(DCS / DIT 211)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE & IT

Paper - I : Mathematics - III

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) What is the smallest period of $sin\left(\frac{2n\pi x}{k}\right)$.

b) What is the value of *bn* for the periodic function $f(x)$ with period 2T?

c) Express the Fourier series representing $f(x) = |x|$ in $-\pi < x < \pi$.

d) What is the Kernel of the Fourier transform.

e) What is the Fourier sine transform of $\frac{1}{x}$?

f) If $F(f(x)) = F(S)$, then the value of $F\{f(x-a)\}$ is.

g) Define Root mean square value.

h) Define the operators E and E^{-1}.

i) Write the Gauss' Backward Formula of Interpolation.

j) Define the interpolatory conditions.

k) Define Laplace's equation.

l) Define Cauchy's problem.

m) Write Simpson's 3/8 – Rule.

n) Write stirling's formula.

o) Define Trapezoidal Rule.

UNIT - I

2) a) Obtain the Fourier series for the function.

$$f(x) = \begin{cases} \pi x, & 0 \le x \le 1 \\ \pi(2-x), & 1 \le x \le 2 \end{cases}$$

b) Obtain the Fourier expansion of $x \sin x$ as a cosine series in $(0, \pi)$.

OR

c)

θ° :	0	30	60	90	120	150	180
T :	0	5224	8097	7850	5499	2626	0

Obtain the first four terms in a series of sines to represent T and calculate T for θ = 75°.

UNIT - II

3) a) Find the Fourier transform of

i) $e^{-2(x-3)^2}$ ii) $e^{-x^2}\cos 3x$

b) Using Parseval's identity, prove that

$$\int_0^\infty \frac{dt}{(a^2+t^2)(b^2+t^2)} = \frac{\pi}{2ab(a+b)}$$

OR

c) Evaluate $L^{-1}\left\{\frac{1}{(s-1)(s^2+1)}\right\}$ by the method of residues.

d) Find the Fourier cosine transform of

$$f(x) = \begin{cases} x, & for \quad 0 < x < 1 \\ 2-x, & for \quad 1 < x < 2 \\ 0, & for \quad x > 2 \end{cases}$$

UNIT - III

4) a) Using Newton's forward difference formula, find the sum $S_n = 1^3 + 2^3 + 3^3 + \ldots + n^3$.

b) Using the method of separation of symbols, show that $\Delta^n u_{x-n} = u_x - n u_{x-1} + \frac{n(n-1)}{2} u_{x-2} + \ldots + (-1)^n u_{x-n}$.

OR

c)

x :	1.7	1.8	1.9	2.0	2.1	2.2
$y = e^x$:	5.4739	6.0496	6.6859	7.3891	8.1662	9.0250

Interpolate the value of y when $x = 1.91$.

d)

x :	0	1	2	3	4	5	6
y :	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

Find dy/dx and d^2y/dx^2 when $x = 3$.

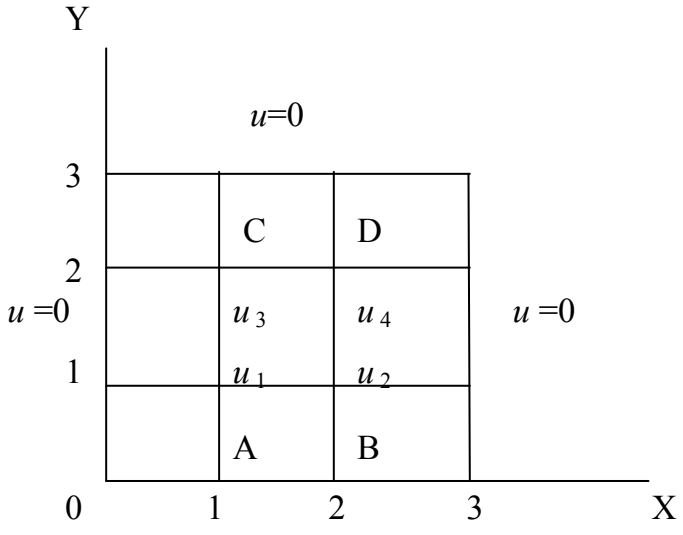
UNIT - IV

5) a) Evaluate $\int_0^{\pi/2} \sqrt{\sin\theta}\, d\theta$. Using Simpson's rule with $h = \pi/12$.

b) Given $dy/dx = 1+y^2$, where $y = 0$ when $x = 0$, find $y(0.2)$, $y(0.4)$.

