

B. Tech. DEGREE EXAMINATION, MAY - 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 compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

- 1) a) Define odd function with examples.
- b) Define periodic function.
- c) Write the form of the Euler's formula.
- d) Define half range cosine series.
- e) Define Integral transform.
- f) Evaluate $\Delta^2 \cos 2x$
- g) Newton's forward interpolation formula.
- h) Define Numerical integration.
- i) Define trapezoidal rule.
- j) Write iterative of Newton's method.
- k) Write iterative of regula falsi method.
- l) Write Bessel's formulae.
- m) Write the formula for unequal spaced values of the arguments of x .
- n) Evaluate $\Delta \tan^{-1}x$
- o) Write the formula $\left(\frac{dy}{dx}\right)_{x=x_0}$

UNIT - I

2) a) Find a Fourier series to represent $f(x) = x - x^2$ from $x = -\pi$ to $x = \pi$

b) Find the Fourier series expansion for $f(x)$

$$f(x) = -x \quad \text{if } -\pi < x < 0$$

$$= +x \quad \text{if } 0 < x < \pi$$

$$\text{Deduce that } \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$$

OR

c) Express $f(x) = x$ as a half-range cosine series $0 < x < 2$

d) Expand $f(x) = e^{-x}$ as a Fourier series in the interval $(-1, 1)$

UNIT - II

3) a) Find the Fourier transform of $f(x) = \frac{1}{1+x^2}$

b) Find the Fourier sine transform of the function $f(x) = e^{-2x} + 4e^{-3x}$

OR

c) Find the Fourier sine transform of $f(x) = e^{-ax}$ and deduce the inversion formula.

d) Show that $f(x) = e^{-x^2/2} - \infty < x < \infty$ is self-reciprocal.

UNIT - III

4) a) Give the values :

1. x	2. 5	3. 7	4. 11	5. 13	6. 17
7. $f(x)$	8. 150	9. 392	10. 1452	11. 2366	12. 5202

Evaluate $f(q)$ using Newton's divided difference formula.

b) Apply Lagrange's interpolation method find the value of x when $f(x) = 15$ from the given data :

x	5	6	9	11
$f(x)$	12	13	14	16

OR

- c) Given $\sin 45^\circ = 0.7071$, $\sin 50^\circ = 0.7660$, $\sin 55^\circ = 0.8192$, $\sin 60^\circ = 0.8660$ find $\sin 62^\circ$ using backward interpolation formula.
- d) Find $y'(0)$ and $y''(0)$ from the following table
- | | | | | | | |
|-----|---|---|----|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | 4 | 8 | 15 | 7 | 6 | 2 |

UNIT - IV

- 5) a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Simpson's $\frac{1}{3}$ rd rule taking $h = \frac{1}{6}$.
- b) Solve $\frac{dy}{dx} = x + y$, $y(1) = 0$ numerically up to $x = 1.2$ with $h = 0.1$.

OR

- c) Apply Runge – kulta method to find an approximate value of y for $x = 0.2$ in steps of 0.1 if $\frac{dy}{dx} = x + y^2$ given that $y = 1$ where $x = 0$ take $h = 0.1$ and carry out the calculation in two steps.



(DCS / DIT 212)

B. Tech. DEGREE EXAMINATION, MAY - 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 compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

- 1) a) What are intrinsic and extrinsic semiconductors. (2)
- b) Define ripple factor and regulation of a rectifier. (2)
- c) Give applications of LED. (2)
- d) Define Barkhausen criteria. (2)
- e) Draw op amp as a summer. (2)
- f) What is a clipper? (1)
- g) What are h-parameters? (2)
- h) What is the need of feed back. (2)

UNIT - I

- 2) a) Draw a self bias circuit and derive an expression for the stability factor.
- b) Explain the working of a half wave rectifier.

OR

- 3) a) Draw neat figures and explain the function of a clipper.
- b) Draw input and output characteristics of a BJT in CE configuration and explain.

UNIT - II

- 4) a) Explain the working of a Depletion type MOSFET.
b) Draw a neat figure and explain the principle of CRT.

OR

- 5) a) Draw the VI characteristics and explain the function of a UJT.
b) Explain the principle of operation of LCD.

UNIT - III

- 6) a) Explain the operation of a class C amplifier.
b) Draw the input and output waveforms and explain Hartely oscillator operation.

OR

- 7) a) Explain the operation of wein bridge oscillator.
b) Explain the class B amplifier operation with neat waveforms.

UNIT - IV

- 8) a) Explain how op amp can be used as an integrator.
b) Discuss the features of IC voltage regulator.

