

**III B.Tech II Semester Regular Examinations, Apr/May 2009**

**INSTRUMENTATION**  
**(Electrical & Electronic Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) In how many stages, can any measuring process can be divided? Draw the block diagram and bring out the uniqueness of each stage, in terms of its functions.  
(b) Distinguish between 'error' and 'correction' and show how they are usually expressed for an instrument. [8+8]
2. What is the process of modulation? Describe the techniques usually adopted. [16]
3. What is Synchronization? What are the different methods by which it can be accomplished? [16]
4. Explain with neat circuit diagram the working of the linear ramp type DVM. [16]
5. (a) Explain the principle and working of peak reading voltmeter with a block diagram.  
(b) Explain the two modes of operation of a vector impedance meter. [8+8]
6. (a) what do you understanding by an analog Transducer and a Digital Transducer? Give examples.  
(b) What are the errors in a Transducer? [8+8]
7. (a) Explain about magneto-strictive torque transducers.  
(b) A shaft is to transmit power up to 44kW at a constant speed of 25rps an it is proposed that the torque be sensed by a pair of torque strain gauges bonded to specially machine potion of the shaft. The gauges are to be connected pushpull in an equiarmed voltage sensitive bridge, the output of which is to be calibrated in power units. If the maximum strain value of the gauges is 0.0015, their resistance is 120  $\Omega$  and gauge factor is 2.1, calculate
  - i. the diameter of the steel shaft to which they are to be bonded, if its modulus of elasticity is  $200 \times 10^9 \text{N/m}^2$ .
  - ii. the output voltage at full power if the excitation of the bridge is 6V.
  - iii. the sensitivity of the bridge in V/kW. [6+10]
8. (a) Describe the working of Pirani gauge with a neat sketch.  
(b) A thermopile arrangement of a copper constantan thermocouple consists of free junction parts and has the reference junction at 2000  $^{\circ}\text{C}$ . If the output voltage is 3.3mv, determine the temperature of the detecting junction. The

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calibration chart of the thermocouple is

[8+8]

Temp( $^{\circ}$ C)	100	200	250
Voltage(mV)	4.22	9.23	11.95

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1. Define Systematic error and explain the types of systematic errors? [16]
2. What is the process of modulation? Describe the techniques usually adopted. [16]
3. (a) Why is an attenuator probe used?  
(b) In a cathode ray tube the distance between the deflecting plates is 1.5cm, the length of the deflecting plates is 4.5cm and the distance of the screen from the centre of the deflecting plates is 33cm. If the accelerating voltage supply is 300volt, calculate deflecting sensitivity of the tube. [8+8]
4. (a) Explain the Phase Meter principles employed in measuring equipment?  
(b) Draw and explain Digital phase meter? [8+8]
5. (a) What is the spectrum of a signal? Explain with various examples.  
(b) A coil of unknown impedance is connected in series with a capacitor of  $224\mu\text{F}$  and an ammeter of negligible impedance is connected to a variable frequency of constant voltage and negligible impedance. The frequency was adjusted both above and below the resonance frequency till the reading of the ammeter was reduced to 70.7% of its value at resonance. This occurred at the frequencies of 876 and 892 kHz. Determine effective resistance, inductance and Q of the coil.  
(c) What is a vector impedance meter? What are its salient features? [6+6+4]
6. (a) What is a self generating Transducers?  
(b) What is a thermocouple? [8+8]
7. (a) Discuss in detail about strain gauge Rosettes.  
(b) The strain gauge having a gauge factor of 2 is connected in a bridge circuit having an excitation voltage 8V. The resistances are equal. It is subjected to a strain of 0.006. If this output is to represent  $2/3^{\text{rd}}$  of full scale deflection of a recorder, **what should be the gain of the amplifier**. The full scale input voltage of the recorder is 1V. [10+6]
8. (a) Mention various types of instruments used for temperature measurement.  
(b) Describe the temperature measurement with resistance thermometers. [4+12]

