BTS(C) – IV – 04.12 – 017 - C

B. Tech Degree IV Semester Examination April 2012

IT/CS/EC/CE/ME/EE/EB/EI/EE/FT 401 ENGINEERING MATHEMATICS III

(*2006 Scheme*)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) Show that $f(z) = Cos\, z$ is analytic and find its derivative.

(b) Find the analytic function whose real part is $e^x(x\,Sin\,y + y\,Cos\,y)$.

(c) Evaluate $\int_c \frac{ze^z}{(z-a)^3}dz$ where z = a lies inside the closed curve C, using Cauchy's integral formula.

(d) Find the Laurant's series of $f(z) = \frac{1}{z(1-z)}$ valid in the region $1 < |z+1| < 2$.

(e) Find the partial differential equation of all spheres whose center lie on the Z-axis.

(f) Solve $p - x^2 = q + y^2$.

(g) Derive one dimensional wave equation.

(h) Solve $Uxx - Uy = 0$ by the method of separation of variables.

PART B

(4 x 15 = 60)

II. (a) Show that for $f(z) = \frac{2xy(x+iy)}{x^2+y^2}$ if $z \neq 0$
$= 0$ if $z = 0$, (7)

the Cauchy-Riemann equations are satisfied at the origin but the derivative of $f(z)$ does not exist at the origin.

(b) Find the bilinear transformation which maps the points $1, i, -1$ onto the points $1, 0, -i$. Hence find the image of $|z| < 1$. (8)

OR

III. (a) If $f(z)$ is an analytic function, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|R.f(z)|^2 = 2|f|(z)|^2$. (6)

(b) Find the image of the line $x + y = 6$ under the transformation $w = \frac{1}{z}$. (4)

(c) Discuss the transformation $w = Sin\, z$. (5)

IV. (a) Verify Cauchy's theorem for $f(z) = z^2$, taken over the boundary of the square with vertices $\pm 1, \pm i$ in counter clockwise direction. (7)

(b) Determine the poles and residue at each pole of $f(z) = \frac{z^2}{(z-1)^2(z+2)}$ and hence evaluate $\int_c \frac{z^2}{(z-1)^2(z+2)}dz$ where c is the circle $|z| = 3$. (8)

OR

(P.T.O)

V. (a) If $f(a)=\int_C \frac{3z^2+7z+1}{z-a}dz$, where c is the circle $|z|=2$. Find the value of (8)

(i) $f(3)$ (ii) $f'(1-i)$ (iii) $f''(1-i)$.

(b) Show that $\int_0^{2\pi} \frac{d\theta}{2+Cos\theta}=\frac{2\pi}{\sqrt{3}}$. (7)

VI. (a) Solve $pq+p+q=0$. (4)

(b) Solve $p(1+q)=qz$. (5)

(c) Solve $x^2.\frac{\partial z}{\partial x}+y^2.\frac{\partial z}{\partial y}=(x+y)z$. (6)

OR

VII. (a) Form the partial differential equation by eliminating the arbitrary function from $F(xy+z^2, x+y+z)=0$. (7)

(b) Solve $\frac{\partial^3 z}{\partial x^3}-2\frac{\partial^2 z}{\partial x^2 \partial y}=2e^{2x}+3x^2y$. (8)

VIII. (a) Obtain D'Alembert's solution of heat equation by method of separation of variables. (7)

(b) A tightly stretched string with fixed end points $x=0$ and $x=\ell$ is initially in a position given by $y=y_0 Sin^3\frac{\pi x}{\ell}$. If it is released from rest from this position, find the displacement $y(x,t)$. (8)

OR

IX. (a) Solve the equation $\frac{\partial u}{\partial t}=\frac{\partial^2 u}{\partial x^2}$ with boundary conditions (7)

$u(x,o)=3Sin\, n\pi x$, $u(0,t)=0$ and $u(1,t)=0$, where $0<x<1, t>0$.

(b) An insulated rod of length ℓ has its ends A and B maintained at 0°C and 100°C respectively until steady state conditions prevail. If B is suddenly reduced to 0°C and maintained at 0°C, find the temperature at a distance x from A at time t. (8)

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BTS(C) – IV – 04.12 – 018 - F

B. Tech Degree IV Semester Examination April 2012

EE 402 LOGIC DESIGN

(2006 Scheme)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) State De-Morgan's theorem. Draw the gate equivalencies and truth table.

(b) (i) Show the multiplication of binary 101 by 110 (ii) Divide 1011010 by 110.

(c) Draw the truth table and logic symbol of a half adder. Derive the logic diagram.

(d) Explain any three applications of monostable multivibrators.

(e) Explain what is meant by PAL and PLA.

(f) Explain with suitable diagrams and waveforms an edge triggered D Flipflop.

(g) Give and explain the classification of logic families.

(h) Explain ECL NOR/OR gate.

PART B

(4 x 15 = 60)

II. (a) Simplify the following equation using K-map (10)
$f(a,b,c,d) = m(2,3,4,5,13,15) + d(8,9,10,11)$

(b) Reduce the expression $(B+BC)(B+\bar{B}C)(B+D)$. (5)

OR

III. (a) Realize all the basic gates using NAND and NOR gates. Write the logic expressions and truth tables. (11)

(b) Convert the following from one system to another: (4)
(i) $(237)_8 = (W)_{10}$ (ii) $(4BAC)_{16} = (Y)_2$

IV. (a) Draw and explain one method of improving the speed of addition. (10)

(b) Explain the operation of a monostable multivibrator using gates. (5)

OR

V. (a) Design and implement a full adder circuit using gates. (10)

(b) Draw the circuit of an astable multivibrator using gates and explain its operation. (5)

VI. (a) With the help of circuit diagram and waveforms explain the working of a 4 bit ring counter. (7)

(b) Explain with relevant logic diagram, truth table and waveforms a MOD-5 asynchronous counter. (8)

OR

VII. (a) What is a shift register? Discuss its classifications. (10)

(b) Explain the RAM organization. (5)

VIII. (a) Define the following terms related to digital IC's: (10)
(i) Fan out (ii) Propagation delay
(iii) Noise Margin (iv) Speed power relation

(b) Explain the interfacting of TTL to CMOS. (5)

OR

IX. (a) Explain the operation of a two-input TTL NAND gate. (8)

(b) List two advantages of CMOS logic family over TTL logic family. Draw the circuit of a CMOS inverter and explain its operation (7)

BTS(C) – IV – 04.12 – 018 - E

B. Tech Degree IV Semester Examination April 2012

CS/EC/EB/EI 402 MICROPROCESSORS

(2006 Scheme)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Describe the function of the following PINS in 8085:
(i) READY (ii) HOLD

(b) Explain the purpose of each flag in the flag register of 8085.

(c) With an example, explain the following instructions: (i) DAD (ii) RAR

(d) Write a delay routine for an 8085 processor working at a 2 MHz clock frequency to provide a delay of 1 millisecond.

(e) Differentiate between maskable and non maskable interrupts in 8085. Also explain how masking of interrupt is done.