OR

- 9) a) Draw a Differentiator using op amps and explain its operation.
b) List the ideal characteristics of an op amp.



(DCS 213)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Second Year)

Computer Science

Paper - III : DIGITAL LOGIC DESIGN

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

(15 x 1 = 15)

Answer ONE question from each unit

(4 x 15 = 60)

- 1) a) Draw the truth table of NAND gate.
- b) Design subtractor circuit.
- c) Define positive logic of TTL family.
- d) Define Decoder.
- e) Define flipflop.
- f) Draw 4×1 multiplexer.
- g) Difference between ROM & RAM.
- h) Define shift register.
- i) What are universal gates?
- j) What is sequential circuit?
- k) What is state table?
- l) State De Morgan's theorem.
- m) What is combinational logic circuit.

- n) What is BCD Code?
- o) Difference between Asynchronous and Synchronous Circuit.

Unit – I

- 2) a) Convert the following :
 - i) $(3456)_{10}$ to base 2
 - ii) $(12EF)_{16}$ to base 8
 - iii) $(10110011)_2$ to base 16
 - iv) $(726)_8$ to base 10
- b) Realize AND, OR, NOT, XOR gates using universal gates.

OR

- 3) a) Minimise the function using K-map and obtain minimal Sop function?
 $f(A, B, C, D) = \pi(1, 2, 3, 4, 6, 9, 10, 12, + 14) + d(5, 7, 11)$
- b) What are universal gates? Why they called so?

Unit – II

- 4) a) Draw and explain the operation of 4 bit comparator.
- b) List the applications of multiplexers and demultiplexers.

OR

- 5) a) What is an encoder? Explain octal to binary encoder.
- b) Design the full adder using two half adders and logic gates.

Unit – III

- 6) Explain the following related to sequential circuit with suitable example.
 - a) State Diagram.
 - b) State Table.
 - c) State assignment.

OR

- 7) a) Distinguish between edge triggering and level triggering give examples.
- b) Differences between Transition Table and Excitation Table.

Unit – IV

- 8) a) Draw the circuit diagram of 4 bit ring counter using D-flip flops and explain its operation with the help of bit pattern.
- b) Discuss comparison between PROM, PLA and PAL.

OR

- 9) a) Explain different types of ROM generally used.
- b) Explain programmable array logic.



(DCS / DIT 214)

B. Tech. DEGREE EXAMINATION, MAY - 2015

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COMPUTER SCIENCE & IT

Paper - IV : Data Structures

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

Answer ONE question from each unit

- 1) Write shorts on : (5 × 3 = 15)
- a) Define polynomial ADT.
 - b) What is stack?
 - c) What is Binary tree?
 - d) What is AVL tree?
 - e) Define time complexity of Quick sort.

Unit – I

- 2) What is circular linked list and explain insertion and deletion operations with suitable example? (15)

OR

- 3) Explain double linked list operations with examples? (15)

Unit – II

- 4) What is Queue ADT? Explain its operations? (15)

OR

- 5) What is infix expression and post fix expression? Convert infix expression to post fix expression? (15)

Unit – III

- 6) What is Quick sort? Write an algorithm to implement Quick sort and give suitable example? (15)

OR

- 7) What is internal sorting? Write a program to implement merge sort with example? (15)

Unit – IV

- 8) Explain Binary search tree operations in detail? (15)

OR

- 9) What is splay tree? Explain operations of splay tree with examples. (15)



(DCS 215)

B. Tech. DEGREE EXAMINATION, MAY - 2015

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COMPUTER SCIENCE

Paper - V : Object Oriented Programming

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

(15)

Answer ONE question from each unit

(4 x 15 = 60)

1) Write short notes on :

- a) Function overloading.
- b) Virtual Functions.
- c) Constructor.
- d) De structor.
- e) File I/O and Binary I/O.

Unit – I

2) Explain the features of OOPs?

(15)

OR

3) Explain :

(5 x 3 = 15)

- a) Name space
- b) Copy constructor
- c) Default Function Arguments
- d) Friend functions
- e) Virtual functions

Unit – II

- 4) a) Explain the function overloading with examples. (9)
- b) Discuss about operator overloading? (6)

OR

- 5) a) Explain the different types of inheritances with suitable examples. (10)
- b) Discuss about abstract data types. (5)

Unit – III

- 6) a) Discuss about Binary I/O. (8)
- b) Explain the C++ stream classes. (7)

OR

- 7) a) Explain the conversion functions. (8)
- b) Explain difference between C and C++ languages. (5)
- c) Explain briefly the importance of asm keyword. (2)

Unit – IV

- 8) Explain the Exception Handling Mechanism with suitable programs. (15)

OR

- 9) a) Explain class templates with example. (10)
- b) Explain the costing operators. (5)



(DCS 216)

B. Tech. DEGREE EXAMINATION, MAY - 2015

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COMPUTER SCIENCE

Paper - VI : Environmental Studies

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

1) Answer the following:

- a) Need for public awareness
- b) Desert Ecosystem
- c) Noise pollution
- d) Disaster management
- e) Human Rights

UNIT - I

2) Give a short note on:

- a) Flood and drought as a serious environmental hazard.
- b) Write about the uses and over exploitation of forest resources.

