**14MA301**
**BT/CE/CH/CS/EC/EE/EI/IT/ME 211**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**March, 2018** **Common to all Branches**

**Third Semester** **Engineering Mathematics -III**

**Time:** Three Hours **Maximum:** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) Define Fourier cosine and sine integrals.
   b) Find the Fourier transform of $e^{-ax}$.
   c) Write the complex form of Fourier integral.
   d) Write the initial condition of D-Alembert's solution of wave equation.
   e) Write the one dimension heat equation.
   f) Solve Uxy= -Ux.
   g) Write Newton's back ward interpolation formula.
   h) What is the order of the Newton iteration method?
   i) Distinguish between Lagrange and Newton's Divided Difference interpolations.
   j) Write the normal equations for $y = a + bx^2$ by least squares method.
   k) Define Laplace and Poison equations.
   l) Write the standard and diagonal 5-point formulas for $u_{ij}$.

**UNIT I**

2. a) Using Fourier integral show that $\int_0^\infty \frac{1-\cos\pi\lambda}{\lambda}\sin\lambda d\lambda = \begin{cases}\frac{\pi}{2}, & if \quad 0<x<\pi \\ 0, & if \quad x>\pi\end{cases}$ 6M

   b) Using Fourier integral show that $\frac{2}{\pi}\int_0^\infty \frac{\sin\lambda\cos\lambda x}{\lambda}d\lambda = \begin{cases}1, & if \quad |x|\le 1 \\ 0, & if \quad |x|>1\end{cases}$ 6M

**(OR)**

3. a) Find the Fourier transform of $f(x) = \begin{cases}1, & \text{if } |x|<a \\ 0, & \text{if } |x|>a\end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin p}{p}dp$ 6M

   b) Find the Fourier transform of $f(x) = \frac{e^{-ax}}{x}$. 6M

**UNIT II**

4. a) Find the deflection U(x ,t) of a vibrating string of unit length with fixed ends starting with initial velocity zero for f(x)=K[1-cos2πx] Where K=0.01. 6M

   b) Find the solution u(x ,y) of $u_{xx} - u_{yy} = 0$ by separating the variables. 6M

**(OR)**

5. a) Find the temperature u(x ,t) in a bar of silver of length 10 cm, constant cross section of area 1 $cm^2$ , density 10.6 $gm/cm^3$ , thermal conductivity 1.04cal/(cm sec $^0$C), specific heat 0.056 cal/(gm $^0$C)) that is perfectly insulated laterally , whose ends are kept at temperature 0 $^0$C and whose initial temperature ( in $^0$C) is f(x) where f(x) = x(10 – x). 6M

   b) Solve the Dirichlet's problem in a rectangle R. 6M

**UNIT III**

6. a) Find $y(25)$ given that $y(20) = 24,\ y(24) = 32,\ y(28) = 35,\ y(32) = 40$ using Newton's Forward interpolation formula. 6M

b) Find the Lagrange's interpolation polynomial from the following data and hence find y(4) 6M

| x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| y | 2 | 3 | 12 | 147 |

**(OR)**

7. a) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ using Simpsons's rule and compare it with the exact value. 6M

b) Using Newton's divided difference formula evaluate y(9) given 6M

| x | 5 | 7 | 11 | 13 | 17 |
|---|---|---|---|---|---|
| y | 150 | 392 | 1452 | 2366 | 5202 |

**UNIT IV**

8. a) Solve the system of equations by using Gauss-seidel method

$$20x + y - 2z = 17, 3x + 20y - z = -18, 2x - 3y + 20z = 25.$$ 6M

b) Solve $2x + 4y - 6z = -4,\ x + 5y + 3z = 10,\ x + 3y + 2z = 5$ using LU decomposition method. 6M

**(OR)**

9. a) Compute $y(0.1)\ and\ y(0.2)$ by Runge-Kutta method of fourth order for the differential equation $\frac{dy}{dx} = x + y, y(0) = 1$. 6M

b) Compute y(0.1) in steps of 0.01 using Euler's method $\frac{dy}{dx} = \frac{y-x}{y+x}$ ,y(0)=1. 6M

**14CS302/14IT302**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**April, 2018** **Common to CSE & IT**

**Third Semester** **DISCRETE MATHEMATICAL STRUCTURES**

**Time:** Three Hours **Maximum :** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) Define Relation.
   b) Give the example for Disjoint sets.
   c) What Strong mathematical induction?
   d) Define permutation and Combination.
   e) What is Recurrence relation?
   f) Define Generating function.
   g) What is Non Homogenous recurrence relation?
   h) Define Equivalence relation.
   i) Define Enumeration.
   j) Give the example for Adjacency matrix.
   k) Define Multi graph.
   l) What is Four colour problem.

