Roll No.

Total No. of Pages: 02

B.E. (IT)

SIXTH SEMESTER

B.E. END SEM. EXAMINATION, MAY-2016

**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. Hypertext links independent documents. (2)

b. Digital Copyright is a protection of author's original work. (3)

c. Lossless compression is used for compressing text. (3)

d. HSB color model is device independent model. (3)

e. Multimedia is an integration of various elements. (3)

Q2. a. What is meant by a multimedia presentation? Describe some of its characteristics. (8)

b. What is LZW Compression? How is a dictionary used and initialized in LZW scheme? (6)

Q3. a. Explain diagrammatically the various steps required in JPEG compression. (7)

b. Discuss the various layers of MPEG-1 standard. How video and audio encoding is done in MPEG. (7)

Q4. a. Derive the Huffman code tree using Dynamic Huffman Encoding for the word "MISSISSIPPI" to be transmitted. Also specify the code word for every character in the above mentioned text. (8)

b. A text string contains 7 different characters having the following frequency of occurrence: A=35, M=25, C=55, E=15, P=10, D=5, L=5 and Q=6. (6)

i. Use static Huffman coding to derive the suitable set of code-words.
ii. Draw the corresponding Huffman tree for the same.
iii. Show the codes for input string "AEMPAALEQ".

Q5. a. What is Animation with respect to multimedia? Explain the different types of animations. (7)
b. What is MIDI connection? What are the different messages used in MIDI. Explain with a suitable diagram. (7)

Q6. a. What is an Arithmetic Coding compression technique? What makes it different from Huffman compression? (6)
b. Code the string "IRAN" using Arithmetic Coding given the probability distribution of symbols as: O=0.1, D=0.1, T=0.1, N=0.1, I=0.2, R=0.1, A=0.1, L=0.1, Y=0.1. (8)

Q7. a. Differentiate between the following (any TWO): (7–3.5 * 2)
i. Source and Transform Encoding
ii. Luminance and Chrominance
iii. Omni-directional and Bi-directional Microphone

b. Write short notes on the following (any TWO): (7–3.5 *2)
i. SGML
ii. Unicode Standards
iii. Multimedia Document

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Roll No.. Date.....

B.E. (Information Technology-VIth Semester)
End Semester Examination – May 2016
IT-312 (Software Engineering)

Time: 3:00 Hrs

Max. Marks-70

Note: Attempt ANY FIVE questions. Q1 is compulsory.
All questions carry equal marks.
Assume suitable missing data, if any.

Q1. [a] Differentiate between static and dynamic testing?
[b] Explain the different modeling views proposed by UML? State the diagrams associated with each view?
[c] Differentiate between Bug, fault and failure?
[d] Establish the relationship between software quality attributes - reliability and maintainability? How do they impact each other?
[e] How does CMM encourage the continuous improvement of software processes?
[f] Differentiate between Verification and Validation? List one technique each of Validation and Verification.
[g] State the importance of inspection and reviews and when are they carried out in SDLC? (2x7= 14)

Q2. [a] Requirement verification is done through the following checks :

- Consistency checks
- Completeness checks

Identify the focus in each check and explain what should be the consequences if not checked. (4)
[b] A program takes an angle as input within the range [0, 360] and determines in which quadrant the angle lies. Identify the equivalence class test cases for output and input domains. (7)
[c] How many states does a bug go through during its life cycle? (3)

Q3. [a] Explain in detail the STLC model? (7)
[b] Explain in detail the various stages of the inspection process proposed by Fagan? How is it different from Gilb Inspection? (7)

Q4. [a] Develop the sequence diagram for 'buying a book from a credit card at the book store'. (3.
[b] Develop the collaboration diagram for 'Cash withdrawal from the ATM machine'. (3
[c] Consider a traffic light system. Draw its activity diagram with the aid of swimlanes. Specify the rules according to which the system is controlled.

Q5. [a] ] For the requirements given below draw the Use Case Diagram

The hospital patient management system (HPMS) will be used to allocate beds to the patients priority basis, and to assign doctors to patients in designated wards as need arises. Doctors also use the system to keep track of the patients assigned to them. Nurses who are in dir contact with the patients will use the system to keep track of the available beds, the patient different wards, and the type of medication required by each patient. The doctors must m rounds to pick up patient treatment card in order to know whether they have cases to trea not.

[b] Comment on the following myths about software testing:

(i) Compete testing is possible

(ii) The purpose of testing is to check the functionality of the software

[c] Explain KPA's at level 2 of CMM?