OR

3) Explain about uses and over exploitation of mineral Resources?

UNIT – II

4) What is food chain and food web? Describe the organisms which typically occupy various levels in ecological pyramid?

OR

5) Explain briefly about Hot-spots of Biodiversity.

UNIT - III

- 6) Write a short notes on:
- a) Marine pollution.
 - b) Solid waste management.

OR

- 7) a) Explain nuclear accidents and holocaust.
- b) Wild life protection Act.

UNIT – IV

- 8) What is mean by population Explosion? Discuss the Indian scenario?

OR

- 9) Briefly discuss HIV/AIDs, mode of its spread and it effects on environment.



(DCS 221)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Second Year)

COMPUTER SCIENCE

Paper - I : Mathematics - IV

Time : 3 Hours

Maximum Marks : 75

Answer question No. 1 compulsory

(15)

Answer ONE question from each unit

(4 x 15 = 60)

- 1) a) Define derivative of a function $f(z)$
- b) State Cauchy – Riemann equations.
- c) Define harmonic function.
- d) Define zero's of a function.
- e) Define Removable singularity.
- f) Define Poisson's integral formula.
- g) Define entire function.
- h) Define conjugate of a function.
- i) Define Residue theorem.
- j) Define pole.
- k) Define frobenius method.
- l) Define Rodaigue's formula.
- m) Define Bessel's equation.

- n) Write the expression for $p_3(x)$.
- o) Write the orthogonal property of Legendre polynomial.

Unit – I

- 2) a) Show that the function $f(z) = \sqrt{|1xy|}$ is not analytic at the origin even though CR equations are satisfied.
- b) Find the orthogonal trajectories of the family of curves $x^4 + y^4 - 6x^2y^2 = C$.

OR

- 3) a) Show that $f(z) = xy + iy$ is every where continuous but not analytic.
- b) State and prove Riemann equation for polar coordinates.

Unit – II

- 4) a) Expand Taylor's series of $\frac{z-1}{z+1}$ about the point $z = 1$.
- b) Compute $\oint \frac{z+4}{z^2+2z+5} dz$ where c is $|z+1-i| = 2$.

OR

- 5) a) State and prove Taylor's series.
- b) Find the Laurent series of $f(z) = \frac{1}{z^2(z-3)^2}$ about $z = 3$.

Unit – III

- 6) a) Evaluate $\int_c \frac{e^z}{\cos \pi z} dz$ where c is the unit circle $|z| = 1$.
- b) Show that $\int_0^{2\pi} \frac{\cos^2 \theta}{1-2a \cos \theta + a^2} d\theta = \frac{2\pi a^2}{1-a^2} \quad a^2 < 1$

OR

- 7) a) Find the residue of $f(z) = \frac{z^3}{(z-1)^4(z-2)(z-3)}$ at its poles and hence evaluate

$$\oint_c f(z) dz \text{ where } c \text{ is the circle } |z| = 2.5.$$

- b) Solve the series in equation $y'' + xy' + y = 0$.

Unit – IV

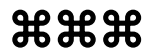
8) a) $J_n''(x) = \frac{1}{4} J_{n-2}(x) - 2J_n(x) + J_{n+2}(x)$

b) Show that $J_0(x) = \frac{1}{\pi} \int_0^\pi \cos(x \cos \phi) d\phi$

OR

9) a) Express $f(x) = x^4 + 3x^3 - x^2 + 5x - 2$ in terms of Legendre polynomials.

b) Prove that $np_n(x) = xp_n'(x) - p_{n-1}'(x)$



(DCS 222)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the End of Second Year)

COMPUTER SCIENCE

Paper - II : Circuit Theory

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 compulsory

(15)

Answer ONE question from each unit

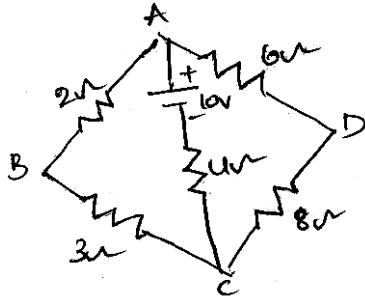
(4 × 15 = 60)

- 1) a) Write about KVL.
- b) When 'n' capacitors are connected :
- i) What is the effective resistance in series combination.
- ii) What is the effective resistance in parallel combination.
- c) State Thevenin's theorem and Norton's theorem.
- d) Define peak factor, crest factor, form factor.
- e) Give the differences between series and parallel resonance.
- f) Define quality factor and give relation between quality factor and bandwidth.
- g) What are the advantages of three phase system.
- h) What is a balanced system.
- i) What is meant by source transformation technique.
- j) Give the expression for energy stored in capacitor & inductor.