(f) Explain the terms: (i) T-state (ii) instruction cycle (iii) Machine cycle.

(g) Explain BSR mode in 8255.

(h) With the help of a diagram, explain how a memory chip is interfaced to 8085.

PART B

(4 x 15 = 60)

II. (a) What is meant by multiplexed address/data bus in 8085? Explain how its demultiplexing is done in detail. (8)

(b) Explain the register organization of 8085 in detail. (7)

OR

III. (a) Draw and explain the block diagram of 8085. (10)

(b) Explain the serial communication and DMA features in 8085. (5)

IV. (a) Explain stack and its application. With suitable example, show how data storage/retrieval is done in a stack. (8)

(b) Explain addressing modes of 8085 with examples. (7)

OR

V. (a) Write an assembly language program to find the smallest of 'n' numbers stored at consecutive memory locations starting from address 5001 H. Value of n is stored at address 5000H and the result need to be stored at location 6000H. (10)

(b) Explain the instructions: (i) LH LD (ii) XT HL (5)

VI. (a) Draw the timing diagram for the instruction STA 4000 H. (10)

(b) Differentiate between hardware interrupts and software interrupts with examples. (5)

OR

VII. (a) Describe the interrupt organization of 8085. Explain the steps involved in handling an interrupt by 8085. (8)

(b) Draw the timing diagram for the instruction MOV A,B. (7)

VIII. Draw the block diagram of programmable timer 8253. Explain its modes of operation in detail. (15)

OR

IX. (a) Explain the transmitter section of 8251 in detail. (10)

(b) Briefly explain various ports in 8255. (5)

BTS(C) – IV – 04.12 – 018 - H

B. Tech Degree IV Semester Examination April 2012

IT 402 MICROPROCESSOR ARCHITECTURE AND SYSTEM DESIGN

(2006 Scheme)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Explain the functions of signals HOLD and READY in 8085 microprocessor.

(b) Explain the functions and operations performed by the instructions:

(i) INX (ii) ORA

(c) Differentiate between memory mapped I/O and peripheral mapped I/O techniques.

(d) What is an interrupt? Discuss the various hardware interrupts of 8085 microprocessor.

(e) What are the different modes of 8255? Also explain BSR control word.

(f) What is cycle stealing DMA?

(g) Differentiate between RISC and CISC systems.

(h) Write five features of Pentium pro.

PART B

(4 x 15 = 60)

II. Draw the functional block diagram of 8085 and explain.

OR

III Draw and explain the timing diagram for the instruction MVI B, 03 H. Explain various addressing modes in 8085 processor.

IV Discuss the classification of interrupt in detail and explain priority interrupt and multiple interrupt.

OR

V. Discuss the programmable interrupt controller 8259 and its interfacing with 8085 processor.

VI. Draw the block diagram of 8279 and explain its working.

OR

VII. With a neat diagram explain the functional features of a 8257 DMA controller.

VIII What is super scalar architecture? Explain.

OR

IX. Explain pentium processor family architecture. Compare pentium and pentium pro architecture.

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BTS (C) – IV – 04.12 – 018 – J

B.Tech Degree IV Semester Examination April 2012

ME 402 INDUSTRIAL ELECTRONICS

(2006 Scheme)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Explain the necessity of biasing in transistor amplifiers.

(b) Write the advantages of negative feedback.

(c) Explain positive diode clippers.

(d) What is Common-mode Rejection Ratio (CMRR)?

(e) Explain Hartley Oscillator.

(f) Explain Astable Multivibrator.

(g) Explain the classification of thyristors.

(h) Describe the working of UPS with block diagram.

PART B

(4 x 15 = 60)

II. (a) Explain transistor biasing circuits. (7)

(b) Explain Class A and Class B power amplifiers. (8)

OR

III. (a) Explain the principles of feedback in Amplifiers. (5)

(b) Explain voltage shunt feedback and current series feedback. (10)

IV. (a) Explain diode clamping circuits. (7)

(b) What is meant by differential amplifier? Explain. (8)

OR

V. (a) Write down the characteristics of an ideal op amp. (6)

(b) Explain the operation of Op-Amp as (i) Summer (ii) Integrator (iii) Differentiator (9)

VI. (a) Discuss the operation of an oscillator. (5)

(b) Explain LC oscillators. (5)

(c) Explain phase shift oscillators. (5)

OR

VII. (a) Describe the basic configuration of a multivibrator. Write its classification. (6)

(b) Explain bistable multivibrator. (9)

VIII. (a) Explain the parallel operation of two thyristors. (6)

(b) With diagram and all necessary waveforms, explain single phase half-wave controlled rectifier. (9)

OR

IX. (a) Write down the advantages of electric heating. (5)

(b) Explain the principle and applications of (i) Induction heating (ii) Dielectric heating (10)

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BTS (C) – IV – 04.12 – 019 – J

B.Tech Degree IV Semester Examination April 2012

EE 403 ELECTRICAL MACHINES I

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Explain the role of commutator in D.C. machines. Also explain its construction.

(b) Explain the advantages of wave winding over lap winding. Also mention the applications of wave and lap windings.

(c) What is the role of compensating windings in D.C machines? How is it connected in D.C machines?

(d) What is reactance voltage in D.C machines? Derive the expression for reactance voltage.

(e) Derive the expression for armature torque of a D.C motor.

(f) Explain why series motor is never started on load.

(g) Derive the condition for maximum efficiency of a single phase transformer.

(h) Explain All day efficiency in a single phase transformer.

PART B

(4 x 15 = 60)

II. (a) Explain the different types of D.C generators.

(b) A 4 pole, lap wound dc shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50A.

OR

III. (a) Derive the expressions for demagnetizing and cross magnetizing ampere turns in D.C machines.

(b) A 4 pole, 50 kW, 250V wave wound shunt generator has 400 armature conductors. Brushes are given a lead of 4 commutator segments. Calculate the demagnetization ampere turns/pole if shunt filed resistance is 50Ω. Also calculate extra shunt field turns/pole to neutralize the demagnetization.

IV. (a) Explain the different methods of improving commutation in D.C machines.

(b) Draw and explain the internal and external characteristics of a separately excited DC generator.

OR

V. (a) Explain the conditions for voltage build up in a D.C shunt generator.

(b) Explain the applications of D.C generators.

VI. (a) Explain the following characteristics for D.C shunt motors.
(i) Ta Vs Ia (ii) N Vs Ia (iii) N Vs Ta

(b) A dc series motor operates at 800 rpm with a line current of 100A from 230V mains. Its armature circuit resistance is 0.15 Ω and its field resistance is 0.1Ω. Find the speed at which the motor runs at a line current of 25A, assuming that the flux at this current is 45% of the flux at 100A.

OR

VII. (a) Explain how speed of a D.C shunt motor is controlled by controlling the armature and field.

(b) Explain how efficiency of a D.C machine can be determined by conducting No load test.

VIII. (a) Explain the constructional details of a transformer.

(b) Explain how the equivalent circuit parameters of a transformer are determined.

OR

IX. (a) Explain the different losses in a transformer.

(b) Explain how 3 phase to 3 phase transformation is possible with the help of two transformers.

