channel. (7)

Q.3 a) The Joint distribution XY is given in Table. The Marginal distribution $P(x)$ and $P(y)$ are also shown

$P(x,y)$		x				$P(y)$
		1	2	3	4	
y	1	$1/8$	$1/16$	$1/32$	$1/32$	$1/4$
	2	$1/16$	$1/8$	$1/32$	$1/32$	$1/4$
	3	$1/16$	$1/16$	$1/16$	$1/16$	$1/4$
	4	$1/4$	0	0	0	$1/4$
$P(x)$		$1/2$	$1/4$	$1/8$	$1/8$	

i) Calculate Joint Entropy $H(X,Y)$.

ii) Calculate the marginal entropies $H(X)$, $H(Y)$ and the Mutual information. (10)

b) Explain Noiseless Channel. Derive the expression to find the capacity of Noiseless -Channel. (4)

Q.4 a) What happen when we cascade two information channels? Derive the relationship for Mutual Information between these two cascades of information channel. Also state the necessary condition that when cascade will not loose information. (7)

b) Explain Z Channel. Derive the expression to find the capacity of Z Channel. (7)

Q.5 a) Define linear code. A generator matrix of (6,3) linear code is given as,

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

- i) Find all codewords and generate syndrome table
- ii) Use syndrome decoding to decode the following received vector and decode the error if any:
(i) 101101
- b) For a (7,4) cyclic code with generator polynomial(x^3+x^2+1) determine the codewords transmitted for the following received vectors(i)1101101 (ii)0101000 (iii)0001100 (7)

Q.6 a) For a (2,1,2) convolutional code give the state diagram. Encode bits 1101 using trellis diagram and decode using viterbi technique. (10)

d) Explain the concept of Turbo coding. (4)

END

Roll No.....

No. of pages: 02

Date _____

SIXTH SEMESTER

B.E. (IT)
END SEMESTER THEORY EXAMINATION, MAY-2015

IT-314: Elective-I (THEORY OF COMPUTATION)

Time: 3:00 Hrs.

Max. Marks: 70

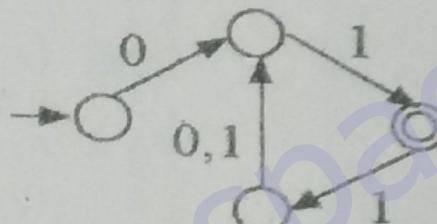
Note:

FIVE
Attempt ANY ~~FOUR~~ questions.

All questions carry equal marks.

Assume suitable missing data, if any

- 1.[a] Write a regular expression equivalent to the following NFA.



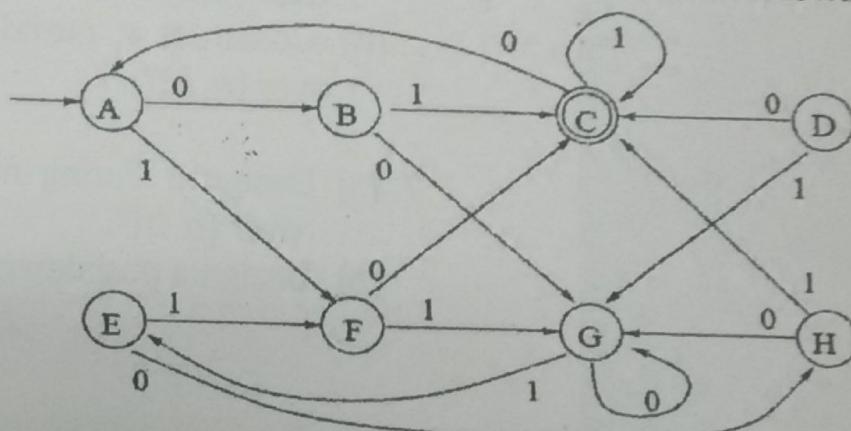
- [b] Define a DFA. Design a DFA to accept language with even number of a's and odd number of b's over input symbol {a, b}, and process the string – aaaabbbb.

- [c] Construct a Melay machine for finding 1's complement of binary numbers and convert it into Moore machine.

- 2.[a] Write a CFG to accept the language

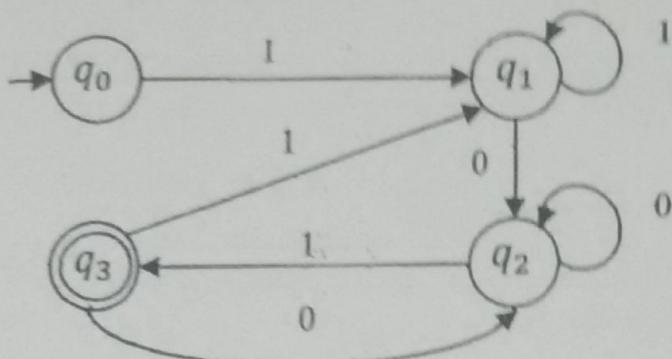
$$L_1 = \{0^i 1^j 2^k \mid k \leq i \text{ or } k \leq j\}$$

- [b] Obtain a minimum state DFA equivalent to the following



132

- 3.[a] Find the regular expression corresponding to the automaton given in following figure.



- [b] Construct the grammar for the language $L_2 = \{a^{n^2} \mid n \geq 1\}$. Identify the type of the grammar obtain.