OR

c) Solve the Poisson equation $u_{xx} + u_{yy} = -10(x^2 + y^2 + 10)$ in the domain of



(DCS / DIT 212)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE & IT

Paper - II : Basic Electronics

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) What is a Diode?

b) What is a Transistor?

c) What are the characteristics of JFET's?

d) Explain about unijunction Transistor.

e) Explain application of UJT.

f) Compare LED & LCD.

g) What is a Oscillator Circuit?

h) What are different types of power amplifiers?

i) What is a op-amp?

j) What is a Rectifier?

k) Define operating point.

l) Explain what is meant by voltage Buffer.

m) What is voltage summing?

n) Explain about Linear IC's.

o) Explain about voltage Regulatores.

UNIT - I

2) a) Explain about Half-wave rectification.

b) Explain about clippers & clampers.

OR

3) Explain briefly about Transistor h-parameter model.

UNIT - II

4) Explain working of photo conductive cells.

OR

5) Briefly explain Depletion type MOSET's.

UNIT - III

6) Explain working principle of class C & D Amplifier.

OR

7) Explain the working of Harteley oscillator.

UNIT - IV

8) Explain about voltage summing & voltage buffer.

OR

9) Explain the operation of Timer IC.

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(DCS 213)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE & IT

Paper - III : Digital Logic Design

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) a) Give the advantage of Octal and Hexadecimal Systems.

b) What are minterms and maxterms?

c) Draw the k-map for a five variable function F(A, B, C, D, E).

d) What is a don't care term?

e) What is carry propagation delay of a full adder?

f) What is encoding?

g) What is a state diagram?

h) What is the need of an exitation table?

i) What is an EEPROM?

UNIT - I

2) a) Using Tabulation method find the minimal expression for f = πM(2, 3, 8, 12, 13).d(10, 14).

b) Reduce the Boolean expression $AB + \overline{AC} + A\overline{B}C\,(AB + C) = 1$.

OR

3) a) Reduce πM (1, 2, 3, 5, 6, 7, 8, 9, 12, 13) and implement it in universal logic.

b) Prove that $A + \overline{B}C(A + \overline{\overline{B}C}) = A$.

UNIT - II

4) a) Explain the operation of a Magnitude Comparator.

b) Design a full adder using a 3 line to 8 line decoder.

OR

5) a) Explain the function of a Decimal adder with an example.

b) Design a Decimal to BCD priority encoder.

UNIT - III

6) a) Explain Hazard-free realization.

b) Convert a SR flip to JK flip flop.

OR

7) a) Design a 4bit up counter.

b) Design a MOD-7 asynchronous counter using T flip flops.

UNIT - IV

8) a) Explain the Design of a Synchronous 3 bit up counter using JK flip flops.

b) Write short notes on static RAMs.

OR

9) Write explanatory notes on:

a) PAL.

b) EPROMS.

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(DCS / DIT 214)

B.Tech. DEGREE EXAMINATION, DECEMBER - 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - IV : Data Structures

Time : 03 Hours **Maximum Marks : 75**

Answer Question No.1 is compulsory ***(15)***

Answer One question from each unit ***(4×15=60)***

1) Explain the following terms:

a) B - Trees

b) B + Trees

c) Time complexities

d) Doubly linked list

e) ADT

UNIT –I

2) Define a database. Explain about different types of database users.

OR

3) Explain in detail about Linked List ADT

UNIT –II

4) What is relational data model and explain in detail about Relational Constraints.

OR

5) What is Delimiter Matching and how do you match them?

UNIT –III

6) What is normalization and explain the normalization technique in detail.

OR

7) What are the preliminaries in Internal Sorting?