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BTS (C) – IV – 04.12 – 019 – H

B.Tech Degree IV Semester Examination April 2012

EC/EI 403 ELECTRONIC CIRCUITS II

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

$(8 \times 5 = 40)$

I. (a) What are the different types of negative feedback used in amplifiers?

(b) Compare the features of RC oscillators and LC oscillators.

(c) Write the classification of amplifiers on the basis of period of conduction and define each type.

(d) What is the basic principle of operation of a push-pull amplifier?

(e) Explain the need for unilaterisation in a single tuned amplifier.

(f) What is Gain-Bandwidth trade off?

(g) Draw the basic block diagram of an op-amp and explain the operation of each block.

(h) What is a constant current source? Explain.

PART B

$(4 \times 15 = 60)$

II. (a) Write the significance of a Barkhausen criteria in oscillators. What are the factors which affect the frequency stability of an oscillator? (8)

(b) Describe the functioning of a crystal controlled oscillator and what are its advantages? (7)

OR

III. (a) Enumerate the advantages of RC oscillators. Explain the working of an RC phase shift oscillator and find the expression for its frequency of oscillators. (8)

(b) Compare the properties of negative feedback amplifier and positive feedback amplifier. (7)

IV. (a) Draw the circuit of a class B push-pull amplifier and explain its operation. What is cross-over distortion and how is it minimized? (9)

(b) A power transistor operating in class A operation has zero-signal power dissipation of 12W and ac power output is 4W. Determine collector efficiency and power rating of the transistor. (6)

OR

V. (a) A class B push-pull amplifier is supplied with $V_{cc} = 40V$. The signal swings the collector voltage down to $V_{min} = 8V$. The dissipation in both transistors total 38W. Determine: the (i) total power input (ii) total power developed across the load (iii) power rating of each transistor (iv) over-all efficiency. (8)

(b) Explain the maximum ratings of a transistor which are to be considered before it is chosen for circuit applications. (7)

(P.T.O.)

VI. (a) What is a tuned amplifier? Draw the circuit diagrams of single and double tuned amplifiers and their frequency response. (7)

(b) Explain the different approaches of broad banding by high frequency compensation. (8)

OR

VII. (a) "A common base configuration given better high frequency performance compared to other configurations". Justify the statement and explain how bandwidth is improved in a cascade amplifier. (8)

(b) What is potential instability in a tuned amplifier and how is the problem of potential instability overcome in a double tuned amplifier? (7)

VIII. (a) What do you understand by "virtual ground"? Explain. (5)

(b) CMRR is the figure of merit of a difference amplifier. Justify your answer. (7)

(c) A difference amplifier has $A_d = 1000$ and $A_c = 0.01$. What is its CMRR expressed in dB? (3)

OR

IX. (a) A difference amplifier has $A_d = 200$ and CMRR = 100dB. What is its common-mode gain, A_c? (3)

(b) Explain the significance of the term common-mode output in a difference amplifier. (6)

(c) Explain a current mirror circuit with circuit diagram. (6)

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BTS (C) – IV – 04.12 – 019 –D

B.Tech Degree IV Semester Examination April 2012

CS 403 COMPUTER ARCHITECTURE AND ORGANIZATION

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Draw and describe block diagram of a digital computer.

(b) Differentiate memory address register and memory data register.

(c) Comment on Booth algorithm with a suitable example.

(d) What are carry generate and carry propagate functions?

(e) Differentiate static and dynamic RAM.

(f) Comment on memory interleaving.

(g) Explain vectored interrupts.

(h) Give the sequence of steps for servicing an interrupt.

PART B

(4 x 15 = 60)

II. (a) Comment on bus structures of a digital computer. (7)

(b) Write short notes on stacks and subroutines. (8)

OR

III. Explain various addressing modes of a digital computer. (15)

IV. (a) Comment on execution of a complete instruction. (7)

(b) Explain the process of integer division in a digital computer. (8)

OR

V. (a) Differentiate hardwired and micro programmed control. (12)

(b) Define emulation. (3)

VI. (a) Comment on the term locality of reference. (4)

(b) Differentiate write back and write through protocols. (5)

(c) Explain LRU page replacement algorithm. (6)

OR

VII. (a) Explain the process of address translation in virtual memory. (9)

(b) Draw the internal organization of a 1K X 1 memory chip. (6)

VIII. (a) Comment on interrupt nesting. (7)

(b) Differentiate polling and daisy chaining. (8)

OR

IX. What is DMA? Explain the process of bus arbitration in DMA. (15)

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B.Tech Degree IV Semester Examination April 2012

IT 403 OPERATIONS RESEARCH

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

$(8 \times 5 = 40)$

I. (a) Define the following terms: (i) Rank of a matrix (ii) Linear dependence of vectors (iii) BIAS.

(b) What are the fundamental theorems of linear programming?

(c) How can you identify the unbounded solution, and infeasible solution from a simplex table?

(d) State (i) maxmin and minimax theorem (ii) Principle of domenance.

(e) Write a note on degeneracy in transportation problem.

(f) What are the theorems used for solving Assignment problems?

(g) Define the following with respect to queuing theory:

(i) Queue discipline (ii) Balking

(iii) Reneging (iv) Jocking

(v) Collusion

(h) What is Kendall notations? Give classification of queuing system based on Kendall notation.

PART B

$(4 \times 15 = 60)$

II. (a) Find the inverse of the following symmetric matrix by partitioning. (8)

$$A = \begin{bmatrix} 1 & 4 & 2 \\ 4 & 2 & 1 \\ 2 & 1 & 3 \end{bmatrix}$$

(b) Find solution of the following simultaneous equations, using Cramer's rule, if consistent. (7)

$$2x_1 - x_2 = 3$$
$$x_1 + 2x_2 + x_3 = 3$$
$$-x_1 + x_3 = 3$$

OR

III. (a) Find solution to the following equations by using matrix Inverse method. (10)

$$2x + y - z = 2$$
$$x + 2y + 3z = 1$$
$$2x + 3y + 4z = 1$$

(b) Determine the rank of the following matrix. (5)

$$\begin{bmatrix} 2 & 3 & 1 & 1 \\ 1 & -1 & 3 & -2 \\ 1 & 0 & 2 & -1 \\ 3 & 5 & 1 & 2 \end{bmatrix}$$

IV. Solve the following linear programming problem using two phase method. (15)

Minimize $z = 12x_1 + 18x_2 + 15x_3$

Subject to $4x_1 + 8x_2 + 6x_3 \geq 64$

$3x_1 + 6x_2 + 12x_3 \geq 96$

$x_1, x_2, x_3 \geq 0$

OR

(P.T.O.)

