

Total No. of Questions :10]

SEAT No. :

P2859

[4958]-1047

[Total No. of Pages :3

T.E. (E & TC)

EMBEDDED PROCESSORS

(2012 Course) (304191) (End Semester) (Semester - II)

Time : 3 Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) a) Explain programmer's model of ARM processor. [6]

b) Draw interfacing diagram to interface LED bank to port pins P 0.12 to P 0.15 of LPC 2148. State algorithm to blink the LEDs. [4]

OR

Q2) a) What is the need of Pin connect Block in LPC 2148? Explain the role of PIN SELX registers. [6]

b) Explain following ARM instructions (any two). [4]

i) ADDEQ R₀, R₁, R₂.

ii) MVN R₂, R₃, ASR # 2.

iii) STR R₀, [R₁, # 4]

iv) ANDS R₀, R₁, R₂.

Q3) a) Explain SPI protocol with suitable diagram. [6]

b) What is meant by TDMI with respect to ARM 7 core. Compare THUMB and ARM instruction set. [4]

OR

P.T.O.

- Q4)** a) Explain the following bits in ADOCR register. [6]
i) SEL.
ii) CLKDIV.
iii) CLKS.
b) Draw and explain the interfacing diagram of SD card with LPC 2148. [4]

- Q5)** a) Compare Cortex - A, cortex - R, cortex - M series processor. [8]
b) Enlist need and desired features of operating systems in developing complex applications in Embedded system. [8]

OR

- Q6)** a) Explain CMSIS standard for firm wave development in ARM cortex based system. [6]
b) Compare Cortex processors over ARM 7 for embedded system design. [6]
c) Why Nested vector Interrupt controller is necessary in ARM cortex? [4]

- Q7)** a) Explain four reset sources under system control block of LPC 1768 in detail. [8]
b) Explain the following power saving modes. [Any three]. [6]
i) Sleep mode.
ii) Deep sleep mode.
iii) Power down mode.
iv) Deep power-down mode.
c) Explain significance of PLL0 and PLL1 in LPC 1768. [4]

OR

- Q8)** a) Draw interfacing diagram of motor control using PWM with LPC 1768. & write down algorithm to control the speed of motor. [8]
- b) Explain three clock sources (oscillators) for LPC 1768. [6]
- c) Describe any two registers with reference to ARM M3 micro controllers (LPC 1768). [4]
- i) FIOMASK.
 - ii) FIOPIN.
 - iii) FIOSET.
 - iv) FIODIR.
- Q9)** a) Explain the CAN protocol and frame structure with reference to ARM M3 microcontroller. [8]
- b) Explain the following with respect to USB controller in LPC 1768. [8]
- i) Features of USB.
 - ii) USB frame structure.

OR

- Q10)**a) Explain the architecture and operation of Ethernet bus with reference to ARM M3 microcontroller. [8]
- b) How in and out data transactions take place in USB? Give operational overview. [8]



Total No. of Questions : 8]

SEAT No. :

P2860

[4958]-1048

[Total No. of Pages : 3

**T.E.(E&TC Engineering)
POWER ELECTRONICS**

(2012Pattern) (Semester-II) (End Sem)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2,Q.3or Q. 4, Q.5 or Q. 6 , Q .7 or Q. 8.*
- 2) *Neat diagrams and waveforms must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of nonprogrammable calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) Draw & Explain a gate drive circuit for IGBT. [7]
- b) Draw & explain single phase half controlled rectifier(semi converter) for R-L load with o/p voltage & current waveforms. What is inherent free wheeling in semi converter for R-L load. [7]
- c) Single phase full bridge inverter is operated from 50V dc supply, it has a resistive load of $R= 5\Omega$. Find: [6]
- i) rms o/p voltage at fundamental frequency(V_{01})
 - ii) rms o/p power
 - iii) rms o/p Voltages at second & third harmonic(V_{02} & V_{03})

OR

- Q2)** a) Compare SCR with MOSFET [7]
- b) What are PWM techniques in inverter? Explain Multiple PWM technique with waveforms. [6]
- c) Draw & explain three phase half controlled bridge converter for R load with o/p voltage waveforms. [7]

P.T.O.

- Q3)** a) Explain operation of step down chopper with R load and derive expressions for average output voltage & rms output voltage. [8]
- b) Explain operation of step up chopper with circuit diagram and derive an expression for its o/p voltage: $V_0 = \frac{V_s}{(1-D)}$ where D is duty cycle. [6]
- c) A step down DC chopper has a resistive load of $R=15\Omega$ and input voltage $E_{dc}=200V$. When the chopper remains ON, its voltage drop is 2.5V. The chopper frequency is 1KHz. If the duty cycle is 50%, determine
- Average output voltage [4]
 - rms output voltage

OR

- Q4)** a) A step up chopper is used to deliver load voltage is 660V from 220V DC source. If the blocking period of thyristor is 500 μs , compute the turn on time. [5]
- b) A single phase full wave ac voltage controller has a resistive load of $R=10\Omega$ and the input voltage is $V_s=230V(\text{rms}), 50 \text{ Hz}$. The delay angles of thyristors T1 and T2 are equal: $\alpha_1 = \alpha_2 = \pi/3$. Determine [5]
- the rms output voltage
 - the rms output current
- c) Draw & explain single phase full wave ac voltage controller has a resistive load with following waveforms: [8]
- Gate signals for T1 and T2
 - o/p rms voltage & current
 - Voltage across T1

- Q5)** a) Explain various modes of operation in DC motor with neat diagrams. [8]
- b) Explain operation of On-line & off-line UPS with block schematic. [8]

OR

- Q6)** a) Explain stepper motor drives. [8]
- b) What are advantages of electronic ballast over conventional ballast? Explain working of electronic ballast with block schematic. [8]

- Q7)** a) What are different over voltage protection techniques in power electronics? Explain any one in with circuit diagram. [8]
- b) What is EMI? Explain various sources & minimizing techniques of EMI. [8]

OR

- Q8)** a) Explain the role of heat sink. [4]
- b) What is the need of resonant converter? Explain ZCS resonant converter with circuit & waveforms. [8]
- c) For a thyristor, Maximum junction temperature is 110°C . The thermal resistances are $\phi_{JC} = 0.16$, $\phi_{CS} = 0.08^{\circ}\text{C/W}$. for heat sink temperature of 60°C , calculate total average power loss in thyristor-sink combination. If heat sink temperature is reduced to 50°C , find new total average power loss in thyristor - sink combination. [4]



Total No. of Questions :8]

SEAT No. :

P2861

[4958]-1049

[Total No. of Pages :2

T.E. (E & TC)

INDUSTRIAL MANAGEMENT

(2012 Course) (End - Semester) (304192)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6,Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Define management. What are the functions of management? [7]
- b) Explain Ishikawa diagram and Pareto Analysis in details. [7]
- c) Write short note on Sources of Finance. [6]

OR

- Q2)** a) What are the characteristics of Management? Distinguish between “Traditional organization” and “Modern organization”. [7]
- b) Define Quality. Explain Jurans Triology of quality with neat diagram. [7]
- c) An ABC Company Ltd. Has given following information for current year, Fixed cost is Rs. 12,00,000, variance cost is Rs.50/Unit, Estimated sales for current year is Rs.50,00,000 and sale price per unit is Rs.200. Calculate [6]
- i) Break even point
 - ii) Contribution and profit, if likely sales turnover in the next year is expected Rs. 45,00,000.
 - iii) Sales turnover if profit target is Rs.15,00,000.

P.T.O.

- Q3)** a) What is Human Resource Planning? Explain process of HRP. [9]
b) Compare Recruitment and Selection strategies. [9]

OR

- Q4)** a) Write strategic importance and objective of HRM. [9]
b) What is need of training? Write importance and investment in training programs. [9]
- Q5)** a) Define Entrepreneurship. Write need and importance of Entrepreneurship development. [8]
b) What are the policies and incentives given to small scale business development? [8]

OR

- Q6)** a) Write types of ownership. Also write advantages and disadvantages of partnership and joint stock company. [8]
b) Which are the steps to start small scale industry? [8]
- Q7)** a) Explain MIS with Human resource department. [8]
b) Write short note on: [8]
i) Business Process Reengineering
ii) Decision support system

OR

- Q8)** a) Explain Characteristics of Information System and its Types. [8]
b) Write a short note on: [8]
i) Enterprise Resource Planning
ii) E-Commerce

EEE

Total No. of Questions : 8]

SEAT No. :

P2862

[4958]-1050

[Total No. of Pages :3

T.E.(E&TC)

**ANTENNA & WAVE PROPAGATION
(2012 Pattern)(Semester-II) (End Sem.)**

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer any one Question out of Q1 & Q2, Q3 & Q4, Q5 & Q6, Q7& Q8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) What is poynting vector? What is its significance? Derive an expression for poynting vector? [8]
- b) Derive vector potential A for an magnetic current source J. [6]
- c) Calculate the skip distance for flat earth with MUF of 10MHz.If wave is reflected from a height of 300 Km where maximum value of refractive index(n) is 0.9. [6]

OR

- Q2)** a) Explain antenna radiation mechanism in detail. [6]
- b) What is polarization of wave? Explain the polarization of three types of wave with the help of relevant diagram? [6]
- c) A lossless resonant $\lambda/2$ dipole antenna with input impedance of 73Ω is to be connected to a transmission line whose characteristics impedance is 50Ω . Assuming that the pattern of the antenna is given approximately by $U=B\sin^3\theta$. Fnd the overall maximum gain of this antenna . [8]

- Q3)** a) Find the following terms for small Dipole antenna: [18]
- i) Specify the current
 - ii) Vector magnetic potential
 - iii) Far field components of Electric & Magnetic fields
 - iv) Radiation density, radiation intensity
 - v) Radiated power, radiation resistance
 - vi) Directivity
 - vii) Draws the radiation pattern.

OR

P.T.O.

- Q4)** a) Calculate the radiation resistance of a double turn and an eight turn small circular loop when radius of loop is $\lambda/10$ and the medium is free space. Calculate its efficiency if loss resistance is 25Ω . [8]
- b) Derive mathematical expression for power density and radiation intensity of half wave dipole antenna and draw radiation pattern of half wave dipole antenna in E and H plane. [10]

- Q5)** a) Write a short notes on [8]
- i) Pattern Multiplication
 - ii) Binomial Array
- b) For an array of four isotropic sources along Z-axis separated by a distance $\lambda/2$ and progressive phase shift $\alpha = 0$ find [8]
- i) Nulls direction
 - ii) Direction of maxima
 - iii) Direction side lobes
 - iv) Half power Beam width
 - v) Draw neat radiation pattern.