**UNIT I**

2. a) Prove that the following is tautology: ~(pvq)v((~p)^q)vp 6M
   b) Prove or Disprove the validity of the following argument.(Using Quantifiers)

   All men are fallible.
   All kings are men. 6M
   All kings are fallible.

**(OR)**

3. a) Determine whether the following inferences are valid or invalid.

   p->q
   q->r
   r->s
   --------
   p->s 6M

   b) Prove that $1+2+3+...+n=\frac{n(n+1)}{2}$ for any n ∈ Z +. 6M

**UNIT II**

4. a) How many 2 digit or 3 digit numbers can be formed using the digits 1, 3, 4,5,6,8 and 9 and repetitions are not allowed. 6M
   b) In how many ways can a committee of k people can be chosen from 10 people, If k can be 1,2,3,--- or 10. 6M

**(OR)**

5. a) Find the coefficient of $X^{21}$ in $\left(X^2+X^3+...+X^6\right)^8$ . 6M
   b) Explain Generating function sequence. 6M

**UNIT III**

6. a) Solve for an given that $a_0=0,\ a_1=6$ and $a_n=-3a_{n-1}+10a_{n-2}+3\,.\,2^n$, for n ≥ 2. Using Generating function method. 6M
   b) Solve the recurrence relation $a_n=6a_{n-1}-9a_{n-2}$ with initial conditions $a_0=4,\ a_1=6$ .using characteristic roots method. 6M

**(OR)**

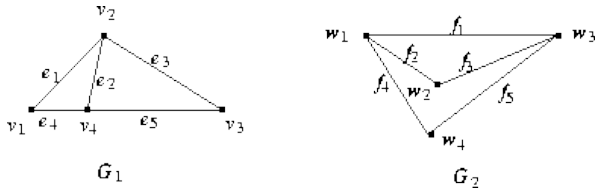
7. a) Explain the operations on Relations. 6M
   b) {(1,2),(2,3),(4,4),(5,4),(5,7)(1,2),(2,3),(4,4),(5,4),(5,7)}. 6M
   In the above relation, Find the Transitive closure.

**UNIT IV**

8. a) Draw the Hasse diagram for the following relation.[D12;/] 6M
   b) Give the Example for Topological sorting. 6M

**(OR)**

9. a) Prove or disprove the following graphs are isomorphic or not. 6M




   b) Prove or disprove the graph K5 is planar or non planar graphs. 6M

**14CS303/14IT303**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**April, 2017** — **Common to CSE & IT**

**Third Semester** — **Digital Logic Design**

**Time:** Three Hours — **Maximum :** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) Find 1's complement of 01111110
   b) Convert $(0.513)_{10}$ to octal.
   c) State Demorgan's Laws?
   d) What are the basic operations in Boolean Algebra?
   e) What is a code convertor?
   f) Which gates are called the Universal Gates? Why?
   g) What is a literal?
   h) Differentiate between a latch and a Flip Flop
   i) What are different types of RAM?
   j) What is a trigger?
   k) What is meant by PLA?
   l) Distinguish between Synchronous and Asynchronous counter.

**UNIT I**

2. a) Find the simplified sum of the products expression using K-map for the function F = Σm(7, 9, 10, 11, 12, 13, 14, 15) 6M
   b) Perform the 1's and 2's complement of the following binary numbers i) 11101010 ii) 01111110 iii) 00000001 iv) 10000000 6M

**(OR)**

3. a) Reduce the following expression to the simplest possible POS and SOP forms f=Σm(6,9,13,18,19,25,27,29,31)+d(2,3,11,15,17,24,28) 8M
   b) Reduce the following expressions using a four-variable K-map $A\bar{B}C + \bar{A}BC\bar{D} + AB\bar{C}D + ABC$ 4M

**UNIT II**

4. a) Obtain the set of prime implicants for the Boolean expression f=Σm(0,1,6,7,8,9,13,14,15) using the tabular method? 6M
   b) Implement Full-Subtractor using two Half- Subtractors and OR Gate. 6M

**(OR)**

5. a) Prove that i) $(A\overline{B} + A\bar{C})(BC + B\bar{C})(ABC) = 0$ ii) $\overline{ABC}(\overline{A + B + C}) = \bar{A}\bar{B}\bar{C}$ 6M
   b) Design a code converter that converts 4- bit binary to Gray code? 6M