V. (a) Consider the pay off matrix of player A as given below and solve it optimally using graphical method. (10)

$$\begin{array}{cc} & \text{Player B} \\ \text{Player A} & \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{bmatrix} \end{array}$$

(b) Formulate the following problem as LPP with respect to player B. (5)

$$\begin{array}{cc} & \text{Player B} \\ \text{Player A} & \begin{bmatrix} 1 & -1 & -1 \\ -1 & -1 & 3 \\ -1 & 2 & -1 \end{bmatrix} \end{array}$$

VI. Find the optimum solution to the following transportation problem in which cells contain the transportation cost in rupees. (15)

	W_1	W_2	W_3	W_4	W_5	Availability
F_1	7	6	4	5	9	40
F_2	8	5	6	7	8	30
F_3	6	8	9	6	5	20
F_4	5	7	7	8	6	10
Required	30	30	15	20	5	

OR

VII. Consider the problem of assigning four sales persons to four different sales regions as shown in the table given below; such that the total sales is maximized. The cell entries represent annual sales figures in lakhs of rupees. Find the optimum allocation of the sales persons to different regions. (15)

		Sales Region 1	2	3	4
Salesman	A	10	22	12	14
	B	16	18	22	10
	C	24	20	12	18
	D	16	14	24	20

VIII. In a maintenance shop, the inter arrival times at tool crib are exponential with an average time of 10 minutes. The length of service is assumed to be exponential distributed with a mean 6 minutes. Find (i) probability that a person arriving at the booth will have to wait. (ii) the average length of queue that forms and the average time that an operator spends in the queue system. (iii) the probability that an arrival will have to wait for more than 12 minutes for service and obtain his tools. (iv) the estimate of the fraction of the day that the tool crib operator will be idle. (v) The Manager of the shop will install a second booth when an arrival would expect to wait 10 minutes or more for the service. By how much must the rate of arrival be increased inorder to justify the second booth. (15)

OR

IX. (a) A hospital clinic has a doctor examining patients brought in for general check up. The doctor averages 4 minutes on each phase of the check up although the distribution of time spent on phase is approximately exponential. If each patient goes through 4 phase in check up and if the arrival of patients in the doctor's office are approximately Poisson at an average rate of 3 per hour, what is the average time spent by a patient waiting in the doctor's office? What is the average time spent in the examination? What is the most probable time spent in the examination? (8)

(b) An arrival rate at a telephone booth is considered to be Poisson with an average time of 10 minutes and exponential call lengths averaging 3 minutes.

(i) Find the fraction of the day that the telephone will be busy.

(ii) What is the probability that an arrival at the booth will have to wait?

(iii) What is the probability that an arrival will have to wait more than 10 minutes before the phone is free? (7)

BTS (C) – IV – 04.12 – 019 – N

B.Tech Degree IV Semester Examination April 2012

ME 403 ADVANCED MECHANICS OF SOLIDS

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Write a brief note on compatibility equation.

(b) State Hooke's law for plane stress and strain condition.

(c) State and explain Caushy's stress formula.

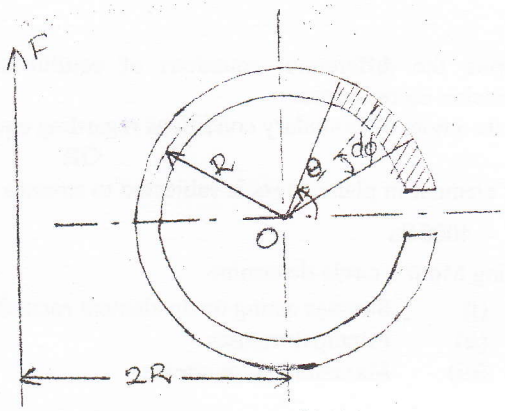
(d) A steel shaft of 10cm diameter is shrink inside a bronze cylinder of 25 cm outer diameter. The shrink allowance is 1 part 1000 (ie. 0.005 cm difference between the radii). Find the circumferential stress in the bronze cylinder at the inside and outer radii and the stress in the shaft.

(e) Write a note on Lame's stress ellipsoid.

(f) Explain the theorem of virtual work.

(g) Describe briefly on the torsion of thin walled tubes.

(h) Determine the shear stress distribution for a circular open section under bending caused by shear force. Locate the shear centre.



PART B

(4 x 15 = 60)

II. (a) In a rectangular strain rosette the strains are measured as $\varepsilon_{0^\circ} = 0.002$ (10)

$\varepsilon_{45^\circ} = 0.001$

$\varepsilon_{90^\circ} = -0.004$

What are the principal strains at the point? Given that Young's modulus of elasticity as 207GPa and Poisson's ratio as 0.3.

(b) At a point P in a body σ_x = 10,000 N/cm^2, σ_y = –5,000 N/cm^2, σ_z = –5,000 N/cm^2 (5)

$\tau_{xy} = \tau_{yz} = \tau_{zx}$ = 10,000 N/cm^2

Determine the normal and shearing stresses on a plane that is equally inclined to all axes.

OR

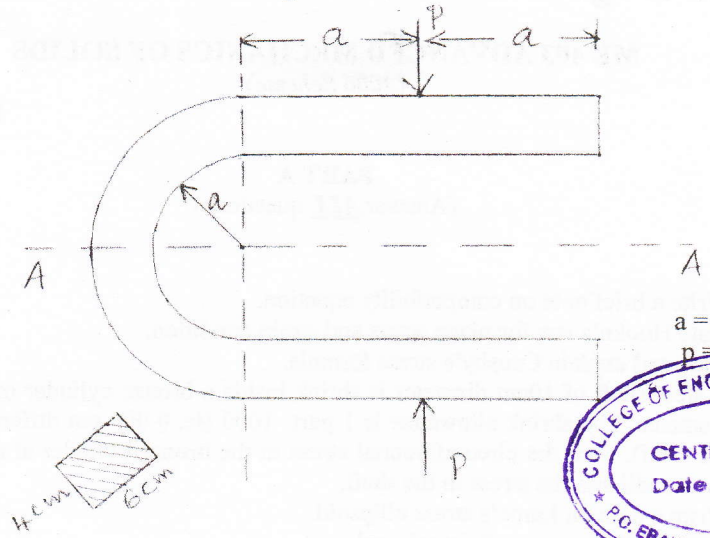
III. (a) Derive the equations in polar co-ordinates related to plane strain condition. (10)

(b) Consider the displacement field $u = \left[y^{2i} + 3yzj + \left(4 + 6x^2\right)k \right] 10^{-2}$ (5)

What are the rectangular strain components at the point $P(1,0,2)$? Use only linear terms.