OR

- Q6)** a) Explain planar array. State its advantages and applications. [6]
- b) Design a broad side Dolph-Tschebysheff array of five elements with half wavelength spacing between elements and with major to minor lobe ratio to be 19dB. Find the excitation coefficients & array factor. [5]
- c) Give the comparison of broadside and End fire antenna array. [5]
- Q7)** a) What is Microstrip patch antenna? Give structure details, radiation pattern, specification and application of such antenna. [5]
- b) What is meant by Rhombic Antenna? How it is constructed? Explain how unidirectional pattern is obtained in properly terminated Rhombic Antenna. [5]
- c) Write a short notes on following antennas with respect to structural details, radiation pattern, features and applications. [6]
- i) Hertz antenna
 - ii) Whip antenna

OR

Q8) a) Write a short notes on the following antennas. **[12]**

i) Lens Antenna

ii) Resonant Antenna

iii) Super-turnstile Antenna

b) A paraboloidal reflector antenna with diameter 20m is designed to operate at frequency of 6 GHz and illumination efficiency of 0.54. Calculate the antenna gain in decibels. **[4]**



Total No. of Questions : 8]

SEAT No. :

P2863

[4958]-1051

[Total No. of Pages : 3

T.E. (Electronics)

ELECTRICAL MACHINES & POWER DEVICES

(2012 Course) (304201) (End sem)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4 , Q5 or Q6, Q7 or Q8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Draw and Explain the basic structure and Steady state characteristics of power diode. [6]
- b) Why SCR is called a latching type device? Derive an expression for anode current I_A . [7]
- c) Write in detail note on protection circuit for power devices. [7]

OR

- Q2)** a) Draw and explain switching characteristics of MOSFET in detail. [6]
- b) Explain various cooling methods for power devices. Compare liquid cooling and vapour phase cooling. [7]
- c) With the help of neat diagram explain the turn-off mechanism of GTO. [7]
- Q3)** a) Explain the basic action of a commutator with the help of neat sketches. [6]
- b) Write a short note on permanent magnet DC motor (PMDC) in detail. [6]
- c) A 25 kW, 250 V, DC shunt generator has armature and field resistance of 0.6Ω and 100Ω respectively. Determine the total armature power developed when working as a motor taking 2kW input. [4]

OR

P.T.O.

Q4) a) What are the drawbacks of three-point starter? Describe four-point starter with neat diagram? [6]

b) Distinguish between self excited and separately excited DC generator. [6]

c) A 4 pole, lap wound dc motor has 540 conductors. Its speed is found to be 1000 rpm when it is made to run light. The flux per pole is 25mWb. It is connected to 230V dcsupply. The armature resistance is 0.8Ω . Calculate [4]

i) induced emf

ii) Armature current

iii) Stray losses

iv) Lost torque.

Q5) a) Explain the principle of operation of a 3-phase induction motor in detail. [8]

b) A 1000V, 50Hz, 3-phase induction motor has star connected stator. the ratio of stator to rotor is 3 : 6. The standstill impedance of rotor per phase is $0.01 + j0.2\Omega$. Calculate [10]

i) Rotor current at start

ii) Rotor P.F. at start

iii) Rotor current at slip of 3%,

iv) External resistance per phase in the rotor to limit starting rotor current to 200A.

OR

Q6) a) Explain the working principle of synchronous generator with the help of neat diagram. [8]

- b) A 400V, 4 pole, 3 phase, 50Hz star connected induction motor has a rotor resistance and reactance per phase equal to 0.01Ω and 0.1Ω respectively. Determine
- i) Starting torque
 - ii) Slip at which maximum torque will occur
 - iii) Speed at which maximum torque will occur
 - iv) Maximum torque
 - v) Full load torque if full load slip is 4%. Assume ratio of stator to rotor turns as 4. [10]

Q7) a) Write a short note on AC servomotor. [8]

b) Explain the construction and working principle of SRM in detail. [8]

OR

Q8) a) Write a short note on BLDC. [8]

b) Explain the operation of a variable reluctance motor. [8]



Total No. of Questions : 8]

SEAT No. :

P2864

[4958]-1053

[Total No. of Pages : 4

T.E.(Electronics)
NETWORK SYNTHESIS
(2012 Course) (Semester-I)

Time : 2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of electronic pocket calculator is allowed.*
- 4) *Assume suitable data, if necessary.*

Q1) a) State the properties of positive real function and check the following

function for positive real function. $Z(s) = \frac{(s + 2)}{s^2 + 3s + 2}$. [6]

b) Synthesize the following function into Foster- I and Cauer-I form.

$$Z(s) = \frac{s(s^2 + 9)}{(s^2 + 1)(s^2 + 16)}. \quad [6]$$

c) Define zeros of transmission and synthesize the following transfer function into a ladder network with 1 ohm termination.

$$Z_{21}(s) = \frac{s^3}{s^3 + 3s^2 + 4s + 2} \quad [8]$$

OR

Q2) a) When is the network said to be causal and stable. State and explain conditions for stability and causality of a network function. [6]

b) State the properties of RC driving point admittance function and realize the following function into Cauer- I form

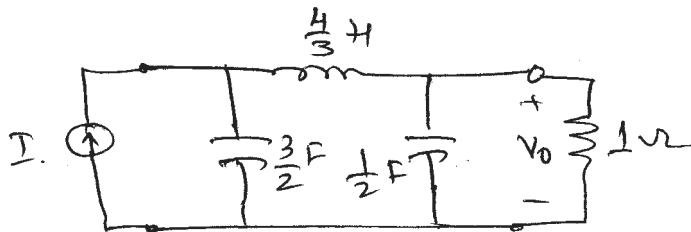
$$Y(s) = \frac{8s^2 + 10s}{s + 1} \quad [6]$$

P.T.O.

- c) State the properties of transfer function and realize the following voltage transfer function.

$$\frac{V_2}{V_1} = \frac{(s-1)(s^2 - 2s + 2)}{(s+1)(s^2 + 2s + 2)} \quad [8]$$

- Q3)** a) State the properties of Butterworth approximated filter. [4]
 b) Realize the transfer function of a third order low pass Butterworth filter as a transfer impedance function. [6]
 c) Consider the low pass filter of Figure① and convert it into a band pass filter with 1Ω termination and bandwidth 6×10^4 rad/sec with band pass center frequency 4×10^4 rad/sec. [6]



Figure①

OR

- Q4)** a) Explain the need and concept of impedance and frequency scaling as used in filter designing. [6]
 b) State the properties of Chebyshev approximation technique. [4]
 c) Obtain a system function $H(s)$ that exhibits the Chebyshev characteristics with not more than 1 dB ripple in passband and attenuation of 20 dB at $\omega = 2$ rad/sec. [6]
- Q5)** a) Compare active and passive filters. [4]
 b) Synthesize the second order low pass filter to have a pole frequency of 10 kHz and a pole Q of 5 using saraga design of salten-key circuit. [6]

- c) What is cascade approach in active filter synthesis. List the advantages of the cascade approach. [6]

OR

- Q6) a) Explain the different biquad feedback topologies used in active filter designing and important considerations. [6]

- b) Design a first order active RC low pass Butterworth filter with cut off frequency 20kHz and pass band gain of 3.6. (use positive feedback topology) [4]

- c) Synthesize the following high pass filter function using RC - CR transformation.

$$T_{HP}(s) = k \cdot \frac{s^2}{s^2 + s + 16} \quad [6]$$

- Q7) a) What is sensitivity. Write the properties of sensitivity function. [4]

- b) For R-L-C circuit shown in Figure ② find the transfer function $\frac{V_o}{I_{in}}$ and compute the sensitivities of gain constant K, resonant frequency (ω_p) and quality factor (Q_p) with respect to R, L and C. [6]

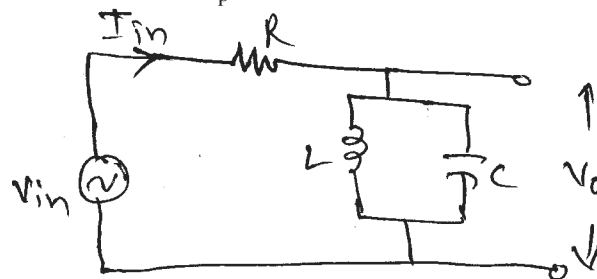


Figure ②

- c) Explain the effect of following op-amp parameters on active filter response. [8]

- i) Input offset voltage
- ii) Slew rate
- iii) Input offset current
- iv) Dynamic range

OR

Q8) a) Prove the following sensitivity relationships.

[6]

i)
$$S_x^{p_1+p_2} = \frac{p_1 S_x^{p_1} + p_2 S_x^{p_2}}{p_1 + p_2}$$

ii)
$$S_x^{p^n} = n S_x^p$$

iii)
$$S_{x^2}^p = \frac{1}{2} S_x^p$$

b) Explain the concept of gain sensitivity. Also explain the various factors affecting gain sensitivity. [6]

c) The input to the inverting amplifier shown in Figure ③ is a sine wave of amplitude 5 volts. If slew rate of op-amp is 1 V/μsec, find the frequency at which slew rate limiting occurs. [6]

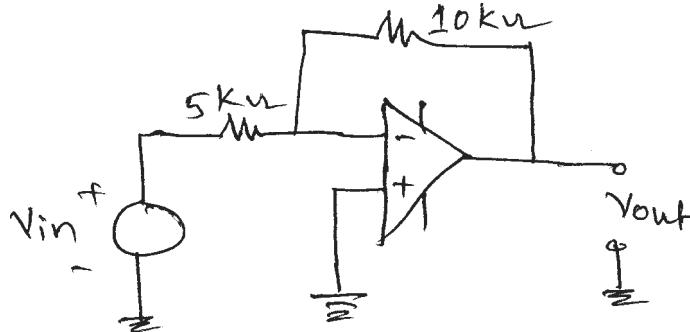


Figure ③



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

P2865

[4958] - 1054

T. E. (Electronics)

MICROCONTROLLERS AND APPLICATION

(2012 Pattern) (304203)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer the Q.1 OR Q.2 and Q.3 OR Q.4 and Q.5 OR Q.6 and Q.7 OR Q.8.*
- 2) *Answer any four questions.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of Calculator is allowed.*
- 6) *Assume suitable data if necessary.*

- Q1)** a) Describe in detail. Assembler and compiler and emulator. [8]
- b) Explain different branch instructions of 8051 microcontroller. [6]
- c) Write features of PIC18FXX Microcontroller over PIC16FXXX. [6]

OR

- Q2)** a) What is the role of microcontroller in embedded System? [4]
- b) Draw and explain port structure of PIC 18FXXX Microcontroller. [8]
- c) Explain Counter operation in 8051 microcontroller. [8]



- Q3)** a) What is peripheral interrupt, IVT and ISR? Draw and Explain the interrupt structure for the PIC 18FXX microcontroller. [8]
- b) Write a Embedded C program for blinking LED's interfaced to PORTD of PIC18FXXX. [8]

OR

P.T.O.