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1. (a) Define 'Drift', 'Threshold Value' and 'Dead-band' of a measuring system, with suitable example for each.  
(b) Distinguish between 'Range' and 'Span' of an instrument. [8+8]
2. (a) Define bandwidth of a signal and explain the ways in which signals are classified according to bandwidth.  
(b) Determine which of the following signals is periodic. If a signal is periodic determine its fundamental period.  
i)  $x(t) = [\sin(t - \pi/6)]^2$   
ii)  $x(t) = e^{j(nt-1)}$  [8+8]
3. Define deflection sensitivity and deflection factor of a cathode ray tube. [16]
4. What are the different types of Digital voltmeters? Explain them briefly with neat sketches. [16]
5. (a) What is a Q-Factor? Explain how Q-Factor is measured? Give the working principle of the meter.  
(b) Tests using a Q meter on a radio tuning coil to find its self capacitance gave the following results.
  - i. With the radio coil connected normally, the resonance was obtained at 1 MHz with tuning capacitor set at 80 pF.
  - ii. With the standard inductor connected in place of the radio coil, the resonance was obtained at 3 MHz. and this condition was not altered when the radio coil was connected in parallel with the standard inductor. Calculate the self-capacitance of the radio coil. [6+10]
6. Explain about the following:
  - (a) bonded wire strain gauges
  - (b) bonded metal foil strain gauges. [10+6]
7. (a) Explain the operation of DC Tachometer generators. What are its advantages and disadvantages.  
(b) Explain Strobotran with a neat sketch. [8+8]
8. Discuss in detail about

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(a) total radiation pyrometers

(b) optical pyrometers.

[8+8]

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1. (a) How are the performance characteristics of an instrument, classified?  
(b) Explain clearly the difference between Accuracy and Precision? [8+8]
2. Derive from fundamentals the expressions representing  
(a) A rectangular pulse train  
(b) a saw tooth wave. [8+8]
3. Draw the block diagram of a general purpose CRO and explain the functions of the following controls:  
(a) Intensity  
(b) Focus  
(c) Horizontal and Vertical positioning. [4+3×4=16]
4. Draw and explain the circuit of a digital frequency meter. What are the different methods used for high frequency determination? [16]
5. Explain the principle and operation of vector impedance meter with a neat block diagram. [16]
6. (a) Discuss the characteristics of materials used for potentiometers.  
(b) A voltage dividing potentiometer is used to measure an angular displacement of  $60^\circ$  and the total angle travel of the potentiometer is  $355^\circ$ . Calculate the voltage output on open circuit if the potentiometer is excited by a 60V source. Calculate the actual value of the output voltage at this setting if a voltmeter of  $1M\Omega$  resistance is connected across the output. The resistance of the potentiometer is  $1K\Omega$ . Calculate the % error. [6+10]
7. (a) Explain shaft speed measurements using Stroboscope with a neat sketches.  
(b) What are the advantages and disadvantages of moving magnet type linear velocity transducer. [12+4]
8. (a) Discuss in detail about turbine meters including their advantages and limitations.  
(b) Describe pressure measurement Piezoelectric transducers with neat sketches. [10+6]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
**SWITCHGEAR AND PROTECTION**  
**(Electrical & Electronic Engineering)**

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1. In a 132kV system, the reactance per phase up to the location of the circuit breaker is  $5\Omega$  and capacitance to earth is  $0.03\mu\text{F}$ . Calculate
  - (a) the maximum value of the restriking voltage,
  - (b) the maximum value of RRRV and
  - (c) the frequency of transient oscillations. [8+8]
2. (a) With the help of neat sketches, describe the principle of resistance switching units in an Air blast circuit breaker.  
(b) Describe the construction of a vacuum interrupter and vacuum circuit breaker. [8+8]
3. State the various applications of over-current relaying. Distinguish between 'inverse characteristic' and 'definite characteristic'. [8+8]
4. (a) Explain how the inclusion of a resistance in the neutral earthing circuit of an alternator affects the performance of the differential protection of the three-phase stator.  
(b) Describe how protection is provided in large turbo-alternators against earth-fault in the rotor [8+8]
5. (a) Discuss earth fault protection for transformers.  
(b) A 3-phase transformer rated for 33kV/6.6kV is connected star-delta and the protecting current transformer on the low voltage side have a ratio of 400/5. Determine the ratio of the current transformer on the HV side. [6+10]
6. (a) What are the requirements of protection of lines?  
(b) Write short notes on the following: [10+6]
  - i. Fault bus protection
  - ii. Translay scheme.
7. (a) State the advantage of neutral grounding of an electrical system.  
(b) Explain reactance grounding with neat sketch. [6+10]
8. (a) What protective measures are taken against lightning over voltages.  
(b) Describe the construction and operation of metal oxide surge arrester. [6+10]