(P.T.O)

IV. Determine the maximum tensile and maximum compressive stresses across the section AA as shown in the figure. (15)



a = 8cm
p = 1920N

OR

V. Derive the expression for radial and tangential stresses in solid disc of uniform thickness rotating with an angular velocity ω. (15)

VI. (a) Derive the differential equations of equilibrium for plane stress condition in Cartisian co-ordinates. (10)

(b) Write a note on boundary conditions regarding equations of equilibrium. (5)

OR

VII. An element in plane stress is subjected to stresses $\sigma_x = 15000\,\text{Pa}$, $\sigma_y = 5000\ \text{Pa}$ and $\tau_{xy} = 4000\,\text{Pa}$ (15)

Using Mohr's circle determine

(i) Stresses acting on an element rotated through an angle $\theta = 40^o$

(ii) Principal stresses

(iii) Maximum shear stresses

VIII. (a) Explain Membrane Analogy. (10)

(b) Explain Saint Venant's principle of shear centre. (5)

OR

IX. Write a brief note on "Torsion of thin walled tubes" and derive an expression for twist per unit length. (15)

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BTS (C) – IV – 04.12 – 020 – K

B.Tech Degree IV Semester Examination April 2012

EE 404 LINEAR SYSTEM ANALYSIS

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

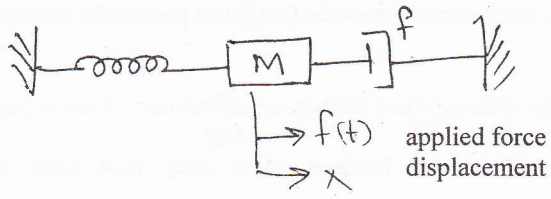
(8 x 5 = 40)

I. (a) Define transfer function. What are the advantages of Laplace transform method for obtaining transfer function?

(b) Differentiate between open loop and closed loop systems. Give example for both.

(c) Explain force current analogy.

(d) Obtain $\frac{X(S)}{F(S)}$



(e) What do you mean by static and generalized error constants?

(f) Obtain the time response of a first order control system subjected to a unit step input.

(g) What are the characteristics of state transition matrix?

(h) Explain Routh's Hurwitz criterion.

PART B

(4 x 15 = 60)

II. Obtain the transfer function of (15)

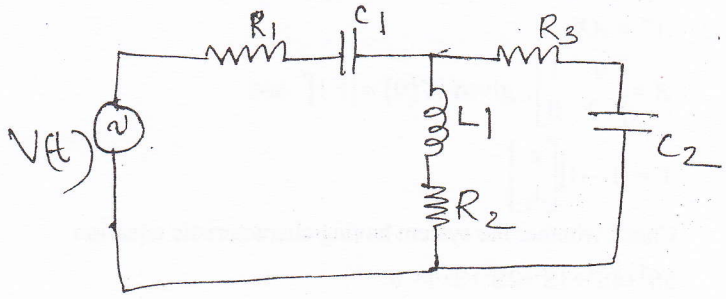
(i) armature controlled dc motor

(ii) field controller dc motor

OR

III. (a) Explain Mason's gain formulae? (5)

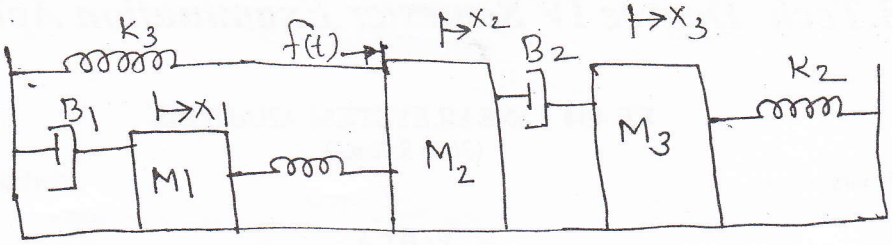
(b) For the electric network shown in the figure, find transfer function. Draw the block diagram and signal flow graph. (10)



(P.T.O.)

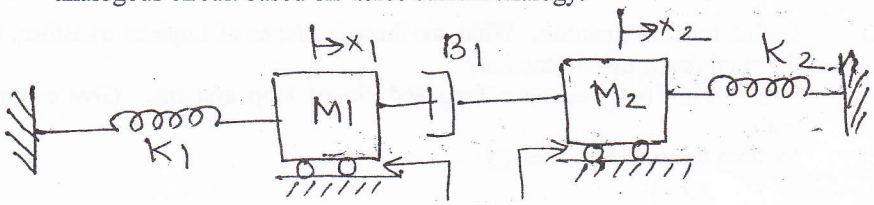
IV. (a) Obtain the mathematical model of a typical thermal system. (5)

(b) Obtain the mathematical model of a mechanical system shown. (10)



OR

V. (a) Obtain the differential equations of mechanical system shown. Draw electrical analogous circuit based on force current analogy. (10)



No friction

(b) Explain the mathematical model of a typical pneumatic system. (5)

VI. What are the different time domain specifications? Derive expressions for each. (15)

OR

VII. (a) The over all transfer function of a unity feed back system is given by $\frac{C(s)}{R(s)} = \frac{10}{S^2+6s+10}$. Find the values of static error constants. Also determine the steady state error for input $r(t) = 1 + t + t^2$. (10)

(b) Explain the effect of adding zero to a 2nd order system. (5)

VIII. For the system given below obtain: (15)

(i) Zero input response

(ii) Zero state response

(iii) Total response

(iv) $$\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

where $x_1(0) = 1$, $x_2(0) = 0$ and $u(t) = 1$

OR

IX. (a) Obtain the time response of the system. (10)

$X^o = AX$

$A = \begin{bmatrix} 0 & 1 \\ -2 & 0 \end{bmatrix}$; given $X(0) = [1\ 1]^T$ and

$Y = [1\ -1] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

(b) Check whether the system having characteristic equation (5)

$5S^5+4S^4+3S^3+2S^2+S+1=0$

is stable or not using Routh Hurwitz criterion?

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BTS (C) – IV – 04.12 – 020 – J

B.Tech Degree IV Semester Examination April 2012

EC/EI 404 SIGNALS AND SYSTEMS

(2006 Scheme)

Time: 3 Hours | Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

$(8 \times 5 = 40)$

I. (a) Distinguish between energy and power signals. Check whether the following signals are energy, power or neither.

(i) $x(t) = A[u(t+a) - u(t-a)]$ for $a > 0$

(ii) $x(t) = r(t) - r(t-2)$

(b) Find the convolution of signals

$x(t) = e^{-3t} \cdot u(t)$

$h(t) = u(t-1)$

(c) Test whether the following systems are time invariant or not

(i) $y[n] = \cos(x[n])$

(ii) $y[n] = x[-n]$

(d) Find the Z transform of the signals

$x[n] = \left(-\frac{1}{5}\right)^n u[n] + 5\left(\frac{1}{2}\right)^{-n} u[-n-1]$. Find ROC.

(e) Find the DTFT of $x[n] = (.5)^n u[n] + 2^n u[-n-1]$.

(f) List the properties of power spectral density.

(g) What is a matched filter? Explain.

(h) Explain threshold effect.

PART B

$(4 \times 15 = 60)$

II. Check whether the followings systems are (i) linear (ii) causal (iii) time invariant

(1) $\frac{dy(t)}{dt} + 2y(t) + 3 = x(t)$

(2) $y(t) = \cos 2\pi t x(t)$

(3) $y(t) = x(t-6) - x(2-t)$ $(3 \times 5 = 15)$

OR

III. Obtain the Fourier transform of the signal $e^{-|t|}$. Also draw its spectrum. (15)

(P.T.O.)