Q6. [a]For the code given below perform the following:-

[i] Draw the DD path graph, calculate the cyclomatic complexity and find the independent path

[ii] Find all du and dc paths?

```
1.  begin
2.  float x, y, z =0;
3.  int count;
4.  input (x,y,count);
5.  do {
6.  if(x<=0) {
7.  if(y>=0) {
8.  x=y*z+1;
9.  }
10. }
11. else {
12. z=1/x;
13. }
14. y = x*y+z;
15. count = count-1;
16. }
17. while(count>0)
18. output(z);
19. end
```

Q7. Write short notes on the following:-

[a] V&V Diagram

[b] State Chart Diagram

Roll No. Date: / /

**BE (~~II~~/~~IV~~/VI/~~VIII~~) Semester End Sem. Examination (May 2016)**

**Course No.: MA -312** Title: Computer Graphics

Time: 3 Hours Max. Marks: 70

***Attempt all questions. All questions carry equal marks.***

1. Explain storage scheme for solids.
2. Write a note on the properties of Bezier curve and on $G_0$, $G_1$ and $G_2$ continuities.
3. Write a note on Phong's Illumination model.
4. Write a note on Phong's shading versus Gouraud shading.
5. Derive Bresenham's algorithm for scan converting a line in the second octant.
6. Briefly explain various techniques used for the image generation on computer terminals. Explain the following statement: "A typical raster display would have a resolution of 1280 x 1024 capable of presenting 256 simultaneous colors selected from a palette of 16.7 millions".
7. Find the overall transformation matrix for the rotation of an object through an angle $\delta$ in counter clock wise direction about an arbitrary axis that passes through the point $P(x_o, y_o, z_o)$ having the direction cosines $(c_x, c_y, c_z)$.
8. The corners of the wedge shaped block are $A(0,0,2)$, $B(0,0,4)$, $C(0,2,4)$, $D(0,0,2)$, $E(-1,2,2)$ and $F(-1,2,4)$. Determine the reflection of wedge about the plane that passes through the $y$-axis at $45^\circ$ between $(-x)$ and $z$-axis.
9. Derive the transformation matrix for the isometric projection of a point onto the $x$ coordinate plane. Find the required angles of rotation of an object if foreshortening along $x$ and $y$ coordinate axes are equal whereas it becomes 40% along the $z$-axis.
10. Explain the Liang-Barsky line clipping algorithm. Using this algorithm, find the clipping coordinates of the line segment with end coordinates A(-10, 50) and B(30, against the window (-30, 10) and (20, 60).

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Roll No. ____

Total No. of page: 2

BE (Information Technology) VI SEMESTER
B.E END SEMESTER EXAMINATION May, 2016
IT-313: INFORMATION THEORY AND CODING

Time: 3.0 Hours
Max.Marks:70

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

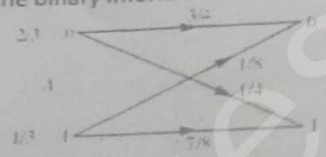
Q.1 a) For a certain exam, 75% of the participating students pass, 25% do not pass. Of the students who have passed, 10% own a car, of those who have failed, 50% own a car.
*a.* How much information does one receive if one is told the result of a student's exam?
*b.* How much information is contained in the announcement of a student who has passed that he does or does not have a car?
*c.* How much uncertainty remains concerning the car ownership of a student if he announces the result of his exam? (5)

b) Explain Markov source. We had a 3-gram model on the language given by
P(000)=0.32 P(001)=0.08 P(010)=0.15 P(011)=0.15 P(100)=0.16 P(101)=0.04 P(110)=0.06 P(111)=0.04
If a 2-gram model for the same source is given by P(00)=0.4 P(01)=0.3 P(10)=0.2 P(11)=0.1
Construct a second-order Markov source. (3) (4)

c) Explain reduction of information channels. (2)

d) Explain Deterministic and noiseless channel with the amount of information transmitted.

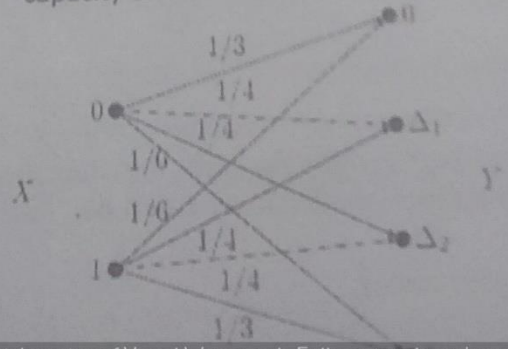
Q.2 a) Consider the binary information channel



Calculate
a) Average uncertainty (or surprise) of the input to the channel *before* observing the channel output;
b) Average uncertainty (or equivocation) of the input to the channel *after* observing the channel output;
c) Reduction in the average uncertainty of the input to the channel *provided* or *resolved* by the channel. (4)

b) Derive the expression to find the capacity of Binary erasure Channel, assume input probabilities $P(0)=\alpha$ and $P(1)=1-\alpha$. (6)

c)Consider a channel with two erasure symbols, one closer to 0 and one closer to 1 is shown following figure. Define the capacity of Channel also Find it. (4)