UNIT - I

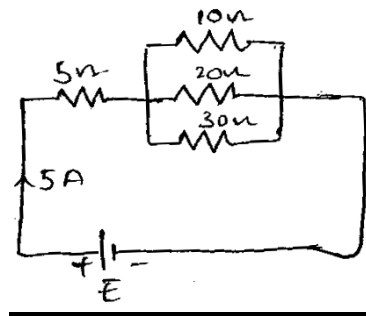
- 2) a) Write about Mesh analysis.

- b) Calculate current in each element of the circuit.



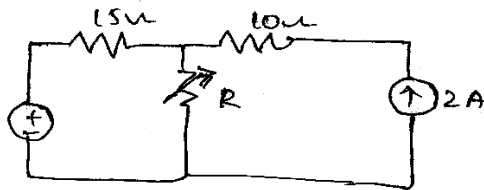
OR

- 3) a) Write about Nodal analysis.
 b) In the circuit shown in figure the current is 5 A. Calculate power consumed by 5Ω resistor. Also determine current through 10 Ω resistor and the supply voltage E.



UNIT - II

- 4) a) Define maximum power transfer theorem.
 b) Find value of R for maximum power transfer. Also calculate the maximum power.



OR

- 5) Derive the expression for response when RC series circuit is excited by a AC source.

UNIT - III

- 6) a) For a π – connected resistive network, compute short circuit z -parameters.
 b) A series RLC circuit consists of $R = 50 \Omega$, $L = 20 \mu\text{H}$ and $C = 10 \mu\text{F}$. The applied voltage is 100V. Find (i) W_o (ii) Q_o (iii) Bandwidth

OR

- 7) Derive the expression for resonant frequency and quality factor for series resonance.

UNIT - IV

- 8) a) What is polyphase system and write its advantages.
- b) For a star connected network, derive the relationship b/w line and phase values with the help of phasor diagram.

OR

- 9) a) Describe about generation of 3- ϕ voltages.
- b) Determine the active and reactive components of voltages in each phase of star connected 4400V, 3-phase s/m supplying 3500 kW at a power factor 0.65.



(DCS 223)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the End of Second Year)

COMPUTER SCIENCE

Paper - III : Computer Organization

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 compulsory

(5 × 3 = 15)

Answer ONE question from each unit

(4 × 15 = 60)

1) Write a short note on :

- a) BUS & Memory Transfer.
- b) Control Memory.
- c) Main Memory.
- d) Addition and Subtraction in signed Magnitude.
- e) DMA (Direct Memory Access)

UNIT - I

2) Explain about Instruction codes and computer registers.

OR

3) List and Explain various Arithmetic Microoperations.

UNIT - II

4) Explain different types of addressing modes with an example.

OR

5) Design of control unit. Explain in detail.

UNIT - III

6) Explain about Booth's Algorithm, with Flowchart.

OR

7) a) What is virtual Memory? Explain its features.

b) Explain the concept of ROM.

UNIT - IV

8) Differentiate : Isolated I/O and Memory Mapped I/O.

OR

9) Explain in detail about IOP.



B. Tech DEGREE EXAMINATION, MAY - 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) Properties of Relations.
- b) Write converse inverse & contrapositive of the statement “ ΔABC is equilateral then it is isosceles”.
- c) Define Recurrence Relation.
- d) Define Permutation with example.
- e) Draw a Hasse diagram for the poset $(A, 1)$, where $A = \{2, 3, 6, 12, 24, 36\}$ and ‘1’ denotes the divisibility relation.