- Q4)** a) Draw an interfacing diagram and write an Embedded C program to interface 16×2 LCD with PIC 18FXX Microcontroller to display the “SPPU PUNE” message. Use 4 bit interface mode with busy flag. [8]
- b) Explain Timer0 control register in details. Also calculate the TMRCON0, TMR0H, TMR0L value to generate 1 second delay using Timer0? Assume that XTAL = 8MHZ. [8]

- Q5)** a) Explain the UART operation in PIC 18FXX with example. [8]
- b) What are the advantages of SPI BUS over 12C BUS? Draw the RTC interfacing with PIC18FXXX. [8]

OR

- Q6)** a) Explain the 12C protocol with the help of MSSP module used in master mode. [8]
- b) Write a Embedded C program for reading single analog input (range 0 to 5V) and display it on LCD. [8]

- Q7)** a) Draw interfacing diagram and write a program to read frequency (range 0-500KHz). [10]
- b) Describe the algorithm for voltmeter with interfacing diagram. [8]

OR

- Q8)** a) Design Speed control of DC motor with the help of variable register as input using a PWM. [10]
- b) Explain different steps involved in designing of data acquisition system. [8]



Total No. of Questions :8]

SEAT No. :

P2866

[4958]-1055

[Total No. of Pages :2

T.E. (Electronics Engg.)

**ELECTROMAGNETIC AND WAVE PROPAGATION
(2012 Pattern) (End Semester) (Semester - I) (304204)**

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*
- 5) *Use of calculator is allowed.*

Q1) a) State and prove Gauss's law. [6]

b) Two dipoles with momentum $-6a_z \text{ nC/m}$ and $9a_z \text{ nC/m}$ are located at point (0,0,2) & (0,0,3) respectively. Find the potential at the origin. [8]

c) State and derive Biot-Savart's law. [6]

OR

Q2) a) Define and derive Electric potential and potential difference. [6]

b) An infinite long current filament is placed along Z-axis. The magnetic field intensity at point P (3,4,0) is $10(-0.8\vec{a}_x + 0.6\vec{a}_y)$ A/m. find the current through the filament. [8]

c) State and explain the scalar and vector magnetic potential. [6]

Q3) a) Write Maxwell's equations in point form and integral form. [9]

b) In free space $E = 20 \cos(\omega t - 50x) a_y$ determine [9]

- i) J_d ii) H iii) ω

OR

P.T.O.

- Q4)** a) State and derive Poynting theorem. [9]
- b) In non magnetic medium $E=4\sin(2\pi 107t-0.8x)az$ V/m. Find the following things.
- ϵ_r, η
 - The time-average power carried by the wave.
 - The total power crossing 100cm^2 of plane $2x+y=5$. [9]

- Q5)** a) Define polarization and explain all types of polarization with expression. [8]
- b) Explain and derive the plane wave equation in lossless dielectrics. [8]

OR

- Q6)** a) Explain the reflected wave, Transmitted wave, incident wave. [6]
- b) In lossless dielectric for which $\mu=60\pi$, $\mu_r = 1$, and
 $H = -0.1 \cos(\omega t - z)a_x + 0.5 \sin(\omega t - z)a_y$ A/m, calculate ϵ_r, ω , and \mathbf{E} . [10]

- Q7)** a) Explain the different types of wave propagation in detail. [8]
- b) Define following terms: [8]
- Virtual height
 - Maximum Usable Frequency (MUF)
 - Skip distance
 - Critical Frequency

OR

- Q8)** a) Derive and explain the Friis Transmission equation. [8]
- b) Explain the characteristics of wireless channel in details. [8]

x x x

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

P2867

[4958] - 1056

T. E. (Electronics)

INSTRUMENTATION SYSTEMS

(304209) (End - Sem) (2012 Pattern)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 2) Neat diagram must be drawn whenever necessary.*
- 3) Figures to the right side indicate full marks.*
- 4) Assume suitable data if necessary.*

- Q1) a)** Differentiate between active and passive transducers. **[4]**
- b) Explain Bourdon tube and Diaphragms for pressure measurement. **[6]**
- c) An RTD has $\alpha = 0.004/^\circ\text{C}$. If $R = 106 \Omega$ at 20°C , find the resistance at 25°C and 100°C **[4]**
- d) Explain advantages and Limitations of LVDT. **[6]**

OR

- Q2) a)** Define the following terms: **[6]**
- i) Reliability
 - ii) Linearity
 - iii) Hysteresis
 - iv) Drift
- b) Explain the different fundamental standards and units for common physical parameters. **[7]**
- c) Write a short note Load cells. **[7]**

P.T.O.

- Q3)** a) Explain general architecture of SMART sensors. [6]
- b) Explain the working of piezoelectric sensors for measurement of accelerometer. [6]
- c) Explain MEMS magnetic field sensors. [4]

OR

- Q4)** a) Explain the working principle of Hall Effect sensors. [6]
- b) Explain Bulk Micromachining technique regarding MEMS. [6]
- c) Draw LM 75 block diagram and give its specification. [4]

- Q5)** a) How data logger is different than DAS? [7]
- b) Explain I to P converter. [6]
- c) Write a short note on RS 232 standards. [5]

OR

- Q6)** a) Explain HART communication protocol. [7]
- b) Explain Data Acquisition system in detailed. [6]
- c) Write a short note on IEEE -488 standard Bus. [5]

- Q7)** a) What are actuators? Give their classification and explain Piston. Actuator in detail. [6]
- b) Explain principle of operation of Stepper motor. State important selection criterion of Stepper motor. [6]
- c) Draw neat diagram of: [4]
- i) Spool valve
- ii) Poppet valve

OR

- Q8)** a) Explain with neat diagram Pressure control valves. [6]
- b) Explain the role of Relays and solenoid valves with any one application. [6]
- c) What are pneumatic actuators? Explain. [4]



Total No. of Questions :10]

SEAT No. :

P2868

[4958]-1057

[Total No. of Pages :2

T.E. (Electronics)

EMBEDDED PROCESSORS

(2012 Course) (End Semester) (304211) (Semester - II)

Time : 2.30 Hours

[Max. Marks :70]

Instructions to candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) a) State and Explain of ARM 7, ARM 9 and ARM 11. **[6]**

b) Describe CPSR and SPSR of ARM 7. **[4]**

OR

Q2) a) Explain following instruction (Any three). **[6]**

i) AND

ii) ORR

iii) EOR

iv) BIC instruction

b) Draw and Explain 3 stage pipeline in ARM 7. **[4]**

Q3) a) Draw and Explain Memory map of LPC 2148. **[4]**

b) Draw interfacing diagram of GLCD with LPC 2148 and write algorithm for same. **[6]**

OR

Q4) a) Explain Timer control register (TCR) and Timer counter register. **[6]**

b) Draw and Explain Timing diagram of SPL Protocol. **[4]**

P.T.O.

- Q5)** a) Write a feature and application of cortex A, cortex R, cortex M processor. [8]
b) Compare the cortex M₃ with ARM 7 TDMI. [8]

OR

- Q6)** a) Draw and Explain block diagram of ARM cortex M₃. [8]
b) Explain CMSIS standard with structure in detail. [8]

- Q7)** a) What is TET LCD. [8]
b) Draw and Explain architectural diagram of LPC 1768 Microcontroller. [8]

OR

- Q8)** a) Draw and Explain interfacing of 7 segment display with cortex 1768. [8]
b) Explain in detail clock and power control. [8]

- Q9)** Write a short note on following block in LPC 1768. [18]
a) CAN.
b) Ethernet.
c) USA.

OR

- Q10)** a) Draw and Explain interfacing diagram of DC motor using PWM of LPC 1768 also write Embedded C program for same. [10]
b) Draw and Explain block diagram of CAN controller. [8]



Total No. of Questions : 8]

SEAT No. :

P2869

[4958]-1058

[Total No. of Pages : 2

T.E.(Electronics)

POWER ELECTRONICS AND APPLICATIONS

(2012Course) (Semester-II) (End Sem)(304212)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2,Q.3or Q. 4, Q.5 or Q. 6 , Q .7 or Q. 8 .*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

Q1) a) What are converters? With the help of neat circuit diagram and relevant waveform, explain the operation of 3Φ semi controlled bridge converter. [7]

b) Draw circuit diagram of half bridge inverter. Obtain expression for the output voltage of half bridge inverter. Derive expression for the rms value of the fundamental component of output voltage. [7]

c) The step down chopper is operating with a resistive load of 10Ω and input voltage of 220 V DC. When the chopper switch remains on, its voltage drop V_{ch} is 2 V. The chopper frequency is 1 kHz, If the duty cycle is 50%, determine the average output voltage and RMS output voltage and chopper efficiency. [6]

OR

Q2) a) Draw 3Φ fully controlled bridge converter. Obtain an expression for average output voltage. [7]

b) Compare 120° and 180° modes of conduction for a 3Φ with star connected resistive load. [6]

c) Explain with circuit diagram, the operation of step up chopper. [7]

Q3) a) What is need of resonant converters? Explain hard and soft switching. [6]

b) Explain the operation of zero voltage switching(ZVS) resonant dc-dc converter with the help of equivalent diagrams and waveforms. [6]

c) Explain types of power line disturbances with sources and preventive techniques. [4]

OR

P.T.O.

- Q4)** a) Explain converter with circuit diagram, waveforms the operation of SLR dc-dc resonant converter. [8]
b) Draw the waveforms and circuit diagram of 12 pulse converter used in HVDC transmission. Explain its operation. [8]
- Q5)** a) Write short notes on Electronic Ballast and Power electronics in capacitor charging applications. [8]
b) Compare ON-line UPS with OFF-line UPS with typical block diagram. Justify why ON-Line UPS is better than OFF-line UPS. [8]

OR

- Q6)** a) Explain with block schematic working of OFF-line UPS. State its specification and applications. [8]
b) Explain working principle of Universal motor and compare with BLDC motor. [8]
- Q7)** a) Explain with block diagram grid connected PV system. [6]
b) Explain wind energy system and control of wind turbines. [6]
c) Distinguish between horizontal axis wind turbine generator and vertical axis wind turbine generator. [6]

OR

- Q8)** a) Explain the need of renewable energy sources. Explain any one in detail. [6]
b) Compare stand alone PV system and grid connected PV system. [6]
c) Explain in brief isolated grid supply system with multiple wind turbines. [6]



Total No. of Questions :12]

SEAT No. :

P2870

[4958]-1059

[Total No. of Pages :2

**T.E. (Electronics Engineering)
INDUSTRIAL MANAGEMENT
(2012 Pattern) (Semester - II) (304213)**

Time :2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Assume suitable data, if necessary.*

- Q1)** a) Justify how “Management is the combination of Art & Science”. [3]
b) Differentiate between Administration & Management. [5]

OR

- Q2)** a) Explain Kaizen. State the benefits of Kaizen. [6]
b) State the advantages of partnerships. [2]
- Q3)** a) State & explain different definitions of Quality with example. [5]
b) Explain 5s Quality management standards. [3]

OR

- Q4)** a) State three quality management tools. Explain any one in detail. [5]
b) Explain types of quality. [3]
- Q5)** a) Explain Break Even Analysis with neat labeled diagram. [4]
b) Write a short note on Capital Structure. [2]

OR

- Q6)** a) Write a short note on Resource Leveling. [2]
b) What are difference types of Capital? Explain it in detail. [4]

P.T.O.