UNIT –IV

8) What is transaction and explain about transaction processing concepts.

OR

9) How do you implement Binary search trees?

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(DCS 215)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - V : Object Oriented Programming

Time : 3 Hours **Maximum Marks: 75**

Question No.1 is compulsory ***(15)***

Answer ONE question from each unit ***(4×15 = 60)***

1) Explain the following terms.

a) Object oriented programming.

b) Constructors

c) Destructors

d) Class

e) Object

UNIT - I

2) What is object oriented programming and explain some of the C++ fundamental

OR

3) What are the two new data types and explain them in detail.

UNIT - II

4) How do you find address of on overloaded function. Explain in detail about it.

OR

5) Explain in detail about the arrays of objects and pointers to objects?

UNIT - III

6) How to create own manipulator functions and also own inserter and extractors.

OR

7) How to make dynamic allocation using new and operator operators.

UNIT - IV

8) Explain about Templates in detail.

OR

9) What are Generic functions and generic classes? Explain in detail.

(DCS 216)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - VI : Environmental Studies

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) Write briefly on:

a) Nuclear Hazard.

b) Global Warming.

c) Energy Conservation.

d) Acid Rain.

e) Solid waste management.

UNIT - I

2) Discuss the multidisciplinary nature of environmental studies.

OR

3) a) Define renewable and non renewable resources.

b) Discuss about the energy resources.

UNIT - II

4) a) Discuss about endemic and endangered species in India with example.

b) Define ecosystem.

OR

5) Discuss in detail about in-situ and ex-situ conservation of biodiversity.

UNIT - III

6) Discuss causes, effects and control measures of water pollution.

OR

7) Discuss about the air and water prevention and control of protection act.

UNIT - IV

8) a) Explain HIV/AIDS.

b) Write note on human rights and value education.

OR

9) Write detailed report on the local polluted industrial site.

(DCS 221)

B. Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper – I : Mathematics - IV

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) Find the value of k, if $2x - x^2 + ky^2$ is Harmonic.

b) What is the condition for the curves $u(x, y) = c, u(x, y) = c'$ to be orthogonal.

c) Find the zeros of $\frac{z^2+1}{1-z^2}$ and also singularities .

d) Prove that $\int_c \frac{dz}{z-a} = 2\pi i$, where c is a circle $|z - a| = r$.

e) State Cauchy's theorem.

f) State Cauchy's inequality.

g) State Residue theorem.

h) Determine the poles of $f(z) = \frac{z^2}{(z-1)^2(z+2)}$.

i) Define zeros of an analytic function.

j) State the orthogonality condition for Bessel's function.

k) Define Legendre's equation.

l) Define generating function of Besse's function.

m) Define Indicial equation.

n) What are necessary conditions for $f(z) = u + iv$ to be analytic.

o) Find the poles of $\frac{(z-1)^2}{z(z-2)^2}$.

UNIT - I

2) a) Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin, even though C-R equations are satisfied.

b) If $f(z)$ is a regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right). |f(z)|^2 = 4|f'(z)|^2$.

OR

3) a) Find the orthogonal Trajectories of the family of curves $x^4 + y^4 - 6x^2y^2 =$ constant.

b) Determine the analytic function whose real part is $x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$.

UNIT - II

4) a) Evaluate $\int_0^{2+i} (\bar{z})^2 dz$, along

i) The line $y = \frac{x}{2}$ ii) The realaxis to 2, and vertically to 2+i

b) Evaluate $\int_c \frac{e^z}{(z^2+\pi^2)^2} dz$, where C is $|z| = 4$.

OR

5) a) Find the Taylor's expansion of $f(z) = \frac{2z^3+1}{z^2+1}$ about the point $z = i$.

b) What type of singularity have the function $\frac{e^{2z}}{(z-1)^4}$.

UNIT - III

6) a) Find the sum of the Residues of $f(z)=\frac{\sin z}{z\cos z}$ at its poles inside the circle $|z|=2$.

b) Show that $\int_0^{2\pi}\frac{\cos 2\theta}{1-2a\cos\theta+a^2}=\frac{2\pi a^2}{1-a^2},(a^2<1)$.