**UNIT III**

6. a) Show the logical diagram of a clocked RS Flip Flop with four NAND gates. 6M
   b) Explain the conversion of i) J-K flip flop in to S-R flip-flop ii) T-flip flop to J-K flip-flop 6M

**(OR)**

7. a) With a neat diagram explain the working of SR-flip flop with characteristic table, excitation table and characteristic equation 6M
   b) Explain in detail about Master-Slave Flip Flop with a logical diagram. 6M

**UNIT IV**

8. a) Design an 4-bit up/down counter using D-Flip Flops. 6M
   b) Explain the working of bi-directional shift register with a neat diagram 6M

**(OR)**

9. a) Compare the programmable features of PAL, PLA and PROM devices. 8M
   b) Realize the function F1=∑ m(1,2,4,6) using PROM of size 8×3. 4M

**14CS304/14IT304**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**April, 2018** **Common to CSE & IT**

**Third Semester** **Operating Systems**

**Time:** Three Hours **Maximum :** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) What is an operating system?
   b) Define a thread.
   c) What is a semaphore?
   d) What is a safe state?
   e) Define a dirty bit.
   f) What is thrashing?
   g) List out file properties.
   h) Define a directory.
   i) Distinguish between seek time and latency time.
   j) What is the role of device controller?
   k) What is a free-space management?
   l) What is compaction?

**UNIT I**

2. a) Explain about the Evolution of operating systems. 6M
   b) What are the main functions of Operating System? Explain them 6M

**(OR)**

3. a) Define a Process. Describe Process State transition diagram with a neat sketch. 6M
   b) List and describe different types of schedulers. 6M

**UNIT II**

4. a) Compare preemptive Scheduling and non-preemptive scheduling. 6M
   b) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

| Process | CPU Burst Time | Priority |
|---|---|---|
| P1 | 10 | 3 |
| P2 | 1 | 1 |
| P3 | 2 | 3 |
| P4 | 1 | 4 |
| P5 | 5 | 2 |

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

i. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1). 6M

ii. What is the turnaround time of each process for each of the scheduling algorithms in part i?

iii. What is the waiting time of each process for each of the scheduling algorithms in part i?

**(OR)**

5. a) Explain the concept of Monitors. 6M
   b) Write and explain Producer - Consumer classical synchronization problem. 6M

**UNIT III**

| | | | |
|---|---|---|---|
| 6. | a) | Describe First-fit, Best-fit and Worst-fit algorithms | 6M |
| | b) | Describe necessary conditions for deadlock occurrence. | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 7. | a) | Describe the demand-paging Memory Management technique. | 6M |
| | b) | Describe Page Replacement algorithms with an example. | 6M |

**UNIT IV**

| | | | |
|---|---|---|---|
| 8. | a) | What is a file? What are the different operations that can be performed on a file? | 6M |
| | b) | Discuss in detail about file accessing methods. | 6M |

**(OR)**

9. Explain the following. 12M

i)Application I/O interface ii) Kernel I/O subsystem

# Scheme of Valuation

**14CS 304**

**Hall Ticket Number:**

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**II/IV B.Tech (Regular) DEGREE EXAMINATION**

**November, 2016** — **Computer Science &Engineering**

**Third Semester** — **Operating Systems**

**Time:** Three Hours — **Maximum :** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

| | | | |
|---|---|---|---|
| 1 | Answer all questions | | (1X12=12 Marks) |
| | a) | What is an operating system? | 1M |
| | b) | Define a thread. | 1M |
| | c) | What is a semaphore? | 1M |
| | d) | What is a safe state? | 1M |
| | e) | Define a dirty bit. | 1M |
| | f) | What is thrashing? | 1M |
| | g) | List out file operations. | 1M |
| | h) | Define a directory. | 1M |
| | i) | Distinguish between seek time and latency time. | 1M |
| | j) | What is the role of device controller? | 1M |
| | k) | What is a free-space management? | 1M |
| | l) | What is compaction? | 1M |
| | | **UNIT I** | |
| 2 | a) | Explain about the Evolution of operating systems.<br>Briefly explain any 4 of the following<br>i) Serial Processing<br>ii) Batch Processing<br>iii) Multiprogramming<br>iv) Timesharing<br>v) Real-Time<br>vi) Parallel Processing<br>vii) Distributed Processing | 6M |
| | b) | What are the main functions of Operating System? Explain them<br>Briefly explain the following<br>i) Processor Management<br>ii) Memory Management<br>iii) I/O Management<br>iv) File Management | 6M |
| | | **(OR)** | |
| 3 | a) | Define a Process. Describe Process State transition diagram with a neat sketch.<br>Definition of a process 2M<br>Diagram 2M<br>Description of States 2M | 6M |
| | b) | List and describe different types of schedulers.<br>Three type<br>i) Long-term Scheduler<br>ii) Medium-term Scheduler<br>iii) Short-term Scheduler 3X2 = 6M | 6M |
| | | **UNIT II** | |
| 4 | a) | Compare preemptive Scheduling and non-preemptive scheduling.<br>Preemptive Scheduling 3M | 6M |