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1. A generator connected through a 3-cycle Circuit Breaker to a transformer is rated 10MVA, 13.8kV with reactances of  $X_d'' = 10\%$ ,  $X_d' = 15\%$  and  $X_d = 100\%$ . It is operating at no load and rated voltage when a 3-phase short circuit occurs between the breaker and the transformer. Determine
  - (a) the sustained short circuit current in breaker;
  - (b) the initial symmetrical rms current in the breaker;
  - (c) the maximum possible d.c component of the short circuit current in the breaker;
  - (d) the momentary current rating of the breaker;
  - (e) the current to be interrupted by the breaker and
  - (f) the interrupting kVA. [16]
2. Describe the principle of air blast circuit breaker with the help of neat sketches, explain the construction of a typical EHV air blast circuit breaker. [8+8]
3. Why are the differential relays more sensitive than over current relays, Explain? [16]
4. What are Restricted earth faults and Inter-turn faults in generators? Explain the protection schemes employed for these faults. [8+8]
5. Draw the connection diagram of a differential relay for the protection a star-delta transformer. How does bias the winding of a differential relay restricts malfunctioning of the relay against
  - (a) CT mismatch
  - (b) Onload changing and
  - (c) Magnetising current? What is magnetising Inrush current? What is the principle used to make a differential relay insensitive to magnetizing inrush current. [4+6+2+4]
6.
  - (a) What is the main drawback of differential over current protection for bus bars and how is it overcome.
  - (b) Explain about voltage differential protection of bus bars. [10+6]
7.
  - (a) Derive an expression for the reactance of the Peterson coil in terms of the capacitance of the protected line.



- (b) Calculate the reactance of a coil suitable for a 33kV, 3-phase transmission system of which the capacitance to earth of each conductor is  $0.5\mu\text{F}$ .

[8+8]

8. Describe the construction and principle of operation of valve type and Zinc oxide lightning arrester.

[16]

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1. (a) Why is current interruption easier in an a.c circuit than in a d.c circuit?  
(b) An OCB is rated for 1000MVA, 2 kA, 66 kV, 3 phase, 3 sec. what are its
  - i. Rated operating voltage
  - ii. Rated operating current
  - iii. Rated symmetrical breaking current. [8+8]
2. Distinguish between Air Blast circuit breaker and oil circuit breakers? [8+8]
3. Explain the 'Differential protection'. State the various applications of differential protection. [8+8]
4. Discuss the different types of faults that can occur on a generator and the protection schemes employed. [16]
5. Draw the connection diagram of a differential relay for the protection a star-delta transformer. How does bias the winding of a differential relay restricts malfunctioning of the relay against
  - (a) CT mismatch
  - (b) Onload changing and
  - (c) Magnetising current? What is magnetising Inrush current? What is the principle used to make a differential relay insensitive to magnetizing inrush current. [4+6+2+4]
6. (a) Explain over current protection of feeder.  
(b) Explain a scheme of protection for a ring mains. [8+8]
7. (a) Discuss ungrounded system and resonant grounded system.  
(b) Write short notes on Protection against arcing grounds. [8+8]
8. (a) What are the basic requirements of a lightning arrester? Differentiate between
  - i. A lightning arrester and a lightning conductor
  - ii. Surge diverter and surge absorber.  
(b) An overhead transmission line with surge impedance 400 ohms is 300km long. One end of this line is short circuited and at the other end a source of 11kV is suddenly switched in, calculate the current at the source end 0.005 sec after the voltage is applied. [10+6]