OR

7) Obtain the solution of the differential equation $x(1-x)\frac{d^2y}{dx^2}-(1+3x)\frac{dy}{dx}-y=0$.

UNIT - IV

8) a) Express $J_5(x)$ in terms of $J_0(x)$ and $J_1(x)$.

b) Expand $f(x)=x^2$, in (0, 2) in terms of $J_2(\alpha_n x)$, where α_n are determined by $J_2(2\alpha_n)=0$

OR

9) a) Show that for any function $f(x)$, for which the n^{th} derivative is continuous $\int_{-1}^{1}f(x)Pn(x)dx=\frac{1}{2^n.n!}\int_{-1}^{1}(1-x^2)^n.\,f^n(x)dx$.

b) Show that $\int_{-1}^{1}(1-x^2)P_m^1(x)P_n^1(x)dx=0$.

EEE

(DCS 222)

B. Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper – II : Circuit Theory

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) Define potential difference.

b) What is the value of one coulomb?

c) Give examples for active elements.

d) Differentiate Bilateral and unilateral elements.

e) State Faraday's laws of electromagnetic induction.

f) Write expression for power absorbed by the capacitor.

g) State KVL.

h) What is the equation for finding the current in any branch in a circuit of m branches.

i) Which principle is applied in Nodal analysis.

j) Super position theorem is applicable to which circuits.

k) What is the average value of a sine wave over a full cycle.

l) What is the phase angle between the capacitor current and the applied voltage in a parallel RC circuit?

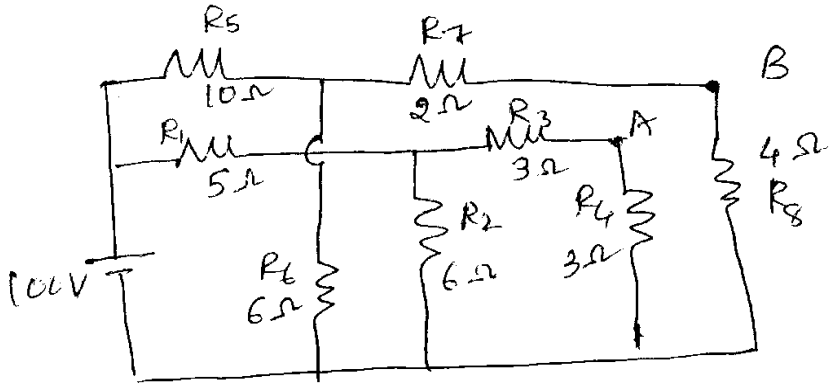
m) Define True power.

n) Maximum power is transferred at which efficiency?

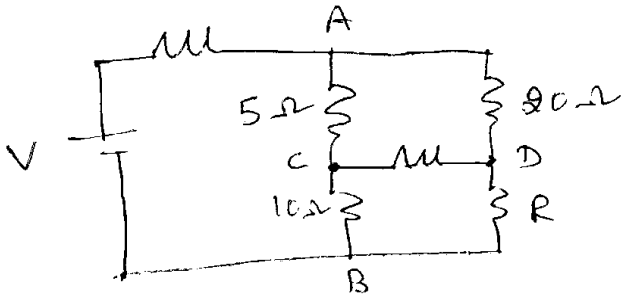
o) What is the impedance of an ideal parallel resonant circuit without resistance in either branch.

UNIT - I

2) a) Determine the voltage V_{AB} in the circuit shown in figure.



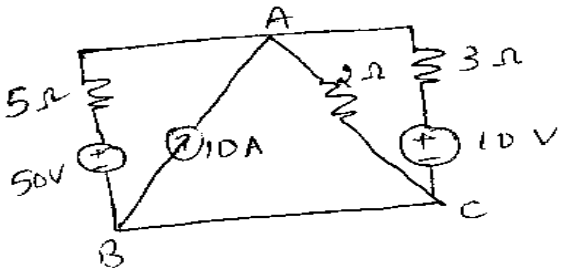
b) Determine the value of R is the circuit shown in the following figure when the current is zero in the branch CD



OR

3) a) Discuss the different types of network elements in detail.