| | | | |
|---|---|---|---|
| | | Non-preemptive 3M | |
| | b) | Consider the following set of processes, with the length of the CPU burst given in milliseconds:<br><br>The processes are assumed to have arrived in the order P1, P2/ P3, P4, P5, all at time 0.<br>i. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).<br>ii. What is the turnaround time of each process for each of the scheduling algorithms in part i?<br>iii. What is the waiting time of each process for each of the scheduling algorithms in part i?<br>3X2 =6M | 6M |

| Process | CPU Burst Time | Priority |
|---|---|---|
| P1 | 10 | 3 |
| P2 | 1 | 1 |
| P3 | 2 | 3 |
| P4 | 1 | 4 |
| P5 | 5 | 2 |

| | | | |
|---|---|---|---|
| | | **(OR)** | |
| 5 | a) | Explain the concept of Monitors.<br>Definition of monitor 2M<br>Concept of it with example 4M | 6M |
| | b) | Write and explain Producer - Consumer classical synchronization problem.<br>Algorithm 4M<br>Explanation 2M | 6M |
| | | **UNIT III** | |
| 6 | a) | Describe First-fit, Best-fit and Worst-fit algorithms 3X2=6M | 6M |
| | b) | Describe necessary conditions for deadlock occurrence.<br>Need to explain the following<br>i) Mutual exclusion<br>ii) Hold & Wait<br>iii) No preemption<br>iv) Circular wait | 6M |
| | | **(OR)** | |
| 7 | a) | Describe the demand-paging Memory Management technique.<br>Concept of it and explanation with neat diagrams | 6M |
| | b) | Describe Page Replacement algorithms with an example.<br>Need to explain the following with examples<br>i) FIFO<br>ii) LRU<br>iii) Optimal 3X2=6M | 6M |
| | | **UNIT IV** | |
| 8 | a) | What is a file? What are the different operations that can be performed on a file?<br>Definition of file wit its importance | 6M |
| | b) | Discuss in detail about file accessing methods. | 6M |
| | | **(OR)** | |
| 9 | | Explain the following.<br>i)Application I/O interface ii) Kernel I/O subsystem | 12 M |

**14CS306/14IT306**

**Hall Ticket Number:**

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**II/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**April, 2018** — **Common for CSE & IT**

**Third Semester** — **Object Oriented Programming**

**Time:** Three Hours — **Maximum :** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) What is the significance of static keyword?
   b) What is unmanaged code.
   c) What is purpose of @ identifier?
   d) List various operators that cannot be overloaded.
   e) What is the use of indexers?
   f) List the various access specifiers in C#.
   g) Define exception.
   h) List various stream classes.
   i) What is an event?
   j) Define Generic class?
   k) What is the purpose of #define directive.
   l) Define collection.

**UNIT I**

2. a) Explain C# value types and program control statements with examples. 6M
   b) Write a program to display the Fibonacci series up to given number N in C# . 6M

**(OR)**

3. a) Explain the three pillars of object-oriented programming in C#? 6M
   b) Define Array. Explain the syntax to declare, initialize and access elements from the following array types with an example.
   (i). Single Dimensional Array. (ii). Jagged Array 6M

**UNIT II**

4. a) Explain inheritance in C# with an example. 6M
   b) Explain interface concept with an example. 6M

**(OR)**

5. a) Write a short note on enumeration and explain its usage with an example. 6M
   b) Explain overloading operators in C# with an example to overload operators +, -, *, > and < 6M

**UNIT III**

6. a) Write a short notes on a) Console I/O b) Stream class 6M
   b) Write a C # Program to demonstrate the use of FileStream Classes. 6M

**(OR)**

7. Write a C# program to compute and display sum, difference, and multiplication of two numbers by writing appropriate methods which could be called through multicast delegate method of programming. 12M

**UNIT IV**

8. a) What is namespace? Explain the purpose of namespace with an example. 6M
   b) Write a c# program using a generic class with two type parameters. 6M

**(OR)**

9. a) Describe properties and methods of ArrayList Class with example program. 6M
   b) Explain the C# pre-processor directives with examples. 6M