- Q7) a)** Explain HRM. What are roles & challenges in front of HR professionals? [10]
- b) Explain how carrier planning plays an important role in organizational development. [6]

OR

- Q8) a)** Explain the term HRIS in detail. [8]
- b) What are objectives of human resource management? [8]

Q9) Write a short note on: [16]

- a) Cooperative Society
- b) Proprietorship
- c) Private Limited Company
- d) Women Entrepreneurship.

OR

- Q10)a)** What are different types of business? [10]
- b) Explain different sources of finance in detail. [6]

- Q11)a)** Define MIS. What is the need of MIS? [8]
- b) What is E commerce? Explain the types of E commerce. [8]

OR

- Q12)a)** What is ERP & BPR. Explain in detail. [8]
- b) Differentiate MIS & DSS. [8]

EEE

Total No. of Questions : 10]

SEAT No. :

P2871

[4958]-1060

[Total No. of Pages :3

T.E.(Electronics)

DISCRETE TIME SIGNAL PROCESSING
(2012 Course) (End Sem) (304210)(Semester-II)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary*
- 2) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 3) *Assume suitable data if necessary.*

Q1) a) An analog signal is represented as $x(t) = 5 \cos(2\pi 2000t) + \cos(2\pi 5000t)$ [6]

- i) What is the Nyquist rate for this signal?
 - ii) If we sample this signal at a rate of 8KHz, what is the folding frequency?
 - iii) Write the equation for the sampled signal
- b) Compute the 4 point DFT of the sequence $x(n) = \{1 2 3 4\}$ using linear transformation method. [4]

OR

Q2) a) Compute the linear convolution of following sequences using Z-transform. [6]

$$x_1(n) = \{1 2 1 1\}$$

$$x_2(n) = \{2 1 2 1\}$$

b) Compute the circular convolution of following sequences. [4]

$$x_1(n) = \{4 3 2 1\}$$

$$x_2(n) = \{1 2 1 2\}$$

Q3) a) Compute the Z-transform of following sequences. [6]

i) $x(n) = n u(n)$

ii) $x(n) = \left(\frac{1}{2}\right)^n u(n) + (3)^n u(-n-1)$

P.T.O.

- b) $H(z)$ is a cascade combination of $H_1(z)$ & $H_2(z)$ where [4]

$$H_1(z) = \frac{1}{1-0.2z^{-1}} \quad H_2(z) = \frac{1}{1-0.3z^{-1}} \text{ write the overall system function.}$$

OR

- Q4)** a) Compute the IDFT of the following sequence $x(k) = \{7 - 2 - j \ 1 \ -2 + j\}$ [4]

- b) If the output of the system is given by $y(n) = 1.5 y(n-1) - 0.5y(n-2) + x(n) + 2x(n-1)$

Find the system function & impulse response [6]

- Q5)** a) Show that the symmetric FIR filter has linear phase response. [6]

- b) Write a note on window functions [4]

- c) Design a bandpass FIR using hamming window for $M = 11$. [7]

$$H(e^{jw}) = 1 \quad \pi/4 \leq w \leq 3\pi/4 \\ = 0 \quad \text{otherwise.}$$

OR

- Q6)** a) What is Gibb's Phenomenon? How it is reduced? [6]

- b) Using frequency sampling method, design FIR filter for $N=7$ [11]

$$H(e^{jw}) = 1 \quad 0 \leq w \leq \pi/2 \\ = 0 \quad \pi/2 \leq w < \pi$$

- Q7)** a) Realize the following system in direct form I & direct form II [6]

$$y(n) = 0.3 y(n-1) - 0.2y(n-2) + x(n) - 2x(n-1) + 0.2x(n-2)$$

- b) What is frequency warping in Bilinear Transformation? How is it overcome? [5]

- c) Convert the analog filter with system function [6]

$$H(s) = \frac{s+0.2}{(s+0.2)^2 + 9}$$

into a digital filter by means of impulse Invariant technique. Assume $T = 1\text{sec}$

OR

Q8) a) Design digital butterworth filter that satisfies the following specification using Bilinear Transformation **[12]**

Sampling frequency = 8 KHz

Passband = 0 – 500 Hz

Stopband = 2– 4 KHz

δ_p = 3dB

δ_s = 20dB

Assume $2/T = 1$

b) Explain direct form II structure for realization of LTI system **[5]**

Q9) a) With the help of block diagram, explain the sampling rate conversion by a non-integer factor **[8]**

b) Discuss the desirable features of a digital signal processor **[8]**

OR

Q10) a) Explain the polyphase structure used for interpolation. **[7]**

b) Write note on **[9]**

i) MAC unit

ii) Barrel shifter

iii) Pipelining



Total No. of Questions : 10]

SEAT No. :

P2872

[4958]-1061

[Total No. of Pages : 3

T.E. (Electrical)

ADVANCED MICROCONTROLLER AND ITS APPLICATIONS

(2012 Course) (Semester - I) (303141) (End - Semester)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10..*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

Q1) a) Explain the status register of PIC 18F458. **[6]**

b) Explain the concept of Pipe lining used in PIC 18 microcontroller. **[4]**

OR

Q2) a) Compare RISC and CISC architectures. **[6]**

b) Write an instruction sequence in assembly language to add a number 0x05 to the contents of memory location 0x06 H and store the result at the same location. **[4]**

Q3) a) Using Timer0 in 16-bit mode, write a C language program to obtain a time delay of 1ms. Assume 8-MHz crystal, leading edge clock, and a prescale value of 1 : 128. **[6]**

b) Explain the instruction

BTFSC f,b,a

MOVLW 0x04

[4]

OR

P.T.O.

- Q4) a)** Explain the following control structures used in embedded C [6]
- i) if then else construct
 - ii) while construct
 - iii) switch construct
- b) Write a program in C to configure Port B as input port and the most significant 4 bits of Port D as input bits and the least significant 4 bits of the same port as output bits. [4]

- Q5) a)** Draw a neat diagram of interfacing of 16x2 LCD with PIC18F458 microcontroller in 8 bit mode. Assume suitable port pins for interfacing. Explain the function of following pins in detail RS, R/W, and EN. [8]
- b) Write short note on SPI protocol. [8]

OR

- Q6) a)** Write a program for PIC 18 microcontroller to transfer a letter 'A' serially and continuously at a baud rate of 9600. Use BRGH = 0. [8]
- b) With a neat diagram of interfacing of 4x4 keypad with PIC18F458. Using a flow chart explain the method of key press detection. [8]
- Q7) a)** Using capture mode, write a program to measure the period of pulse which is fed to CCP1 pin (RC2). Output the count corresponding to the period of pulse on Port B and Port D. Use timer 1 without a pre-scalar for capture mode. [9]
- b) Write a short note on PWM control DC motor using CCP mode. [8]

OR

- Q8)** a) A stepper motor is interfaced with PIC18 microcontroller through lower nibble of Port B(RD0-RD3). Write program to rotate the stepper motor in anti-clock wise direction continuously. Assume the 4 step sequence is stored from locations 0x10 to 0x13 H. [9]
- b) Explain the steps involved in PWM programming using CCP module in PIC 18F458 microcontroller. [8]
- Q9)** a) Explain the steps involved in programming of A/D converter in PIC18F458 microcontroller using method of polling. [9]
- b) Explain with a neat diagram, interfacing of DAC 0808 with PIC microcontroller and write a program for ramp waveform generation using DAC interfaced with PIC microcontroller through Port D. Assume the crystal frequency to be 10MHz. [8]

OR

- Q10)**a) Draw interfacing of LM35 with PIC 18F458. Write a program to measure the temperature and display the 10 bit digital equivalent value of the temperature on Port C and Port D. [9]
- b) Explain in detail the functions of the following special function registers ADCON0, ADCON1 ADRESH and ADRESL of PIC18 microcontroller. [8]



Total No. of Questions : 10]

SEAT No. :

P2873

[4958]-1062

[Total No. of Pages : 3

T.E.(Electrical)

ELECTRICAL MACHINES-II

(2012 Pattern) (End Semester)(Semester-I)

Time :2 ½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of electronic pocket calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

Q1) a) Compare salient pole type rotor construction with nonsalient pole type construction in case of 3 phase alternator. **[4]**

b) A 1000 kVA star connected, 3 phase 2300 volts salient pole alternator has direct axis reactance of 1.95Ω and quadrature axis reactance of 1.40Ω . Calculate excitation voltage & voltage regulation at rated kVA, 0.6 pf lag. Neglect armature resistance. **[6]**

OR

Q2) a) Explain one dark & two equally bright lamp method of synchronizing 3 phase alternators. **[4]**

b) A 3 phase star connected, 1000 kVA, 11000 V alternator has rated current of 52.5 A .The armature resistance per phase is 0.45Ω . The test results are given below

O.C. Test - field current = 12.5A, volt. betⁿ lines = 422 V.

S.C. Test - field current = 12.5 A, line current = 52.5 A

Determine the full load voltage regulation of alternator at 0.8 pf lag. **[6]**

Q3) a) Explain any one method of starting three phase synchronous motor. **[4]**

b) A 10 HP, 400V star connected 3 phase synchronous motor has synchronous reactance of 10Ω /phase & armature resistance of negligible value. Calculate the minimum current and corresponding induced emf at full load. Assume efficiency = 85% **[6]**

OR

P.T.O.

Q4) a) With neat diagram explain the slip test to determine direct & quadrature axis reactance. [6]

b) Compare 3 phase synchronous motor with 3 phase induction motor. [4]

Q5) a) State different methods of controlling speed of 3 phase induction motor. Explain v/f method. [8]

b) Explain the operation of 3 phase induction motor as induction generator. State advantages & applications of 3 ph. induction generator. [8]

OR

Q6) a) Explain construction & working of linear induction motor. State its applications. [8]

b) Explain construction & working of permanent magnet D.C. motor. State its applications. [8]

Q7) a) Compare compensated a.c. series motor with noncompensated a.c. series motor. [4]

b) Draw & explain briefly phasor diagram of noncompensated a.c. series motor. [4]

c) What are the problems experienced by d.c. series motor operated on a.c. supply. Explain the remedies for a.c. operation. [8]

OR

Q8) a) A blocked rotor test is conducted on 1 phase, 50Hz, 230V, 6.2A, 0.75kW, 6000rpm series motor. The test results are as below.

| V _{sc} | I _{sc} | W _{sc} |
|-----------------|-----------------|-----------------|
| 130V | 4A | 160W |

Taking voltage scale of 1 cm = 20V. Draw circle diagram. Determine full load efficiency, full load power factor torque scale. [10]

b) Explain briefly-

- i) Transformer emf
- ii) Rotational emf

in case of a.c. series motor.