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1. Write a short notes on the rate of restriking voltage and explain its importance in arc extinction. [8+8]
2. (a) What are the key features of SF<sub>6</sub> Circuit Breaker over other circuit breakers.  
(b) Write a short notes on the maintenance of Oil circuit breaker. [8+8]
3. (a) Explain the following terms with respect to switch gear protection
  - i. Pick up level
  - ii. operating time
  - iii. Reach
  - iv. Under Reach
  - v. Over Reach.  
(b) An earth fault setting relay has a setting of 20%, current rating 5A, it is connected to a C.T of ratio 500:5. Calculate pick up current in primary for which the earth fault relay operates. [8+8]
4. Discuss the unbalanced loading and overload protection in alternators. 'Overload protection is not necessary for alternators' ? Justify yourself? [8+8]
5. Draw the connection diagram of a differential relay for the protection a star-delta transformer. How does bias the winding of a differential relay restricts malfunctioning of the relay against
  - (a) CT mismatch
  - (b) Onload changing and
  - (c) Magnetising current? What is magnetising Inrush current? What is the principle used to make a differential relay insensitive to magnetizing inrush current. [4+6+2+4]
6. (a) Explain bus bar protection need special attention. Why?  
(b) What is back up protection of bus bars? [10+6]
7. (a) Discuss about effectively grounded system and ungrounded system.  
(b) A 132 kV, 3-Phase, 50Hz, 100km long transmission line has a capacitance of 0.012 $\mu$ F per km per phase. Determine the inductive reactance and kVA rating of the arc suppression coil suitable for this line. [8+8]

8. Explain the working lightning arrests. [16]

- (a) Rod gap
- (b) Horn gap
- (c) Multi gap
- (d) Expulsion type.

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1. (a) Let  $x(n)$  be the sequence  
 $x(n) = \delta(n+1) - \delta(n) + 2\delta(n-1) + 3\delta(n-2)$  which has a DTFT  $X(e^{j\omega}) = X_R(e^{j\omega}) + jX_I(e^{j\omega})$   
 where  $X_R(e^{j\omega})$  and  $X_I(e^{j\omega})$  are the real part and the imaginary part of  $X(e^{j\omega})$ , respectively. Find the sequences  $y(n)$  that has a DTFT given by  
 $y(e^{j\omega}) = X_I(e^{j\omega}) + jX_R(e^{j\omega}) \cdot e^{j2\omega}$
- (b) Let  $x(n)$  be a sequence with a DTFT  $X(e^{j\omega})$ . Find the DTFT of  $x(n) * x^*(-n)$  in terms of  $X(e^{j\omega})$ . [16]
2. (a) Distinguish between DFT and DTFT .
- (b) Consider a sequence  $x(n)$  of length  $L$ . Consider its DTFT  $X_d(\omega)$  is sampled and  $N$  is the number of frequency samples. Discuss the relation between  $L$  and  $N$  for inverse DTFT = inverse DFT comment on the aliasing problem.
- (c) Compute the DFT of  $x(n) = \{1, 0, 0, 0\}$  and compare with  $X_d(\omega)$ . [4+6+6]
3. (a) Let  $x(n)$  be a real valued sequence with  $N$ -points and Let  $X(K)$  represent its DFT , with real and imaginary parts denoted by  $X_R(K)$  and  $X_I(K)$  respectively. So that  $X(K) = X_R(K) + jX_I(K)$ . Now show that if  $x(n)$  is real,  $X_R(K)$  is even and  $X_I(K)$  is odd.
- (b) Compute the FFT of the sequence  $x(n) = \{1, 0, 0, 0, 0, 0, 0, 0\}$  [8+8]
4. (a) Determine the frequency response , magnitude response and phase response for the system given by  $y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) - x(n-1)$
- (b) A causal LTI system is described by the difference equation  $y(n) = y(n-1) + y(n-2) + x(n-1)$ , where  $x(n)$  is the input and  $y(n)$  is the output. Find
  - i. The system function  $H(Z) = Y(Z)/X(Z)$  for the system, plot the poles and zeroes of  $H(Z)$  and indicate the region of convergence.
  - ii. The unit sample response of the system.
  - iii. Is this system stable or not? [6+10]
5. Design low pass Butterworth filter that has a 3 - dB cutoff frequency of 1.5 KHZ and an attenuation of 40dB at 3 KHZ. Also realize the designed filter. [16]
6. (a) What is an FIR filter ? Compare an FIR filter with an IIR filter.