IV. Check whether the following systems with impulse response $h[n]$ are stable or not.

(i) $h[n] = (z)^n u[-n]$

(ii) $h[n] = \sin\left(n\pi/2\right)$

(iii) $h[n] = \delta[n] + \sin n\pi$

(iv) $h[n] = e^{2n} u[n-1]$ (15)

OR

V. (a) Find the transfer function and impulse response of a discrete time LJI system described by the difference equation $y[n] = \frac{1}{2}y(n-1) + n[n] + \frac{1}{3}x[n-1]$. (10)

(b) Explain five properties of DTFT. (5)

VI. Explain Gaussian distribution and its properties. Also find the mean, variance and cumulative distributive function of a Gaussian random variable. (15)

OR

VII. (a) Explain the probability density function. (5)

(b) A random variable has a probability distribution function given by

$$F(x) = 0 \quad ; \quad -\infty < x \le 0$$

$$= 1 - e^{-2x}; \quad 0 \le x < \infty$$

Find: (i) the probability that $x > .6$

(ii) the probability that $x \le .25$

(iii) The probability that $.4 < x \le .8$ (10)

VIII. What is angle modulation? Explain the effect of noise on conventional AM. Also derive S/N ratio. (15)

OR

IX. (a) Explain pre-emphasis and de-emphasis filtering with the help of filter characteristics and circuits. (10)

(b) Compare the features of narrow band noise and white noise. (5)

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B. Tech Degree IV Semester Examination April 2012

CS/IT 404 AUTOMATA LANGUAGES AND COMPUTATION

(*2006 Scheme*)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) State and prove pumping lemma for regular expressions.

(b) Give two applications of finite automata.

(c) Explain what is meant by inherently ambiguous languages.

(d) Define context free grammar (CFG). Give the CFG generating the set of palindromes (null string not accepted) over the alphabet $\{a,b\}$.

(e) Differentiate the implementation of multitape turing machine and multitrack turing machine.

(f) With a neat diagram, explain the turing machine model.

(g) Distinguish between decidable and undecidable problems.

(h) Explain the Chomsky Hierarchy.

PART B

(4 x 15 = 60)

II. (a) Differentiate DFA and NFA with suitable examples. (7)

(b) Construct finite automata for the following regular expressions: (8)

(i) $(1+0)^*+10(1^*0^*)^+$ (ii) $01\left[(10)^*+(111)^+\right](1^*+0^+)$

OR

III. (a) Show the equivalence of DFA and NFA. (7)

(b) Construct DFAs accepting the following languages over $\{a,b\}$. (8)

(i) Set of strings that either begin or end (or both) with 01.

(ii) Set of all strings having even no. of 0s and even no. of 1s.

IV. (a) Consider the grammar $(\{S,A,B\},\{a,b\},P,S)$ with the following productions: (8)

$S \to bA / aB$

$A \to bAA / aS / a$

$B \to aBB / bS / b$

Construct an equivalent grammar in Chomsky normal form.

(b) State and prove pumping lemma for CFL. (7)

OR

V. (a) Define push down automata. Design a PDA that accepts the language $\{a^n b^n / n >= 0\}$ over $\{a,b\}$. (8)

(b) Prove the equivalence of PDA and CFL. (7)

VI. (a) Show that a non-deterministic turing machine can be simulated by a deterministic turing machine. (8)

(b) Design a turing machine to accept the language $\{wcw^R / w \text{ in } (a+b)^*\}$. (7)

OR

VII. (a) Design a turing machine to simulate $\{0^n 1^m / n \neq m\}$ over $\{0,1\}$. (8)

(b) Explain how subroutine is implemented in a TM. (7)

VIII. (a) Define linear bounded automation (LBA). Show that if L is a context sensitive language, then L is accepted by some LBA. (8)

(b) Prove the equivalence of regular grammar and finite automata. (7)

OR

IX. (a) Prove that the halting problem of TM is undecidable. (8)

BTS(C) – IV – 04.12 – 020 - M

B. Tech Degree IV Semester Examination April 2012

ME 404 APPLIED THERMODYNAMICS

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) State and explain Carnot's Theorem.

(b) Define irreversibility and availability.

(c) Explain P-V-T surface.

(d) What is binary vapour cycle?

(e) Explain volumetric and gravimetric analysis of gas mixtures.

(f) Explain gas constant and specific heat of the gas mixtures.

(g) What are the various advantages of liquid and gaseous fuels over solid fuels?

(h) Explain adiabatic flame temperature.

PART B

(4 x 15 = 60)

II. The internal energy of a certain substance is given by the equation $u = 3.56\ pv + 84$ KJ/Kg, where u is in KJ/Kg, p is in Kpa and v is in M^3/Kg. A system consists of 3Kg of substance which expands from an initial pressure of 500KPa, volume of $0.22m^3$ to a final pressure of 100KPa in a process in which pressure and volume are given by the relation of $PV^{1.2} = C$. If the expansion is quasi static find the heat transfer, internal energy and work transfer for the process. In another process the same system expands according to the same pressure volume relationship and from the same initial state to final state but the heat transfer in this case is 30 KJ. Find the work transfer for the process. (15)

OR

III (a) Explain the Claussius Clapeyron equation. (7)

(b) Air flows steadily at the rate of 0.5 Kg/s through air compressor entering at 7m/s velocity, 100 KPa pressure, 0.95 m^3/Kg. volume and leaving at 5 m/s, 700 KPa and 0.19 m^3/Kg. The internal energy of the air leaving is 90 KJ/Kg greater than that of the air entering. Cooling water in the compressor jacket absorbs heat from the air at the rate of 58KW. Compute: (i) The rate of shaft work input (ii) The ratio of inlet pipe diameter to outlet pipe diameter. (8)

IV (a) Describe Rankine Cycle and explain how actual vapour cycle is different from Rankine Cycle. (7)

(b) Find the enthalpy and entropy of the steam when pressure is 2 Mpa and the specific volume is $0.09m^3$/kg. (8)

OR

V. (a) Explain any one of modern steam generator. (6)

(b) A Lancashire boiler generates 2400 KJ of dry steam per hour at a pressure of 11 bar. The grate area is $3m^2$ and 90kg of coal is burnt per m^3 of grate area per hour. The calorific value of coal is 33180 KJ/Kg and temperature of feed water is 17.5°C. Determine: (9)

(i) Actual evaporation per Kg. of coal.

(ii) Equivalent evaporation from and at 100°C

(iii) Efficiency of the boiler.

(P.T.O)

VI. (a) State and explain Gibb's -Dalton's law. (6)

(b) A mixture consisting of 1 Kg of Helium and 2.5 Kg of Nitrogen at 25°C and 10 Kg/cm^2 is compressed in a reversible adiabatic process to 70 Kg/cm^2. (9)
Calculate: (i) partial pressure of the constituents (ii) final temperature
(iii) change in internal energy of the mixture. Assume:

	Nitrogen	Helium
C_V	0.743 KJ/Kgk	3.14KJ/Kgk
Cp	1.04 KJ/Kgk	5.23 KJ/Kgk

OR

VII. (a) Explain the working of single stage reciprocating air compressor and obtain the work done in a polytropic compression without clearance volume. (10)

(b) Explain Roots blower with neat figure. (5)

VIII (a) Explain the bomb calorimeter. (7)

(b) The products of combustion of hydro carbon fuel of unknown composition have the following composition as measured on a dry basis: (8)
CO_2 8% CO 0.9% O_2 8.8% N_2 82.3%
Calculate: (i) the air fuel ratio (ii) composition of the fuel on a mass basis
(iii) percentage theoretical air on a mass basis.