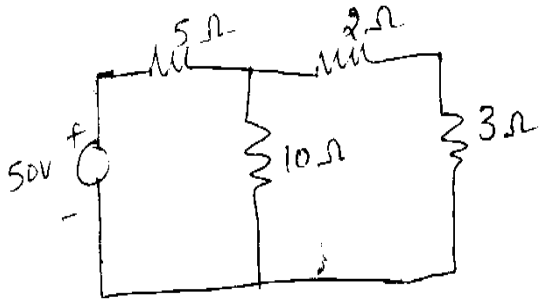
b) Using source transformation, find the power delivered by 50V voltage source in the circuit shown.



UNIT - II

4) a) Derive the expression for resistances when transformed from star to delta and delta to star connectons.

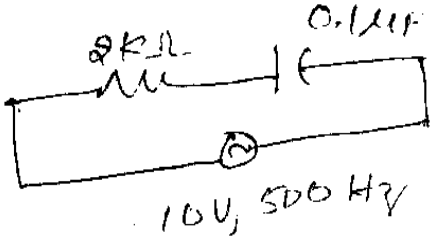
b) Use Thevenin's theorem to find the current in 3Ω resistor in the circuit shown.



OR

5) a) Derive the expression for voltage and phase angle in series RC circuit. Also draw the phasor diagram.

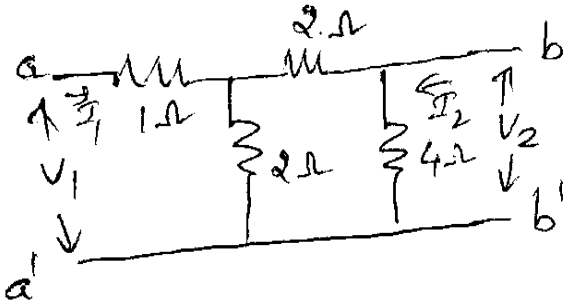
b) A sine wave generator supplies a 500Hz, 10V rms signal to a 2kΩ resistor in series with a 0.1μF capacitor as shown infigure. Determine the total impedance z, current I, phase angle θ, capacitive voltage V_C and resistive voltage V_R.



UNIT - III

6) a) Derive and explain the short circuit admittance parameters.

b) Find the y parameters for the network shown:



OR

7) a) Derive the expressions for bandwidth and quality factor.

b) Determine the quality factor of a coil for the series circuit consisting of R=10Ω, L = 0.1H and C = 10μ F.

UNIT - IV

8) a) What are the advantages of a three phase system? Also discuss about the generation of voltages.

b) A balanced delta connected load of (2 + j3) ohms per phase is connected to a balanced 3-ϕ 440V supply. The phase current is 10A. Find

i) Total active power

ii) Reactive power &

iii) Apparent power in the circuit

OR

9) a) Explain how the currents and voltages vary in a balanced 3 –ϕ system with star connected load.

b) A balanced star connected load of impedance (15+j20)Ω per phase is connected to a 3-ϕ, 440V, 50Hz supply. Find the line currents and power absorbed by the load. Assume R Y B phase sequence.

EEE

(DCS 223)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - III : Computer Organisation

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) Explain the following terms:

a) DATABASE

b) E-R Model

c) EER Model

d) Concurrency

e) Normalization

UNIT - I

2) Explain with example the implementation of register transfer?

OR

3) Discuss in detail about various arithmetic operations.

UNIT - II

4) What is an instruction code? Explain in detail various addressing modes.

OR

5) Explain about interrupt priorities?

UNIT - III

6) Explain with neat diagram, the address selection for control memory.

OR

7) Explain the database system architecture using a simple example and diagram.

UNIT - IV

8) Explain about asynchronous data transfer and asynchronous communication interface.

OR

9) Explain about input output interface.

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(DCS 224)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper – IV : Discrete Mathematical Structures

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) Write short notes on:

a) State distributive laws.

b) If n is the product of two positive integers a and b, then show that either $a \le n^{1/2}$ or $b \le n^{1/2}$.

c) Define Recurrence relation.

d) Define graph and directed graph.

e) Define lattice.