[6]

Q9) a) A 220 V single phase induction motor gives following test results.

Blocked rotor test 110 V, 10A, 400 W

No load test 220 V, 4A, 100 W

The stator winding resistance is 2Ω . Neglecting R_0 find the parameters of equivalent circuit. Also find core, frictional & windage losses. [8]

b) With neat diagram explain the construction & working of capacitor start induction motor. Draw its torque-speed characteristics & phasor diagram.

[10]

OR

Q10) a) The following data pertains to a 230V, 50Hz capacitor start single phase induction motor at stand still.

Main winding excited = 100V, 2A, 40 W

Auxiliary winding excited alone = 80V, 1A, 50W.

Determine the value of capacitance for determining the maximum starting torque. [8]

b) With neat diagram explain the construction and working of shaded pole induction motor. Draw torque speed characteristics. State its applications.

[10]



Total No. of Questions : 10]

SEAT No. :

P2874

[4958]-1063

[Total No. of Pages :2

T.E.(Electrical)

POWER ELECTRONICS

(2012 Course)(Semester-I)(303143)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q1 or 2,Q3or 4, Q5 or 6 , Q 7 or 8, Q 9 or 10.*
- 2) *Assume suitable data if necessary.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of electronic calculator is allowed.*

- Q1) a)** Draw and explain static characteristic of SCR. **[5]**
- b) Explain single phase ac voltage regulator feeding R load. Draw output voltage waveform. **[5]**

OR

- Q2) a)** Describe working of single phase two pulse SCR controlled converter with R load Draw waveforms of load voltage, load current. **[5]**
- b) Explain V-I Characteristic of TRIAC in 1st and IIIrd quadrant. **[5]**
- Q3) a)** Explain method adopted for the protection of SCR against-dv/dt rate.**[3]**
- b) Explain working of three phase fully controlled converter with output waveforms for firing angle of 60° with R load **[7]**

OR

- Q4) a)** Draw and explain single phase semi converter with output waveforms for RL load. **[5]**
- b) A three phase half wave controlled converter is fed from 3 phase, 400V, and 50Hz source and is connected to a load taking a constant current. Calculate average value of load voltage for a firing angle of 30°&60°. **[5]**

P.T.O.

- Q5)** a) Explain four quadrant chopper feeding RLE load in detail with neat diagram. [12]
b) Give a comparison between MOSFET and IGBT [4]

OR

- Q6)** a) Explain Turn on and turn off process in MCT. State its merits. [8]
b) Draw a power circuit diagram for a type-A chopper. Show load voltage waveforms for $\alpha=0.3$ and $\alpha=0.8$. For both these duty cycles, calculate:
i) the average value of output voltage in terms of source voltage. [8]

- Q7)** a) Explain single phase full bridge inverter with necessary waveforms for R - L load. [8]
b) What is pulse width modulation? Explain sinusoidal PWM technique in detail. [8]

OR

- Q8)** a) Explain with circuit diagram and waveforms operation of single phase current source inverter. [8]
b) What are different voltage control methods for inverter? Explain any one type of control method. [8]
- Q9)** a) Explain working of three phase six step voltage source inverter in 180° mode of operation. For star connected balanced load draw output voltage waveforms. Show devices conducting in each step. [12]
b) What are different harmonic reduction techniques? Explain any two techniques. [6]

OR

- Q10)** a) What is multilevel inverter? Explain any one type in detail. [6]
b) Explain working of three phase six step voltage source inverter in 120° mode of operation. For star connected balanced load draw output voltage waveforms. Show devices conducting in each step. [12]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

P2875

[4958] - 1064

T. E. (Electrical)

ELECTRICAL INSTALLATION, MAINTAINANCE & TESTING (EIMT)

(2012 Course) (Semester - I)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) Answer the Q.1 OR Q2, Q3 OR Q4, Q5 OR Q6, Q7 OR Q8.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) a) Explain breakdown maintainance and condition based maintainance. Give one example of each. **[8]**

b) Explain the factors that reduce the breakdown strength of transformer oil. **[6]**

c) Explain the abnormal operating conditions in induction motor. **[6]**

OR

Q2) a) Describe induction motor fault monitoring methods and remedies. **[8]**

b) Enlist various failure modes of transformer. Explain failure due to structural defects. **[6]**

c) What are the activities performed in preventive maintainance of induction motor. **[6]**

Q3) a) Enlist the methods of locating cable faults. Explain murray loop test with the help of neat diagram. **[8]**

b) Explain type test of transformer. **[8]**

OR

P.T.O.

- Q4)** a) Describe various abnormal conditions in induction motor. [8]
b) Write short note on testing of capacitor bank. [8]

- Q5)** a) Differentiate between: [8]
i) Volume required for conductors in overhead system and volume of two wire d.c. system.
ii) Feeder and distributor
- b) The loads on 'R' phase distributor are as under: [10]
i) 200A, p.f. 0.707 lag, load at 100 mt:
ii) 150A, unity p.f, load at 250mt
iii) 80A, p.f. 0.8 lag, load at 400 mt.

All the loads are from feeding point. The resistance and inductive reactance are 0.5 ohm and 0.325 ohm per km, length respectively. Neglecting voltage drop in neutral wire, find the voltage across the load at far end. The voltage at feeding point is 240V.

OR

- Q6)** a) Explain the types of primary distribution. [8]
b) The cost of overhead transmission line is Rs $(35000a + 3500)$ per km, where 'a' is the area of cross section of each conductor in cm^2 . The line is supplying the load of 6mw at 33kv and p.f. 0.8 lagging. The average working hours are 20 hours per day in the year. Energy cost is Rs 2.00 per kwh. The cost of interest and depreciation is 10% per annum. Using kelvin's law find the most economical size of conductor. Specific resistance of conductor material is 10^{-6} ohm - cm. [10]

Also state the limitations of Kelvin's law.

- Q7)** a) Explain the types of substations. [8]
- b) Explain the function of the following equipment used in substations and state their locations. [8]
- i) Shunt capacitor
 - ii) Series capacitor
 - iii) Shunt reactor
 - iv) Surge arrestor

OR

- Q8)** a) Why earthing is necessary? Explain the types of earthing. [8]
- b) Explain various residential wiring methods. [8]



Total No. of Questions : 12]

SEAT No. :

P2876

[4958]-1065

[Total No. of Pages : 3

T.E. (Electrical)

INDUSTRIAL & TECHNOLOGY MANAGEMENT

(2012 Course) (End Sem) (311121)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume Suitable data if necessary.*

UNIT - I

- Q1) a)** Define Management. What are the different functions of Management?
State the importance of Management. **[5]**
- b) What are the different types of organization? Explain functional organization. **[5]**

OR

- Q2) a)** Define Micro Economics. Explain the concept of supply and elasticity of supply. **[5]**
- b) Differentiate between Proprietary firm and Partnership firm. **[5]**

UNIT - II

- Q3) a)** Explain in brief following: **[5]**
- i) Quality circle
 - ii) Pareto Analysis
- b) Explain the contribution of F.W. Taylor in the field of Management. **[5]**

OR

P.T.O.

- Q4) a)** Explain in brief following: [6]
- i) Ethics in technology management
 - ii) Pokka Yoke
 - iii) Classification of technology
- b) Differentiate between Administration and Management. [4]

UNIT - III

- Q5) a)** What is sales promotion? State its significance along with the advantages and its disadvantages. [5]
- b) What is marketing research? State and explain methods of marketing research. [5]

OR

- Q6) a)** State different types of costs. Explain the same. [6]
- b) Define the concept of Financial Management. Elaborate the scope of financial management in a business organization. [4]

UNIT - IV

- Q7) a)** Define leadership. Describe its types. What are their importances? [6]
- b) Define Motivation. Distinguish between X & Y Theory. [6]

OR

- Q8) a)** State group dynamics theories. What are different types of conflicts? [6]
- b) Define Entrepreneur. Explain the different traits of Entrepreneur. [6]

UNIT - V

- Q9) a)** Explain in brief following: [7]
- i) HR Planning
 - ii) Training and Development
 - iii) Time Management
- b) What are the provisions of Labour Welfare as per Factories Act 1948?[7]

OR

- Q10)a)** What is performance appraisal? State the objectives and types of performance appraisal. [7]
- b) Explain in brief following: [7]
- i) Halo effect
 - ii) Professional and Business ethics

UNIT - VI

- Q11)a)** State the Patent Laws, Trade mark and Copy Right Laws. [7]
- b) Explain the Patent format and structure. [7]

OR

- Q12)a)** What is the intellectual Property Rights (IPR)? Explain all its types. [7]
- b) State the criteria for securing Patents. What are the guidelines of the common IPR policy on patents? [7]

x x x

Total No. of Questions :10]

SEAT No. :

P2877

[Total No. of Pages :2

[4958] - 1066

T.E. (Electrical)

ENERGY AUDIT AND MANAGEMENT

(2012 Pattern) (End - Sem) (303150) (Semester - II)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1) a)** Give salient features of Electricity Act 2003. **[5]**
- b) What are the responsibilities of energy manager under EC act 2001? **[5]**

OR

- Q2) a)** Explain green building concept. **[5]**
- b) Define supply side management (SSM). What is its barrier? **[5]**

- Q3) a)** Explain the principles of successful energy management. **[5]**
- b) Explain structure of power factor penalties and incentives in tariff for demand control. **[5]**

OR

- Q4) a)** What is forced field analysis concept in Energy Management? **[5]**
- b) Explain utility side management avenues for management of power network. **[5]**

P.T.O.