OR

IX. (a) Explain the application of first law of thermodynamics to combustion. (6)

(b) A small gas turbine uses C_8H_{18} (ℓ) for fuel and 400 percent theoretical air. The air and fuel enter at 25°C and the products of combustion leave at 900K. The output of the engine and fuel consumption are measured and it is found that the specific fuel consumption is 0.25 Kg/s of fuel per MW output. Determine the heat transfer from the engine per Kmol of fuel. Assume complete combustion. (9)

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BTS (C) – IV – 04.12 – 021 – J

B.Tech Degree IV Semester Examination April 2012

EC/EE 405 ANALOG COMMUNICATION

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

$(8 \times 5 = 40)$

I. (a) Draw the block diagram of SSB generation using 'The Third Method'.

(b) Explain the function of Beat Frequency Oscillator.

(c) Discuss the bandwidth requirement of a frequency modulated system.

(d) How noise problem is solved in a frequency modulated system? Explain.

(e) Define: SNR, noise figure, angle modulation, capture effect and double spotting.

(f) Derive the relationship between noise figure and noise temperature.

(g) What are signaling tones?

(h) What do you mean by call routing?

PART B

$(4 \times 15 = 60)$

II. (a) Mention the elements of a communication system. Describe their functionality. (5)

(b) A certain transmitter radiates 9KW with the carrier unmodulated and 10.125KW when the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave is simultaneously transmitted with modulation index 0.4, determine the total radiated power. (5)

(c) Explain the operation of a SSB pilot carrier transmitter with necessary block diagram. (5)

OR

III. (a) Define modulation, and explain the need for modulation. (5)

(b) Calculate the output power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of 50 percent. (5)

(c) Explain the operation of an AM transmitter with the necessary block diagram. (5)

IV. (a) Draw the complete block diagram of the Armstrong frequency modulation system and explain the function of the mixer and multipliers shown. (10)

(b) Describe stereo FM receiver using block diagram. (5)

OR

(P.T.O.)

V. (a) Explain how the ratio detector demodulates the FM signal proving that the output voltage is proportional to the difference between the individual input voltages to the diodes. (9)

(b) The equation of an angle modulated voltage is $v = 10\sin\left(10^8 t + 3\sin 10^4 t\right)$.

(i) What form of angle modulation is this?

(ii) Calculate the carrier and modulating frequencies, the modulation index and deviation.

(iii) What is the power dissipated in a 100Ω resistor? (6)

VI. (a) If the resistor is operating at 27°C and the bandwidth of interest is 2MHz, then what is the maximum noise power output of a resistor?
Given, $K = 1.38 \times 10^{-23}$ J/K. (5)

(b) Calculate the noise voltage at the input of a television RF amplifier, using a device that has a 200Ω equivalent noise resistance and a 300Ω input resistance. The bandwidth of the amplifier is 6mHz and the temperature is 17°C. (5)

(c) What is Thermal Agitation Noise? (5)

OR

VII. Compare the following:

(i) Simple AGC and delayed AGC

(ii) Amplitude modulation and frequency modulation

(iii) Pulse width modulation and pulse position modulation (15)

VIII. (a) With the help of a neat diagram explain the mechanism of Strowger switch. (10)

(b) Explain the principle of 3 × 3 cross bar switching. (5)

OR

IX. Compare the following:

(i) DTMF and pulse signaling

(ii) Centralised and distributed SPC

(iii) In channel and common channel signaling techniques (15)

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BTS (C) – IV – 04.12 – 021 – E

B.Tech Degree IV Semester Examination April 2012

IT/CS 405 DATA STRUCTURES AND ALGORITHMS

(2006 Scheme)

Time: 3 Hours | Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

(8 × 5 = 40)

I. (a) What is spare matrix? How is it represented?

(b) Compare an array and a linked list.

(c) Write short notes on:

(i) Queue

(ii) Dqueue

(d) Explain the role of stack in postfix evaluation.

(e) Write the recursive algorithm for pre-order tree traversals.

(f) Write short notes on:

(i) Directed acyclic graph

(ii) Connected graph.

(g) Give an applications of Dqueue

(h) Write short notes on:

(i) AVL trees

(ii) Threaded binary tree

PART B

(4 × 15 = 60)

II. Explain merge sort with example.

OR

III. Distinguish between insertion sort and selection sort.

IV. Why queue is implemented as circular queue? Specify conditions for empty and full queue?

OR

V. Write a java program to convert infix expression to postfix expression.

VI. Explain (i) Insertion (ii) Deletion (iii) Searching, in a binary search tree with appropriate diagrams.

OR

VII. Define AVL tree and explain the rotations for AVL trees.

VIII. Explain Prims and Kruskal algorithms to find minimum spanning tree.

OR

IX. Define B-tree. Explain the structure of B-tree with example.

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BTS (C) – IV – 04.12 – 021 – L

B.Tech Degree IV Semester Examination April 2012

ME 405 HYDRAULIC MACHINERY

(2006 Scheme)

Time: 3 Hours | Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

$(8 \times 5 = 40)$

I. (a) What is Buckingham's Pi theorem?

(b) Explain principles of Similitude.

(c) List the factors to be considered for the selection of type and speed of turbines for a particular application.

(d) Differentiate between reaction turbines and impulse turbines.

(e) List the advantages of centrifugal pump over reciprocating pump.

(f) Explain the advantages of using air vessel in reciprocating pump.

(g) Sketch and explain a torque converter.

(h) What is a surge tank? Explain its use.

PART B

$(4 \times 15 = 60)$

II. A jet of water of diameter 6cm, strikes a curved vane at its centre. The curved vane is moving with a velocity of 10 m/s in the direction of jet. If the velocity of the jet is 22m/s and it is deflected through an angle of 160°, determine: (i) force exerted on the vane in the direction of jet. (ii) power of jet (iii) efficiency of the jet.

OR

III. Stating necessary assumptions, derive the momentum equation.

IV. A reaction turbine has diameter of 1m and flow area $0.35m^2$ at the inlet. It operates under a head of 60m. The speed of the runner is 400rpm.Angles made by the absolute and relative velocities at the inlet are 18° and 60° respectively with the tangential velocity of the wheel. Assuming radial discharge, find (i) discharge (ii) power developed (iii) hydraulic efficiency.

OR

V. Write notes on:

(i) Speed regulation of turbines

(ii) Draft tube

(iii) Cavitation

VI. (a) Derive an expression for discharge, Q for a reciprocating pump.

(b) Draw and explain an indicator diagram for a reciprocating pump. Also show the effect of acceleration and friction on it.

OR

VII. A centrifugal pump delivers 50 litres of water per second to a height of 15m through a 20m long pipe. Diameter of the pipe is 14cm. Overall efficiency is 72% and the coefficient of friction is 0.015. Determine the power needed to drive the pump.