Q.3 a) Consider a binary symmetric communication channel, whose input source is the alphabet X = {0, 1} with probabilities {0.5, 0.5}; whose output alphabet is Y = {0, 1}; and whose channel matrix is

$$\begin{pmatrix} 1-\epsilon & \epsilon \\ \epsilon & 1-\epsilon \end{pmatrix}$$

1. What is the entropy of the source, H(X)?
2. What is the probability distribution of the outputs, p(Y ), and the entropy of this output distribution, H(Y )?
3. What is the joint probability distribution for the source and the output, p(X, Y), and what is the joint entropy, H(X, Y )?
4. What is the mutual information of this channel, I(X; Y)?
5. How many values are there for $\epsilon$ for which the mutual information of this channel is maximal? What are those values, and what then is the capacity of such a channel in bits? (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 t when cascade will not loose information.

b) Explain weakly symmetric Channel. Derive the expression to find the capacity of weakly symm Channel. (9)

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

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

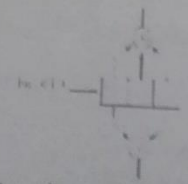
i) Find all codewords and generate syndrome table

ii) Use syndrome decoding to decode the following received vector and decode the error if any:

(i) 110011 (7)

b) For a (7,4) cyclic code with generator polynomial($x^3+x+1$) determine the codewords transmitted the following received vectors(i)1011011 (ii)1000001 (iii)1010100 (7)

Q.6 a) Explain (n, k, L) convolutional encoder.



For a above (2,1,2) convolutional encoder give the trellis and state diagram. Encode bits 1101 usi diagram and incur error at bit position e= (00 00 01 00 10 00). Find the correct decoded outp viterbi technique. (11)

d) Explain the concept of Turbo coding. (3)

*END*

Roll No..... No. of pages: 02 Date .....

SIXTH SEMESTER B.E. (IT)

**B.E. END SEMESTER THEORY EXAMINATION, MAY-2016**

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

**Time: 3:00 Hrs.** **Max. Marks: 70**

FIVE

**Note:** *Attempt ANY [redacted] questions.*
*All questions carry equal marks.*
*Assume suitable missing data, if any*

1.[a] Design a DFA for the language contains strings in which left most symbol differ from right most symbol over input symbol $\{0, 1\}$.

[b] Construct mealy and moore machines for regular expression $(0 + 1)^*(00 + 11)$.

2.[a] Show a derivation of the string $a^2b^3c^2d^3$ according to your grammar.

[b] Prove that language which contains set of strings of balanced parentheses is not regular.

3.[a] Write an unrestricted grammar to accept the language $L_1 = \{a^ib^jc^kd^l \mid i = k \text{ and } j = l\}$. Mention the start symbol of your grammar. Use upper-case Roman letters for non-terminal symbols.

[b] If context free grammer G is $S \rightarrow SbS \mid a$, show that G is ambiguous.

4. [a] Convert the grammar $S \rightarrow AB, A \rightarrow BS \mid a, B \rightarrow SA \mid b$, into GNF.

[b] Construct the context free grammar generating following

(i) $L_2 = \{a^nb^m \mid n \neq m\}$

(ii) $L_3 = \{a^nb^mc^md^n \mid n \geq 1, m \geq 1\}$

5.[a] Prove that language $L_4 = \{a^nb^nc^n \mid n > 0\}$ is not context free language.

[b] Construct a context free grammer G which accepts $N(A)$, where $A = (\{q_0, q_1\}, \{a, b\}, \{z_0, z\}, \partial, q_0, z_0, \phi)$ and $\partial$ is given by

$\partial(q_0, b, z_0) = \{(q_0, zz_0)\}$ $\quad$ $\partial(q_0, a, z) = \{(q_1, z)\}$

$\partial(q_0, \wedge, z_0) = \{(q_0, \wedge)\}$ $\quad$ $\partial(q_1, b, z) = \{(q_1, \wedge)\}$

$\partial(q_0, b, z) = \{(q_0, zz)\}$ $\quad$ $\partial(q_1, a, z_0) = \{(q_0, z_0)\}$

6.[a] Construct a push down automata to accept the following language

$$L_5 = \{a^n b^m a^n | \, m, n > 1)\}.$$

[b] Design a Turing machine which computes following function.

$$f(w) = ww^r | \, w \in (a, b)$$

7.[a] Design PDA for the language $L_6 = \{ww^r | \, w \in (a, b)\}$

[b] Design a Turing machine which can compute 2's complement of a given binary string.