UNIT - I

2) a) Construct a truth table for the following statement: $\sim P \leftrightarrow \sim Q \leftrightarrow Q \rightarrow R$. (7)

b) Show that the following statements are logically equivalent :

$$P \rightarrow Q \wedge P \rightarrow R \Leftrightarrow P \rightarrow (Q \wedge R) \quad (8)$$

OR

3) a) Show that $P \rightarrow Q \rightarrow R, Q \rightarrow R \rightarrow S \Rightarrow P \rightarrow Q \rightarrow S$. (7)

b) Prove that $A - B \cap C = A - B \cup A - C$. (8)

UNIT - II

- 4) a) State the Binomial theorem. (5)
- b) Show that the number of r-permutations of a set of n distinct elements is given by
- $$P(n,r) = \frac{n!}{n-r!} \quad (10)$$

OR

- 5) a) Find the number of positive integers less than or equal to 2076 and divisible by 3 or 4. (8)
- b) Find the coefficient of $x^4 x^7$ in the expansion of $(x-y)^{11}$. (8)

UNIT - III

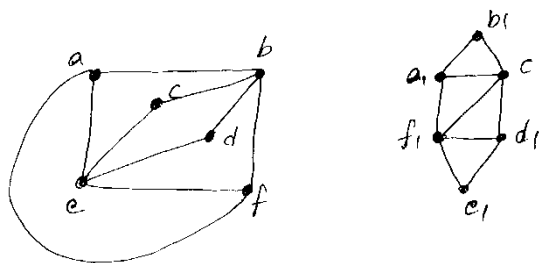
- 6) a) Solve the recurrence relation $a_n - 7 a_{n-1} + 12 a_{n-2} = 0$ for $n \geq 2$, $a_0 = 1$ & $a_1 = 2$. (8)
- b) Solve the recurrence relation of Fibonacci series. (7)

OR

- 7) a) Solve the recurrence relation $u_{n+2} + 4 u_{n+1} + 3 u_n = 5 (-2)^n$, $u_0 = 1$, $u_1 = 0$. Using generating function. (8)
- b) Solve $a_n = a_{n-1} + n$ where $a_0 = 2$ by substitution. (7)

UNIT - IV

- 8) a) Verify the following graphs are isomorphic or not? (7)



- b) Find the chromatic number of the following graphs : (8)
- i) Complete Graph (K_n) ii) Complete Bi-partite graph ($K_{m,n}$) iii) Cycle graph (C_n)

OR

- 9) a) State and prove five color theorem. (8)
- b) Give the adjacency matrix and graph representation of the relation. (7)
- $R = \{(a, a), (a, c), (b, a), (b, b), (b, d), (c, b), (c, c), (c, d), (d, a), (d, b), (d, d)\}$ on set $A = \{a, b, c, d\}$.



B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the End of Second Year)

COMPUTER SCIENCE

Paper - V : File Structures

Time : 3 Hours

Maximum Marks : 75

Answer Question No.1 compulsory

(15)

Answer any ONE question from each unit

(4 × 15 = 60)

- 1) a) Define separate chaining.
b) What is Acyclic graph?
c) Describe how to find strong components?
d) Define Euler circuit.
e) What do you mean by File Structure.

UNIT - I

- 2) a) Explain hashing, Rehashing and extendible hashing.
OR
b) Explain the following :
i) Open addressing
ii) Topological sort

UNIT - II

- 3) a) Explain Kruskal's algorithm in detail.
OR
b) Explain about DFS and its applications.

UNIT - III

- 4) a) Describe the methods used for organizing records of a file.
OR
b) Explain file processing operations with example.

UNIT - IV

5) a) Explain in detail about the sorting of large files.

OR

b) Explain about indexing with large files.



(DCS 226)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the End of Second Year)

COMPUTER SCIENCE

Paper - VI : Microprocessors

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

- 1) a) Define procedures?
b) Write different types of flags?
c) Define DMA.
d) Define Interrupts?
e) What is Macros?
f) Explain about while – Do implementation.
g) Define Assembler?
h) What is debugging.

UNIT – I

- 2) a) Draw the architecture of 8086 micro processor and explain about each block.
b) Write an ALP to divide a 16 bit number with a 8 bit number and store the result in memory.

OR

- 3) a) Write an ALP to convert packed BCD to ASCII.
b) Write an ALP to perform addition of two 16 bit numbers.

UNIT - II

- 4) a) Write the differences between procedures and macros and explain them with suitable examples.
b) Explain if –then else statement with suitable examples.

OR

- 5) a) What are the logical instructions and explain them with examples.
b) What are the Assembler directives.

UNIT - III

- 6) a) Explain about addressing a Memory and ports in Micro computer system.
b) Explain 8086 hardware review.

OR

- 7) a) Define Interrupt vector Table? Draw and explain interrupt vector table.
b) Explain Hardware interrupt applications.

UNIT - IV

- 8) a) Explain the DMA transfer.
b) Explain 8086 maximum mode of operation.

OR

- 9) a) Explain Interfacing of Dynamic RAM.
b) Write short note on 80186 Processor.