- 4.[a] Let G be the grammer $S \rightarrow 0B|1A$, $A \rightarrow 0|0S|1AA$, $B \rightarrow 1|1S|0BB$. For the string 00110101, find
 (i) the left most derivation.
 (ii) the right most derivation.
 [b] Reduce the following grammer to GNF

$$S \rightarrow ASA \mid bA, A \rightarrow B \mid S, B \rightarrow c$$

- 5.[a] State the Pumping Lemma and explain how it is used to prove that languages are not regular.

- [b] Construct the grammar G generating following

$$L_3 = \{a^m b^n \mid m, n \geq 0, m \neq n\}$$

- 6.[a] Design a Turing machine to accept the set of all palindromes over $\{0,1\}^*$.

- [b] Construct a pushdown automata accepting all palindromes over $\{a,b\}^*$.

7. [a] Design a Turing machine which works as copying machine over $\{a,b\}^*$.

- [b] Design a pushdown automata for the following language

$$L_4 = \{a^n b^n \mid n > m \geq 0\}$$

Total No. of pages: 2
Sixth Semester

Roll No.....
BE (MPAE)

END SEMESTER EXAMINATION May, 2015
MA-315: Metrology & Statistical Quality Control

Time: 3 Hours

Max. Marks: 70

Notes: 1. Attempt any five questions. Attempt sections A and B separately.
2. Assume missing data, if required. Use appropriate units.

(SECTION-A)

- Q1(a) Give best combination for obtaining a length dimension of 3.123 mm.
(b) A thin rigid disc, 30.00 mm in diameter, when measured with a micrometer (of 10mm anvil) was observed as 29.99mm, while a shaft of same diameter was found to be 30.05mm. Explain the error.
(c) Sketch and explain an arrangement for avoiding shock loading in Sigma mechanical comparator (sketch only relevant portion). OR

(c) Sketch and explain differential type of pneumatic comparator. (3+5+6)

- Q2 (a) State best combination for setting an angle of 14 deg. 2 min. 57 sec.
(b) (i) State 5 geometrical requirements in design of a sine bar. Sketch the modified design.
(ii) Describe 3 tests to be carried out on a drilling machine to establish its accuracy.

OR

- (b) For testing flatness of a surface plate, a rectangle ABCD (400x300mm) was marked on its surface. A level was used to determine straightness along AB, AD, AC & BD. Taking triangle ABD as datum, the midpoint O, of BD, is 0.05 mm above. Readings are taken along AC and are 0.01, -0.02, 0.03, 0.05 and 0.04 mm. Determine the level at C with respect to datum.
(c) What is the influence on assembly of bolt & nut if (i) minor diameter of bolt and (ii) major diameter of nut, are beyond tolerance limits?

OR

- Rewrite the following statements with corrections, if any:
(i) There is virtual increase in effective diameter of a metric nut if its flank angle is 58 degrees, (ii) Increase in effective diameter of nut is essential if it has to be assembled with a bolt of shorter pitch.
(2+5, 5 or 10+2)

- Q3 (a) Design, dimension and sketch the plug gage for checking the diameter of an engine cylinder, 80.00 \pm 0.20mm, on a pneumatic comparator. Prove the relation used.

- OR
The squareness of a rectangular block is measured on a squareness tester/autocollimator. The collimator readings are 10,15,8,6 and 14(repeat on first face)seconds for the faces. Determine the error of squareness on each face. Sketch the tester used.

- (b) Explain various orders of surface texture. Name various measures of surface roughness.

- OR
(b) What is best size of wire & explain how it is used for determining effective diameter of an external thread. (9+5)

(SECTION-B)

- 1 (a) What is standardization? Why is it needed? Briefly explain any six features of ISO standards. (5)

(b) Briefly explain at least six factors that should be considered for achieving reliability? Explain cost of reliability with help of a diagram. (5)

(c) Give basic organizational structure of quality circles. Explain the steps involved in the process of operation of quality circles (4)

2 (a) A certain part is made in lots that are typically about 0.5% defectives. All these defectives might be eliminated by a 100% inspection. All parts that are defective in the technical sense of failing to meet the design specification are also unsatisfactory in the sense that they will prevent proper functioning of the assembled product. Inspection cost for screening inspection is estimated as Re. 0.015 per unit. Unsatisfactory product cost is Rs 2 per unit. Annual need is for 10,000 parts. Compare the sums of annual inspection cost and unsatisfactory product cost under 100% inspection and no inspection. (5)

(b)(i) What is an ideal OC curve and why is it said so? What are the three limitations of sampling inspection? When should stratified sampling be preferred over simple sampling and why? (3)
(ii) If all other process parameters are held fixed, a decrease in probability of a Type-II error will occur with an increase in sample size, (True/False). Explain. (2)

(c) A control chart is to be constructed for the average breaking strength of nylon fibres. Samples of size 5 are drawn randomly from the process. The process mean and standard deviation are estimated to be 120kg and 8kg respectively.

(i) If the control limits are placed three standard deviations away from the process mean, what is the probability of a Type-I error? (2)
(ii) If the process mean shifts to 125kg, what is the probability of making Type-II error on the first subgroup plotted after the shift? (2)

3(a) What are the four steps in a typical inspection procedure? Explain the three ways in which an inspection procedure can be automated with one example of each. What are the Type-I and Type-II errors that can occur in inspection? (5)

(b) Explain five elements of JIT manufacturing system. (5)

(c) An inspector must 100% inspect a production batch of 500 parts. If the actual fraction defect rate in the batch is 0.02, and the inspector's accuracy is given by $p_1=0.96$ and $p_2=0.84$, determine (a) the number of defects the inspector can be expected to report and (b) the expected number of Type-I and Type-II errors the inspector will make. (4)