Q5) a) Define energy audit? Why energy audit is necessary? Describe two methods used in energy audit. [9]

b) Enlist and explain various instrumentation used for energy audit. [9]

OR

Q6) a) What are Energy-Production, Specific energy consumption-production relationship? Explain least square method used for plotting these relationships. [9]

b) Explain action plans for implementation of energy conservation options.[9]

Q7) a) Explain energy conservation measures in transmission and distribution system. [8]

b) What is co-generation? Explain energy conservation measures in waste heat recovery system. [8]

OR

Q8) a) Explain various energy conservation measures in motor and drive systems. [8]

b) Explain energy conservation measures in agriculture pumping system.[8]

Q9) a) Explain discounted cash flow methods of financial appraisal. [10]

b) Explain energy audit case study of an educational institute. [6]

OR

Q10)a) What is sensitivity analysis? Discuss the main objectives of carrying out sensitivity analysis. What are the factors to be considered while carrying out sensitivity analysis? [10]

b) Explain energy audit case study in municipal corporations. [6]



Total No. of Questions :10]

SEAT No. :

P2878

[4958]-1067

[Total No. of Pages :3

**T.E. Electrical
Power System - II
(2012 Course) (Semester - II)**

Time : 2½ Hours

[Max. Marks :70]

Instructions to the candidates:

- 1) *All question are compulsory.*
- 2) *Figures to the indicates full marks.*

Q1) a) Derive power flow equation for receiving end side of transmission line. [6]

b) Write short note on “HVDC lines in India” [4]

OR

Q2) a) Explain constant current control in HVDC transmission system. [6]

b) Explain interference of radio and television signals in EHVAC transmission line. [4]

Q3) a) Derive ABCD constant in case of long transmission lines. [6]

b) Explain phenomena of corona in EHVAC power transmission. [4]

OR

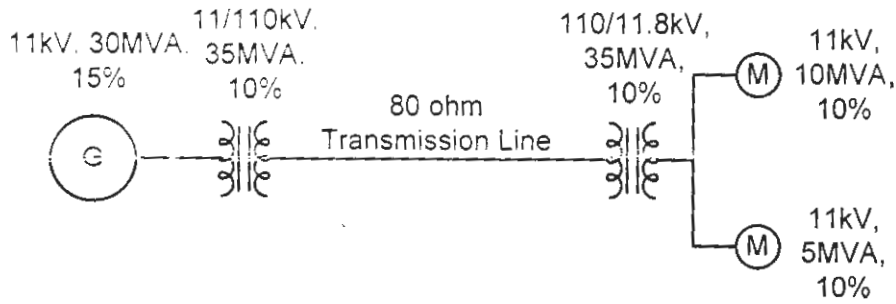
Q4) a) Derive the formula for critical disruptive voltage in corona. [6]

b) Compare bipolar and mono polar HVDC system. [4]

Q5) a) Derive Y_{BUS} matrix using singular transformation method for ‘n’ bus system. [8]

b) Draw per unit reactance diagram of following system assuming base of 30MVA, 11kV on generator. [9]

P.T.O.



OR

Q6) a) What are the advantages of per unit system? How the base impedance is converted to per unit system? What formula is to be used if base of per unit values is to be changed? [8]

b) Derive power flow equation for 'n' bus system. [9]

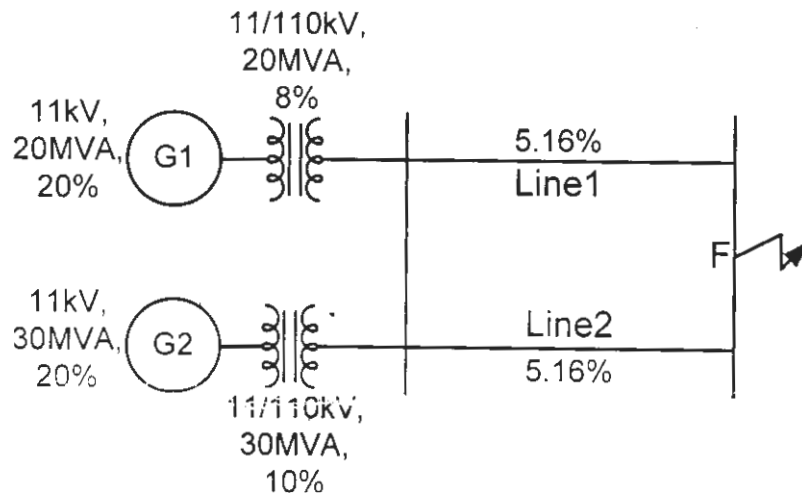
Q7) a) Write a short note on Selection of Circuit breakers. [8]

b) A three phase 11kV, 5MVA generator has a direct axis steady state reactance of 20%. It is connected to a 3MVA transformer having 5% leakage reactance and ratio of 11/33kV. The 33kV side is connected to a transmission line having 30ohm reactance. A three phase fault occurs at other end of transmission line. Calculate steady state fault MVA and current assuming no load prior to the fault. Take base of 11kV,5MVA on generator. [9]

OR

Q8) a) Draw and explain sub-transient, transient and steady state impedance of an alternator. [8]

b) For the following system if the three phase fault is occurred at point F Determine fault current supplied by each generator. All impedances are given on their individual rating. Take base of 11kV , 30MVA on generator side. [9]



Q9) a) A delta connected load is connected to three phase supply. One line of supply is open. The current in other two lines is $20\angle 0^\circ$ A and $20\angle 180^\circ$ A. Find symmetrical components of the line currents. [8]

b) Derive formula for fault current in case of LL fault. [8]

OR

Q10) a) A 3-phase 11kV, 10MVA alternator have $X_0 = 0.05$ pu, $X_1 = X_2 = 0.15$ pu. It is on no load and rated terminal voltage. Find the ratio of the line currents for a single line to ground fault to three phase fault if (a) neutral is solidly grounded (b) neutral is grounded through $X_n = 0.062$ pu. [8]

b) Derive formula for fault current in case of LLG fault. [8]



Total No. of Questions :8]

SEAT No. :

P2879

[4958]-1068

[Total No. of Pages :3

T.E. (Electrical Engineering)
DESIGN OF ELECTRICAL MACHINES
(2012 Course) (End - Semester) (303149) (Semester - II)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1) a)** What are different types of winding used in a transformer? Explain any one. **[6]**
- b) Derive the output equation of a three phase transformer with usual notation. **[6]**
- c) A 200 KVA, 6600/400V, three phase transformer, delta/star connected, 50Hz, core type transformer has the following particulars: Maximum flux density = 1.3 Wb/m², current density = 2.5 A/mm², window space factor = 0.3, Overall height = overall width and use three stepped core, stacking factor = 0.9, emf per turn = 10 volts. Width of largest stamping = 0.9d and net iron area = 0.6d². Calculate overall core dimensions. **[8]**

OR

- Q2) a)** Discuss mechanical forces developed under short circuit condition in a transformer and measures to overcome this effect. **[6]**
- b) Define and explain short time rating and continuous time rating. **[6]**
- c) Calculate the percentage regulation at full load 0.8pf lag for a 300 kVA, 6600/440V, delta-star, three phase, 50Hz, core type transformer having cylindrical coils of equal length with the following data. Height of coils = 4.7cm, thickness of HV coil = 1.6 cm, thickness of LV coil = 2.5 cm, insulation between LV & HV coils = 1.4 cm, Mean diameter of the coils = 27 cm, volt/turns = 7.9 V, full load copper loss = 3.75 kW. **[8]**

P.T.O.

- Q3) a)** Discuss the various factors to be considered for selection specific magnetic loading (B_{av}) and specific electric loading (a_c). [10]
- b) Explain the factors should be considered when estimating the length of air gap of three phase induction motor. Why the air gaps should be as small as possible? [8]

OR

- Q4) a)** Derive the output equation of a three phase induction motor in terms of its specific loadings. Also indicate the significance of terms involved. [8]
- b) Estimate the main dimensions for three phase, 50Hz, 10kW, 400V, 4 pole squirrel cage induction motor. Assume full load efficiency of 0.85, full load power factor of 0.9 and winding factor 0.96. The specific magnetic loading is 0.6 Wb/m^2 and the specific electric loading = 22000 A/m . Take rotor peripheral speed as 25 m/s at synchronous speed. [10]

- Q5) a)** Discuss the various factors which decide selection of number of stator slots in case of three phase induction motor. [8]
- b) Explain the concept of 'Unbalance Magnetic Pull (UMP)' and its estimation. Why is UMP high when three phase induction motor is designed with small air gap? [8]

OR

- Q6) a)** Derive the equation for end ring current for the rotor of squirrel cage induction motor along with the necessary diagram. [8]
- b) A 15kW, three phase, 50Hz, 400V, 4 pole, star connected squirrel cage induction motor has 60 slots, each containing 7 conductors. The rotor slots are 50. Assume full load efficiency as 0.85, full load power factor as 0.9 and rotor mmf is 80% of stator mmf. Calculate the value of bar and end ring current. Also find the area of each bar and each end ring, if current density is $5/\text{mm}^2$. [8]

- Q7) a)** Derive the equation for No Load Current of three phase induction motor. [8]
- b) A 20 kW, three phase, 50Hz, 400V, 8 pole, star connected squirrel cage induction motor has magnetizing current of 30% of the full load current. Calculate the value of stator turns per phase, if the mmf required for the flux density at 60° from pole axis is 600A. Assume full load efficiency as 0.9, full load power factor as 0.85 and winding factor as 0.955. [8]

OR

- Q8) a)** Explain the effect of ducts on the calculation of magnetizing current of three phase induction motor. [8]
- b) Discuss the performance calculation of three phase induction motor from circle diagram. [8]

EEE

Total No. of Questions :8]

SEAT No. :

P2880

[4958]-1069

[Total No. of Pages :2

T.E. (Electrical)

CONTROL SYSTEM - I

(2012 Course) (303147) (Semester - II)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer all questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

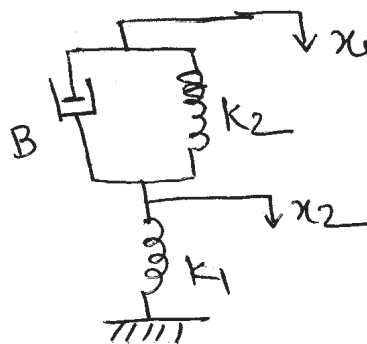
Q1) a) Compare open loop system with close loop system. Give one example of each. [6]

b) Derive transfer function of lead network. [7]

c) Explain different static error coefficients and steady state error in each case. [7]

OR

Q2) a) Explain Force - voltage analogy and find transfer function of [7]



b) Derive transfer function of DC servomotor. [6]

c) Find damping ratio, settling time and peak overshoot for system with close loop transfer function given by $T(S) = \frac{10}{s^2 + 7s + 20}$. [7]

P.T.O.