**OR**

Design a Turing machine which can accept the set of all palindromes of a given binary string.

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Total No. of Page(s): 2 Roll No. .....

B.E. (IT)

SIXTH SEMESTER

B.E. END-SEMESTER EXAMINATION, MAY 2016

**IT-314: Simulation and Modelling**

Time: 03:00 Hrs. Max. Marks: 70

*Note: Attempt any FIVE questions .All Question carry EQUAL marks. Assume suitable missing data, if any.*

1. (a) What are the features that distinguish the modeling process from software development life cycle? **[10]**
   (b) What is model classification? Explain each with suitable example. **[4]**

2. (a) With the help of block diagram explain the concepts introduced by Zeigler to build and apply computer simulation. **[7]**
   (b) Compare verification and validation. Why validation is important in modeling and simulation. **[7]**

3. (a) Describe all the parameters of a queuing system, notations and basic queuing relationship with the help of block diagram. **[10]**
   (b) Compare and contrast single server and multi server queue for a queuing system. **[4]**

4. (a) Assume that you are using a simulation to study the steady state average waiting time of customer in a complex system. However because of the simulation complexity, the computer time needed to arrive at a steady state value is excessive, leading to poor estimates of the steady state values. How you improve the speed at which the simulation converges. [7]

   (b) A certain college has 5 printers in computer lab for the use of 1500 undergraduate and 2000 graduate students. Print jobs arrive uniformly during the day and have an exponentially distributed page

count. They are spooled on a single hard disk while waiting for the first printer to be available. How this queuing system would be characterized. Explain? [7]

5. With reference to modeling explain the following:
   1. CASE shell designing
   2. CAME tool design techniques

[7+7]

6. What is process reengineering technique? How reuse and reverse engineering are used to build a model. Give suitable example [14]

7. Write short note on any *four* of the following: [14]
   1. Continuous simulation language.
   2. Discrete simulation language.
   3. Applications of simulation.
   4. Classification of process models.
   5. Face validity.

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Total No. of Page(s): ...3....

SIXTH SEMESTER B.E. (IT)

B.E. END SEM. EXAMINATION, May-2016

IT-315: Microwave and Satellite communication

Time: 03:00 Hrs. Max. Marks: 70

*Note:* Attempt any FIVE questions.

Q.1: (6+4+4) Marks

(a) A load of $100 + j150\ \Omega$ is connected to a 75 Ω lossless line. Find the following parameters using Smith chart: (i) Reflection coefficient; (ii) Standing wave ratio; (iii) The load admittance; (iv) $Z_{in}$ at 0.4λ from the load.

(b) A 60 Ω distortionless transmission line has a capacitance of $0.15\ \text{nF/m}$. The attenuation on the line is $1.15 \times 10^{-3}\ \text{Np/m}$. Calculate: (i) Line parameters: resistance, inductance and capacitance per meter of the line; (ii) the velocity of wave propagation.

(c) Explain microstrip antenna with Features and applications.

Q.2: (7+7) Marks

(a) A plane wave propagating in a lossless dielectric medium has an electric field given as $E_x = E_o \cos(\omega t - \beta z)$ with a frequency of 5.0 GHz and a wavelength in the material of 3.0 cm. Determine the propagation constant, phase velocity, relative permittivity of medium, and wave impedance.

(b) Explain Horn antenna with its types and applications.

Q.3: (8+6) Marks

(a) Define in short: (i) Radiation patterns; (ii) Beam Area; (iii) Directivity and Gain; (iv) Relation between effective height and effective aperture.

(b) Find out and plot the relative field pattern of two isotropic point source of same amplitude and opposite phase separated by a distance $d=\lambda$.

Q.4: 14 Marks

What is Hertzian dipole? Derive the power radiated by Hertzian dipole antenna and its radiation resistance.

Q.5: (7+7) Marks

(a) Derive the expression for the attenuation of the $TE_{10}$ mode of a rectangular waveguide due to conductor loss.

(b) A rectangular waveguide with dimensions $a = 2.5cm$, $b = 1cm$ is to operate below 15.1 GHz. How many TE and TM modes can the waveguide transmit if the guide is filled with a medium characterized by $\sigma = 0, \varepsilon = 4\varepsilon_o, \mu_r = 1$? Calculate the cutoff frequencies of the modes.

Q.6: (4+5+5) Marks

(a) What are Kepler's three laws of planetary motion? Give the mathematical formulation of Kepler's third law of planetary motion.

(b) Define the following in short: (i) Line of Apsides; (ii) Line of Nodes; (iii) Prograde Orbit; (iv) Mean Anomaly; (v) Look Angles.

(c) With the help of a simple block diagram, explain the function of telemetry, tracking, command and Monitoring subsystem.