- (b) Discuss frequency sampling method for an FIR filter design . [8+8]
7. Consider the signal  $x(n) = a^n u(n)$  ,  $|a| < 1$
- (a) Determine the spectrum of a signal.
- (b) The signal is applied to a Interpolator that increases sampling rate by a factor by '2'. Determine its output spectrum.
- (c) Show that the spectrum in part (ii) is simply Fourier transform of  $x(n/2)$ . [16]
8. (a) What are the advantages of DSP processors over conventional microprocessors?
- (b) Explain the Implementation of convolver with single multiplier/adder. [8+8]

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1. (a) Define the following terms as referred to LTI discrete time system:
  - i. Stability
  - ii. Causality
  - iii. Time invariance
  - iv. Linearity.
- (b) Determine whether the following system is
  - i. Linear
  - ii. Causal
  - iii. Stable
  - iv. Time invariant
$$y(n) = \log_{10} |x(n)|$$

Justify your answer. [16]
2. (a) Define DFT of a sequence  $x(n)$ . Obtain the relationship between DFT and DTFT.
- (b) Consider a sequence  $x(n) = \{2, -1, 1, 1\}$  and  $T = 0.5$  compute its DFT and compare it with its DTFT. [8+8]
3. (a) Implement the decimation in time FFT algorithm for  $N=16$ .
- (b) In the above Question how many non - trivial multiplications are required. [10+6]
4. (a) An LTI system is described by the equation  $y(n)=x(n)+0.81x(n-1)-0.81x(n-2)-0.45y(n-2)$ . Determine the transfer function of the system. Sketch the poles and zeroes on the Z-plane.
- (b) Define stable and unstable system. Test the condition for stability of the first-order IIR filter governed by the equation  $y(n)=x(n)+bx(n-1)$ . [8+8]
5. (a) Describe digital IIR filter characterization in time ? domain.
- (b) Convert analog filter with transfer function  $(s + 0.1)/(s + 0.1)^2 + 9$  Into a digital IIR filter using bilinear transformation. The digital filter vshould have a resonant frequency of  $\omega_r = \pi/4$ . [6+10]

6. (a) Describe the FIR filter characteristics in time domain.  
(b) Determine the frequency response of a linear phase FIR filter given by  
 $y(n) = A_1x(n) + A_2x(n - 1) + A_3x(n - 2) + A_2x(n - 3) + A_1x(n - 4)$ . [6+10]  
7. Design one stage and two stage interpolators to meet following specifications.

$$I = 20$$

- (a) Pass band :  $0 \leq F \leq 90$   
(b) Transition band :  $90 \leq F \leq 100$   
(c) Input sampling rate : 10,000HZ  
(d) Ripple :  $\delta_1 = 10^{-2}$ ,  $\delta_2 = 10^{-3}$ . [16]  
8. Discuss various interrupt types supported by TMS320C5X processor. [16]

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1. (a) Show that  $X(e^{j\omega})$  is real and even if,  $x(n)$  is real and even.  
 (b) Verify parseval's theorem for the DTFT (discrete time Fourier transform) i.e.  