VIII. Draw a neat sketch of

(i) Hydraulic intensifier

(ii) Hydraulic accumulator

and explain the difference between them.

OR

IX. Write notes on:

(i) Gear pump

(ii) Hydraulic ram

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BTS (C) – IV – 04.12 – 022 – C

B.Tech Degree IV Semester Examination April 2012

EB/EC/EE/EI 406 INDUSTRIAL AND POWER ELECTRONICS

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer ***ALL*** questions)

$(8 \times 5 = 40)$

I. (a) Explain the significance of average on state current and RMS current rating for a thyristor.

(b) Explain RC firing circuit with suitable waveforms.

(c) Explain the difference between single phase half controlled and fully controlled bridge converters.

(d) Explain any one scheme for speed control of separately excited DC motor.

(e) Explain the sinusoidal pulse width modulation used in inverters.

(f) Explain the working of a single phase series inverter.

(g) What is the effect of high dv/dt on an SCR? How SCR is protected against it?.

(h) Explain the principle of Dielectric heating.

PART B

$(4 \times 15 = 60)$

II. (a) Explain the structure and working of an n-channel power MOSFET.

(b) The latching current of an SCR inserted in between a dc voltage source of 100V and the load is 50mA. Calculate the minimum width of the gate pulse current required to turn on the SCR in case the load consists of R = 10Ω in series with L = 0.5H.

OR

III. (a) Explain the two transistor model of a thyristor. Based on the model, explain the turn on process of thyristor by Gate triggering and dv/dt triggering.

(b) Design a UJT relaxation oscillator for triggering an SCR. The UJT has the following data.

$\eta = 0.72$, $I_p = 0.6$mA, $V_p = 18$V, $V_v = 1$V, $I_v = 2.5$mA, $R_{BB} = 5$KΩ, normal leakage current with emitter open is 4.2mA. The firing frequency is 2KHz. Assume C = 0.04μF.

IV. (a) Explain the working of a single phase half wave rectifier feeding an R – L – E load with the aid of suitable waveforms. Also derive the expression for average output voltage.

(b) A 230V, 50Hz, one pulse SCR controlled converter is triggered at a firing angle of 40° and the load current extinguishes at an angle of 210°. Find the average output voltage and the average load current for load consists of R = 5Ω and L = 2mH.

OR

(P.T.O.)

V. (a) With suitable waveforms, explain the working of a 3ϕ full converter feeding a resistive load. Also derive the expression for average output voltage.

(b) A 3 phase full converter feeds power to a resistive load of 10Ω. For a firing angle delay of 30°, the load takes 5KW. Find the magnitude of per phase input supply voltage.

VI. (a) Draw the circuit diagram and explain the working of a four quadrant chopper.

(b) A step up chopper has input voltage of 220V and output voltage of 660V. If the non conducting time of thyristor chopper is 100μs, compute the pulse width of output voltage.

OR

VII. (a) Explain the speed control of Induction motor using Static Kramer drive.

(b) For a single phase full bridge inverter, Vs = 230Vdc, T = 1ms. The load consists of RLC in series with R = 1Ω, WL = 6Ω and 1/WC = 7Ω. Find the power delivered to load due to fundamental component of current.

VIII. (a) Explain the working of a Buck Boost converter with necessary diagrams.

(b) A boost regulator has an input voltage of Vs = 5V. The average output voltage Vo = 15 V and average load current Io = 0.5A. The switching frequency is 25KHz. If L = 150μH and C = 220μF, determine (i) duty ratio (ii) ripple current of inductor (iii) ripple voltage of filter capacitor.

OR

IX. (a) Explain the difference between on line UPS and offline UPS with block diagrams.

(b) A buck boost regulator has an input voltage of Vs = 12V. The duty ratio is 0.25 and the switching frequency is 25KHz. The inductance L = 150μH and filter capacitance C = 220μF. The average load current Io = 1.25A. Determine: (i) the average output voltage (ii) the peak-peak output voltage ripple. (iii) the peak-peak ripple current of inductor.

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BTS (C) – IV – 04.12 – 022 – B

B.Tech Degree IV Semester Examination April 2012

CS/IT 406 DATA COMMUNICATION

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) Why digital transmission is preferred as method of transmission?

(b) Describe various categories and features of twisted pair.

(c) Write a note on advantages of biphase encoding schemes.

(d) Describe the data compression method of Huffman coding.

(e) Compare the features of asynchronous and synchronous transmission methods.

(f) What are the three data transfer modes in HDLC?

(g) What is meant by direct sequence spread spectrum?

(h) List the benefits of spread spectrum.

PART B

(4 x 15 = 60)

II. (a) Draw the general block diagram of communication model and explain key elements. (8)

(b) Describe the characteristics which distinguish optical fibre from twisted pair or coaxial cable. (7)

OR

III. (a) Describe various types of transmission impairments. (8)

(b) Describe the components of optical fibre cable. (7)

IV. Explain various digital signal encoding formats with the help of figures? (15)

OR

V. Describe various modulation techniques for transforming digital data into analog signals. Compare their performance in terms of data rate to transmission bandwidth ratio. (15)

VI. (a) Describe the CRC process in detail with the help of an example. (8)

(b) Explain the structure of the HDLC frame in detail. (7)

OR

VII. (a) Describe various automatic repeat request mechanisms in detail with the help of figures. (8)

(b) Explain the three phases involved in HDLC operation. (7)

VIII. (a) Describe the characteristics of frequency division multiplexing with the help of figures. (8)

(b) Explain the basic principles of code division multiple access. (7)

OR

IX. (a) Describe the characteristics of statistical time division multiplexing with the help of figures. (8)

(b) Write a short note on frequency hopping spread spectrum system. (7)

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BTS (C) – IV – 04.12 – 022 – D

B.Tech Degree IV Semester Examination April 2012

ME 406 MANUFACTURING PROCESS

(*2006 Scheme*)

Time : 3 Hours | Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) List any five applications of casting.

(b) Explain the significance of gating ratio.

(c) Write a brief note on casting cleaning.

(d) Explain die casting.

(e) Distinguish between hot working and cold working.

(f) Discuss the principle of rolling.

(g) Explain thermit welding.

(h) Explain the principle of shielded arc welding.

PART B

(4 x 15 = 60)

II. Explain in detail about the desirable properties of a moulding sand.

OR

III. (a) Give a brief account on the forces acting on moulding flasks.

(b) Explain the different types of cores.

IV. Describe in detail about the various casting defects and also how it can be eliminated.

OR

V. Write notes on:

(i) Centrifugal casting

(ii) Shell moulding.

VI. Explain the following with appropriate sketches:

(i) Press forging

(ii) Forging design

OR

VII. Explain the following operations:

(i) Tube extrusion

(ii) Spinning

(iii) Drawing

VIII. Explain gas welding in detail, indicating clearly the different gas combinations used, types of flames and applications.

OR

IX. (a) Distinguish between brazing and soldering.

(b) Explain TIG welding.

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