- Q3)** a) Explain Routh Hurwitz stability criterion. [6]
 b) Draw root locus for following system. Also find range of values of K for which system is stable. $G(S) = \frac{K}{s(s+2)(s^2+s+1)}$ [10]

OR

- Q4)** a) Using Routh Harvitz criterion determine whether the given close loop system is unstable. If unstable how many poles are on right halves plane or imaginary axis. [8]

$$G(S) = \frac{10}{s^5 + 7s^4 + 6s^3 + 42s^2 + 8s + 56}$$

- b) Explain rules for construction of root locus. [8]

- Q5)** a) Draw bode plot for following system $G(S) = \frac{1000}{s(1+0.1s)(1+0.001s)}$ Find gain margin and phase margin comment on stability. [12]

- b) Define Gain margin and phase margin. Explain how it is to be found using bode plot. [6]

OR

- Q6)** a) Draw polar plot for $G(S) = \frac{10}{s(s+1)(s+4)}$. [9]

- b) Explain Nyquist stability criterion. Explain procedure for drawing nyquist plot and how to determine stability. [9]

- Q7)** a) Explain P and PI controllers. Explain their effect on damping ratio and steady state error. [8]

- b) Design a PID controller for system with unity feedback and [8]

$$G(S) = \frac{K}{(s+3)(s^2+s+1)}$$

OR

- Q8)** a) Explain Ziegler Nichols method of tuning PID controller. [8]

- b) Explain procedure for designing PID controller using root locus. [8]

EEE

Total No. of Questions : 8]

SEAT No. :

P2881

[4958]-1070

[Total No. of Pages :3

T.E.(Electrical.)

UTILIZATION OF ELECTRICAL ENERGY

(2012 Pattern)(Semester-II) (End sem)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right side indicate full marks.*
- 3) *Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is and steam table is allowed.*
- 4) *Assume suitable data if necessary.*

Q1) a) Define: [6]

- i) Solid Angle
- ii) Reflection factor
- iii) Coefficient of Utilization

b) Write a note on Anodizing. [6]

c) A piece of an insulating material is to be heated by dielectric heating. The size of the piece is 12 cm X 12 cm X 3 cm. A frequency of 30 MHz is used and the power absorbed is 500 watt. If material has relative permittivity of 5 and power factor of 0.05. Calculate. [8]

- i) The voltage necessary for heating
- ii) Current flowing through the material
- iii) Frequency to get the same loss if voltage were limited to 1700 V.

OR

Q2) a) Explain construction and working of

- i) Push button
- ii) Contactor [6]

b) With suitable diagram explain mercury vapour lamp. [6]

c) An electric furnace consuming 5 KW takes 15 minutes to just melt 4lbs of aluminium, the initial temperature being 15°C. Find the efficiency of the furnace. Specific heat of Aluminium is 0.212, melting point is 658°C and latent heat of fusion is 76.8 cal per gram. 860 K cal = 1KWH. [8]

P.T.O.

- Q3)** a) Compare steam engine drive and electric drive. [8]
b) Describe composite system. [8]

OR

- Q4)** a) Draw and explain block diagram of electric locomotive. [8]
b) Explain functions of following equipments in traction substation. [8]
i) Circuit breaker.
ii) Interrupter

- Q5)** a) Define: [8]
i) Average Speed
ii) Schedule speed
iii) Coefficient of adhesion
iv) Tractive effort
b) A train is required to run between two stations 1.6 km apart at an average speed of 40 kmph. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is to be limited to 64 kmph, acceleration to 2 kmphs and coasting and breaking retardation to 0.16 kmphs and 3.2 kmphs respectively. Determine the duration of acceleration, coasting and breaking periods. Also draw speed- time curve. [8]

OR

- Q6)** a) Derive the expression for simplified quadrilateral speed time curve. [8]
b) An electric train weighing 200 tonne has eight motors geared to driving wheel, each wheel is 90 cm diameter. Determine the torque developed by each motor to accelerate the train to a speed of 48 kmph in 30 seconds up a gradient of 1 in 200. The tractive resistance is of 50 N/tonne. The effect of rotational inertia is 10% of the train weight, the gear ratio is 4 to 1 and gearing efficiency is 80%. [8]

- Q7)** a) Explain French method of Regenerative braking. [6]
b) What are the desirable characteristics of motor for traction purpose. [6]

- c) A motor coach weighing 150 tonne is equipped with 4,600 V motors for series parallel control. The current per motor is 300 A. Calculate [6]
- i) Duration of starting period
 - ii) Speed of the train at transition

At 300 A, 600 V, tractive effort is 15000 N per motor and the train speed is 30 kmph. Assume that train is started up a gradient of 1% and train resistance is 10N per tonne. Allow 10% for the effect of rotational inertia. Each motor has a resistance of 0.1 ohm.

OR

- Q8)** a) How A.C series motor is suitable for traction. [6]
- b) Explain transition methods with neat diagram. [6]
- c) Derive the expression for energy lost and efficiency for series parallel control of two DC series motor. [6]



Total No. of Questions : 10]

SEAT No. :

P2882

[4958]-1071

[Total No. of Pages : 2

T.E. (Instrumentation & Control)
INSTRUMENTAL METHODS FOR CHEMICAL ANALYSIS
(2012 Course) (Semester - I) (End-Sem.)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 to Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data, if necessary.*

Q1) a) Compare classical and Instrumental methods of chemical analysis. **[4]**

b) Explain principal and experimental setup of Potentiometry. **[6]**

OR

Q2) a) Explain principal and experimental setup of coulometry (any one). **[6]**

b) Define the concept Back Ground Correction. **[4]**

Q3) a) Explain with neat sketch Filter photometer. **[5]**

b) Explain with neat sketch UV-Visible Spectrophotometer. **[5]**

OR

Q4) a) State the Laws of Photometry (Beer's Law & Lambert's Law). **[4]**

b) Explain the Instrumentation of Atomic Absorption Spectrophotometer (AAS). **[6]**

Q5) a) Explain the Instrumentation of Flame Photometer. List the applications of Flame photometer. **[8]**

b) Write a short note on Direct Coupled Plasma. **[8]**

OR

P.T.O.

Q6) a) What is Fluorescence? Explain the working of double beam fluorimeter. [8]

b) Explain the principle and working of Fourier Transform Infrared Spectrophotometer (FTIR) with the help of suitable block diagram. [8]

Q7) a) Explain the Principle of Mass Spectrometer. And explain any one type of Mass Spectrometer. [10]

b) Explain Fourier Transform Nuclear Magnetic Resonance Spectrometer (FTNMR) with a neat sketch. [8]

OR

Q8) a) Explain the block diagram of Gas Chromatography. List the GC detectors. [8]

b) Write a short note on

i) NO_x Gas Analyzer

ii) CO Gas Analyzer [2 × 5]

Q9) a) Explain the Instrumentation of High Pressure Liquid Chromatography (HPLC). Explain any one detector. [8]

b) What is ESCA? Explain Auger Emission Spectroscopy? [8]

OR

Q10)a) Explain the Instrumentation for X-ray spectrometry. [8]

b) Write short notes on Ionization Chamber. [8]



Total No. of Questions :10]

SEAT No. :

P2801

[4958]-1072

[Total No. of Pages :2

**T.E.(Instrumentation and Control)
EMBEDDED SYSTEM DESIGN
(2012 Pattern) (Semester - I) (306261)**

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn whenever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) a) Draw and explain power on reset circuit of 8051 μ C. [7]

b) Explain the function RS0 and RS1 bits of PSW register of 8051 μ C. [3]

OR

Q2) a) Explain different addressing modes of 8051 μ C. [7]

b) Explain the following flags of 8051 μ C. [3]

i) Carry ii) Auxiliary Carry iii) Parity

Q3) a) With neat sketch explain interfacing of three digit common cathode multiplexed LED display with 8051 μ C. [7]

b) Explain RS-232 communication protocol of serial communication. [3]

OR

Q4) a) With neat sketch explain interfacing of 4×4 matrix keyboard with 8051 μ C. [7]

b) Explain Port-1 structure of 8051 μ C. [3]

P.T.O.

- Q5)** a) Explain the interfacing of serial ADC with 89C51 μ C. [8]
b) Explain the interfacing of serial RTC with 89C51 μ C. [8]

OR

Q6) Discuss the design of traffic light controller using 89C51 μ C based on following points.

- a) Block diagram. [6]
b) Circuit explanation. [10]

- Q7)** a) Explain register file structure of AT8535 AVR μ C. [8]
b) Explain the stack operation of AT8535 AVR μ C. [8]

OR

- Q8)** a) Explain following instructions of AT8535 AVR μ C. [8]
i) LPM ii) SBRS Rd,b iii) BREQ k iv) SLEEP
b) What is watchdog timer? Explain watchdog timer of AT8535 AVR μ C. [8]

- Q9)** a) Explain timer-0 operation of AT8535 AVR microcontroller. [9]
b) Explain UART of AT8535 AVR microcontroller. [9]

OR

- Q10)** a) Explain different clock sources used in AVR μ C. [9]
b) Explain with suitable block diagram ADC pre-scaler of ATmega8535 AVR μ C. [9]

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Total No. of Questions : 10]

SEAT No. :

P2883

[4958]-1073

[Total No. of Pages : 2

T.E.(Instrumentation & Control)
CONTROL SYSTEM COMPONENTS
(2012 Coures) (Semester-I) (306263)(End Semester)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Draw neat sketches wherever necessary.*
- 2) *Answer five questions.*
- 3) *Q1 or 2, Q3 or 4, Q5 or 6, Q 7 or 8, Q 9 or 10.*
- 4) *Assume suitable data.*

Q1) a) Draw and explain the working of a flow switch. **[6]**

b) Compare pneumatic and hydraulic system. **[4]**

OR

Q2) a) Draw and explain the application of an electromechanical relay. **[6]**

b) State the specifications and applications of a contactor. **[4]**

Q3) a) Draw the symbols for selector switch, Temperature switch, pressure switch level switch and flow switch. **[5]**

b) Draw and explain the working of time delay valve in pneumatics. **[5]**

OR

Q4) a) Explain with diagram the concept of inching of a motor. **[5]**

b) Compare an electromechanical relay and a solid state relay. **[5]**

Q5) a) Draw and explain the working of centrifugal and vane pump in hydraulics. **[10]**

b) Draw & explain the working of a pressure reducing valve in hydraulics. **[8]**

OR

Q6) a) Draw & explain the meter- in and meter out-circuit in hydraulics. **[10]**

P.T.O.

b) Draw & explain the hydraulic circuit for controlling a double acting cylinder. [8]

Q7) a) Draw and explain the construction of shaker feeder. [8]

b) Draw & explain the use of low selector for motor speed manipulation. [8]

OR

Q8) a) Draw and explain the working of a circuit breaker in electrical system. [8]

b) Define fuse. Draw and explain construction and working of a HRC fuse. [8]

Q9) a) State the advantages fo fluidics. Draw and explain the bistable amplifier. [8]

b) Draw and explain the explosion proof housing. Give its singificance in industrial systems. [8]

OR

Q10) a) Define hazardous area Give hazardous area classification in detail. [8]

b) State the types intrinsic safety barrier. Explain any one type. [8]



Total No. of Questions : 10]

SEAT No. :

P4543

[Total No. of Pages : 3

[4958] - 1074

T.E. (Instru.)