UNIT - I

2) a) If the product of two integers a and b is even, then show that either a is even or b is even.

b) Construct truth table for $[(p \vee q) \wedge (\sim r)] \leftrightarrow (q \rightarrow r)$.

OR

3) a) Explain bijection principle.

b) Discuss various types of quantifiers.

UNIT - II

4) a) Prove by mathematical induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n.

b) How many different licence plates are there that involve 1, 2, or 3 letters followed by 4 digits?

OR

5) a) In how many ways can you 6 children arrange themselves in a ring?

b) What is the coefficient of $X^{12}\ Y^{13}$ in the expansion of $(X + Y)^{25}$.

UNIT - III

6) a) Find the coefficient of X^{20} in $(X^3 + X^4 + X^5 \ldots\ldots)^5$.

b) Solve $a_n - 8a_{n-1} + 21a_{n-2} - 18a_{n-3} = 0$ for $n \geq 3$.

OR

7) a) Find a generating function to count the number of integral solutions $e_1 + e_2 + e_3 = 10$ if for each i, $0 \leq e_i$.

b) Find the coefficient of X^{16} in $(1+ X^4 + X^8)^{10}$.

UNIT - IV

8) a) Suppose x and m are positive integers and r is the smallest positive integer for which there exist integers c and d such that $r = c.\ x + d.\ m$. Then show that $r = gcd\ (x, m)$.

b) Prove that 19 is not a divisor of $4n^2 + 4$ for any integer n.

OR

9) a) If A = (V, E) is a digraph, then show that for $n \geq 1, (x, y) \in E^n$ iff there is a directed path of length n from x to y in A.

b) State and prove four color problem.

EEE

(DCS 225)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - V : File Structures

Time : 3 Hours **Maximum Marks: 75**

Answer question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) Write short notes on:

a) Hashing

b) Acyclic graphs

c) Spanning tree

d) CD ROMs

e) Magnetic tapes

UNIT - I

2) Write indetail about Extendible Hashing.

OR

3) Explain some of the Graph Algorithms and write short notes on Rehashing.

UNIT - II

4) Explain detail about Euler circuits.

OR

5) Write Dikstra's algorithm and explain it with an Iterative example.

UNIT - III

6) Write short notes on how do we manage a file of records.

OR

7) Discuss the various fundamental file processing concepts?

UNIT - IV

8) Write short notes on Indexing?

OR

9) What are different secondary storage devices.

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(DCS 226)

B.Tech. DEGREE EXAMINATION, DECEMBER – 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper – VI : Microprocessors

Time : 3 Hours **Maximum Marks: 75**

Answer Question No.1 is compulsory ***(15)***

Answer one question from each unit ***(4×15 = 60)***

1) a) What is a 'Queue'?

b) What is a stack pointer.

c) What is a general purpose register.

d) What is the function of 'parity flag'?

e) Give an example of register addressing mode.

f) What is the role of instruction "XLAT''?

g) What is the difference between 'WAIT' and 'HLT'?

h) What is an interrupt priority?

UNIT - I

2) a) What is the difference between JUMP and WHILE –DO instructions.

b) Give an example to utilise 'REPEAT' instruction in a program.

OR

3) a) List out the assembler directives of 8086 and explain them.

b) Explain different addressing modes of 8086.

UNIT - II

4) Explain all Assembler directives.

OR

5) a) Explain the standard programming structure of 8086 for IF – THEN –ELSE.

b) Write a program in 8086 that will perform $u \leftarrow v + (s - 6)$

UNIT - III

6) a) What are the five types of interrupts supported on 8086?

b) Explain the addressing memory of 8086.

OR

7) a) Discuss the 8085 interrupts.

b) Write short notes on ports in micro computer system.

UNIT - IV

8) a) Explain interfacing Dynamic RAM.

b) Write short notes on multiple Bus micro computer system.

OR

9) a) Write short notes on DMA.

b) Write the differences between synchronous and asynchronous serial data transmission.