CONTROL SYSTEM DESIGN

(2012 Pattern)

Time : 2 1/2 Hours]

[Max. Marks : 70

Instructions to the candidates :-

- 1) All questions are compulsory.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic tables, electronic pocket calculator and steam table is allowed.
- 5) Your answer will be valued as a whole.
- 6) Assume suitable data, if necessary.

- Q1)** a) Discuss the selection of compensator as per required specification. [4]
b) Draw lead compensator and find it's transfer function. [6]

OR

- Q2)** Design a lag compensator for the system whose open-loop transfer function is

$$G(s)H(s) = \frac{4}{s(2s+1)}$$

So that the phase margin will be 40° without sacrificing K_v . Also compute network component. [10]

- Q3)** a) A process cycles at proportional gain of 20 with period of oscillation is 5sec in close loop. Determine tuning constants of PID controller. [8]
b) Write equations for PI controller. [2]

OR

- Q4)** Design a PD controller such that dominant roots of characteristics equation is located at $s = -1.2 + j102$. The forward transfer function of unity gain feedback control system is given by [10]

$$G(s) = \frac{30}{s(s+1)(s+3)}$$

P.T.O.

- Q5) a)** Convert following state space model into controllable phase variable canonical form. [8]

$$\dot{x} = \begin{bmatrix} 1 & 2 & 0 \\ 1 & -1 & -3 \\ 0 & 2 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix} u$$

$$Y = [0 \ 0 \ 1]x$$

- b) Convert the state model given below in to transfer function. [8]

$$\dot{x} = \begin{bmatrix} 1 & 1 & 0 \\ 1 & -1 & -3 \\ 1 & 2 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix} u$$

$$Y = [1 \ 0 \ 1]x + 5u$$

OR

- Q6)** The transfer function of system is given by

$$\frac{y(s)}{u(s)} = \frac{s+1}{s^2+9s+20}$$

- a) Convert transfer function into canonical state model. [8]
 b) Convert transfer function into observable canonical state model. [8]

- Q7) a)** Determine whether following system is controllable and observable or not

$$\dot{x} = \begin{bmatrix} 1 & 2 & 0 \\ 1 & -1 & -3 \\ 0 & 2 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix} u \quad [9]$$

$$Y = [1 \ 0 \ 1] x$$

- b) Convert following state space model in to canonical form using diagonalisation method [9]

$$\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} x + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

$$Y = [1, 2, 2] x$$

OR

Q8) a) Obtain response if no input is applied [9]

$$\dot{x} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u$$

b) Give derivation to find solution of state space model. [9]

Q9) a) Consider a system having transfer function [8]

$$G(s) = \frac{1}{s^2 + 5s + 4}$$

b) Find the state space model of the given transfer function. Verify that the system is controllable, If so, Design a state feedback controller using Ackerman's method such that closed - loop poles are at $s_1 = -3$, $s_2 = -6$. [8]

OR

Q10) a) A consider a system having transfer function [8]

$$G(s) = \frac{3}{s^2 + 8s + 15}$$

b) Find the state space model of the given transfer function. Verify that the system is observable, If so, determine the observer gain matrix using Ackerman's method to place the observer poles at $s_1 = -5$ and $s_2 = -7$. [8]



Total No. of Questions :10]

SEAT No. :

P2884

[4958]-1075

[Total No. of Pages :2

T.E. (Instrumentation and Control Engineering)
INDUSTRIAL ORGANIZATION AND MANAGEMENT
(2012 Course) (End Semester) (Semester - I)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat diagrams should be drawn whenever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) Write short notes on:-

- a) ISO 14000 EMS
- b) Raw Material Handling and Storage **[10]**

OR

- Q2)** a) What are the different types of Business Organizations? Explain any two. **[4]**
- b) Explain Business process Re-engineering. Explain its importance to business. **[6]**

- Q3)** a) Explain briefly Porter's 5 forces of competition. **[5]**
- b) Define pollution. Give the factors causing pollution. Explain air pollution in brief. **[5]**

OR

- Q4)** a) With reference to general example, explain Ishikawa diagram. **[5]**
- b) Derive the equation for economic ordering quantity. **[5]**

P.T.O.

- Q5) a)** Explain in relation with Manpower planning. [12]
- i) Need
 - ii) Objectives
 - iii) Requirements
 - iv) Factors affecting
- b) Write a note on job description and its need. [6]

OR

- Q6) a)** What is Leadership? What are the characteristics possessed by a leader?
What are different leadership styles? [12]
- b) Define training. Explain briefly its methods with examples. [6]

- Q7) a)** What is capital budgeting? Explain briefly the different methods of capital budgeting. [8]
- b) What is the need and functions of money and capital market? [8]

OR

- Q8) a)** Write a note on “Capital”. [8]
- b) Explain concept of budget, its objectives and types. [8]

- Q9) a)** What is the need of business and professional ethics in today’s competitive market? [8]
- b) What is ERP? What is the importance of ERP for industrial organizations? [8]

OR

- Q10)a)** Explain the role of Information Technology in modern era of business. [8]
- b) Draw the block diagram of MIS and explain. [8]

x x x

Total No. of Questions :10]

SEAT No. :

P2885

[Total No. of Pages :3

[4958] - 1076

T.E. (Instrumentation & Control)
DIGITAL SIGNAL PROCESSING
(Semester - II) (2012 Course)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume Suitable data if necessary.*

Q1) a) Explain in detail classification of system. **[4]**

b) If the impulse response of the system is **[6]**

$$h(n) = [(0.5)^n + n(0.2)^n] u(n)$$

- i) Find the Transfer Function
- ii) Obtain the differential equation of the system.

OR

Q2) a) Find inverse z- transform of **[5]**

$$X(z) = \frac{z(z-0.5)}{(z-0.8)(z-1)}$$

b) Find DFT of a sequence for N = 4 **[5]**

$$X(n) = \begin{cases} 0.5 & 0 \leq n \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

P.T.O.

Q3) a) Find impulse and step response for the following system [6]

$$X(n) = y(n) - 3/4 y(n-1) + 1/8 y(n-2).$$

b) Compute 4 - point DFT of the sequence [4]

$$X(n) = \{3, 1, 5\}.$$

OR

Q4) a) Determine the Circular convolution of the given two sequence. [6]

$$X(n) = \{1, 2, 3, 2\} \quad h(n) = \{1, 2, 1, 2\}.$$

b) Explain any two properties of Discrete Time Fourier Transform (DTFT) with proof. [4]

Q5) a) Obtain the 8-point DFT of a given sequence using DIT FFT Algorithm [12]

$$X(n) = \{1, 1, 2, 1\}.$$

b) Explain the concept of bit reversal technique in FFT Algorithm. [4]

OR

Q6) a) Obtain the 4-point DFT of a given sequence using DIT & DIF FFT Algorithm [12]

$$X(n) = \{4, 3, 2, 1\}.$$

b) Sketch Signal flow graph of 8-point Decimal in Frequency (DIF) FFT Algorithm. [4]

- Q7) a)** Explain various window functions used in FIR filter design. [6]
- b) Design a low pass filter with 11 coefficients for following specification
 Pass band frequency edge = 250 Hz, Sampling frequency = 1000 Hz
 Use Rectangular and Hamming Window for Design. [12]

OR

- Q8) a)** Design a linear phase FIR filter using Hamming window for desired frequency response [12]

$$H_d(\omega) = e^{-j(N-1)\omega/2}, \quad 0 < |\omega| < \pi/4$$

$$0, \quad \pi/4 < |\omega| < \pi \quad \text{for } N = 7$$

- b) Differentiate between FIR & IIR filter. [6]
- Q9) a)** Find the order of analog low pass Butterworth filter for the given specification [6]

$$\alpha_p = 1 \text{ dB}, \alpha_s = 30 \text{ dB}, \Omega_p = 200 \text{ rad/sec}, \Omega_s = 600 \text{ rad/sec.}$$

- b) Design a Chebyshev filter with a max pass band attenuation of 2.5 dB at $\Omega_p = 20 \text{ rad/sec}$ & stop band attenuation of 30 dB at $\Omega_s = 50 \text{ rad/sec}$. [10]

OR

- Q10) a)** Design a Butterworth filter using Impulse invariance method for following specification. [10]

$$0.9 \leq |H(e^{j\omega})| \leq 1 \quad 0 \leq \omega \leq \pi/2$$

$$|H(e^{j\omega})| \leq 0.2 \quad 3\pi/4 \leq \omega \leq \pi$$

- b) Compare the features of digital Butterworth and Chebyshev type-1 filter in terms of [6]
- i) Filter order
- ii) Transition width



Total No. of Questions :10]

SEAT No. :

P2886

[4958]-1077

[Total No. of Pages :2

T.E. (Instrumentation and Control Engineering)
Instrument & System Design
(2012 Pattern) (Semester - II) (End - Semester)

Time : 2½ Hours.

[Max. Marks :70]

Instructions to candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat circuit diagrams should be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Explain Ergonomics and Aesthetics. **[3]**
b) Draw the internal constructional diagram of IC XTR 110. Write its features and applications. **[7]**

OR

- Q2)** a) What is noise? Classify it and explain thermal noise. **[5]**
b) Explain the working of cold junction compensation circuit in IC AD 594. **[5]**

- Q3)** a) Write a note on prototyping and testing. **[5]**
b) What is triboelectric effect? Explain ESD & its minimization mechanisms. **[5]**

OR

- Q4)** a) Define IP standard. Explain IP 54 & 34 standards. **[5]**
b) Draw the internal circuit of IC HCNR 201 and explain its operation for positive input positive output. **[5]**

P.T.O.

- Q5)** a) Introduce and explain in detail the IC MM74C922. [9]
b) Describe the features of ICM 7217 and explain the functions of following pins. [9]
i) Zero.
ii) Count input.
iii) Scan.
iv) Up / Down

OR

- Q6)** a) Design frequency multiplier ($f_{out} = 10 * f_{in}$) using suitable IC. Also draw the circuit diagram. [9]
b) A stepper motor is to be interfaced to micro controller. Suggest suitable IC. Draw interfacing diagram. Give its features, specifications and applications. [9]

- Q7)** a) What is soldering? Give its types. Explain wave soldering method. What are its advantages? [8]
b) Differentiate between single side board and double side board. [8]

OR

- Q8)** a) Explain different types of printed circuit boards. [8]
b) Give the design rules for analog circuit PCBs. [8]

- Q9)** a) Explain the terms maintainability and availability. [4]
b) Different between reliability and quality. [6]
c) Write a note on failure and failure modes. [6]

OR

- Q10)** a) Explain reliability, Exponential, Weibull and Gamma Distribution. [8]
b) Write short notes on- [8]
i) Documentation.
ii) Quality Assurance.