$$\sum_{n=-\infty}^{\infty} |x(n)|^2 = \frac{1}{2\pi} \int_{2\pi} |X(\Omega)|^2 d\Omega. \quad [16]$$
2. (a) Compute Discrete Fourier transform of the following finite length sequence considered to be of length N.  
     i.  $x(n) = \delta(n + n_0)$  where  $0 < n_0 < N$   
     ii.  $x(n) = a^n$  where  $0 < a < 1$ .  
 (b) If  $x(n)$  denotes a finite length sequence of length N, show that  $x((-n))_N = x((N - n))_N$ . [8+8]
3. (a) Implement the decimation in time FFT algorithm for N=16.  
 (b) In the above Question how many non - trivial multiplications are required. [10+6]
4. (a) Explain how the analysis of discrete time invariant system can be obtained using convolution properties of Z transform.  
 (b) Determine the impulse response of the system described by the difference equation  $y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1)$  using Z transform. [8+8]
5. If the specifications analog low pass filter are to have a 1 dB attenuation at cutoff frequency of 1KHZ and maximum stop band ripple  $\delta_s = 0.01$  for  $|f| > 5\text{KHZ}$ , determine required filter order  
     (a) Butterworth  
     (b) Type - I Chebyshev  
     (c) Type- II Chebyshev. [16]
6. (a) Compare the frequency domain characteristics of different windows used in FIR filter design.  
 (b) What are the advantages and disadvantages of FIR filters over IIR filters. [12+4]

7. (a) Consider a signal  $x(n) = u(n)$
- i. Obtain a signal with a decimation factor '3'
  - ii. Obtain a signal with a interpolation factor '3'.
- (b) Consider a signal  $x(n) = \sin \pi n. u(n)$
- i. Obtain a signal with a decimation factor '2'
  - ii. Obtain a signal with a interpolation factor '2'. [6+10]
8. What are the different buses of TMS320C5X processor and their functions? [16]

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1. (a) Find the convolution of the given two signals:  
 graphically:  $x(n)=u(n)-u(n-5)$   
 $h(n)=2[u(n)-u(n-3)]$   
 (b) Verify the result of part(a) by evaluating directly the convolution sum. [16]
2. (a) If  $x(n)$  is a periodic sequence with a period  $N$ , also periodic with period  $2N$ .  
 $X_1(K)$  denotes the discrete Fourier series coefficient of  $x(n)$  with period  $N$   
 and  $X_2(k)$  denote the discrete Fourier series coefficient of  $x(n)$  with period  
 $2N$ . Determine  $X_2(K)$  in terms of  $X_1(K)$ .  
 (b) Prove the following properties.  
 i.  $W_N^n x(n) \rightarrow X((K+1))_N R_N(K)$   
 ii.  $x * (n) \rightarrow X * ((-K))_N R_N(K)$  [8+8]
3. (a) Implement the decimation in time FFT algorithm for  $N=16$ .  
 (b) In the above Question how many non - trivial multiplications are required.  
 [10+6]
4. (a) Determine the frequency response , magnitude response and phase response  
 for the system given by  $y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) - x(n-1)$   
 (b) A causal LTI system is described by the difference equation  $y(n)=y(n-1)+y(n-2)+x(n-1)$ , where  $x(n)$  is the input and  $y(n)$  is the output. Find  
 i. The system function  $H(Z)=Y(Z)/X(Z)$  for the system, plot the poles and  
 zeroes of  $H(Z)$  and indicate the region of convergence.  
 ii. The unit sample response of the system.  
 iii. Is this system stable or not? [6+10]
5. Determine the system function  $H(Z)$  of the lowest order chebyshev digital filter that  
 meets following specifications.  
 (a) 1/2 dB ripple in the pass band  $0 \leq |\omega| \leq 0.24\pi$   
 (b) At least 50 dB attenuation in the stop band  
 $0.35\pi \leq |\omega| \leq \pi$  . Use Impulse Invariant method. [16]

6. Use a rectangular and hanning windows to find fourth order linear phase FIR filter to approximate ideal low pass filter  $e^{-j2.5\omega}$  for a  $|\omega| \leq 1$  and zero for  $1 \leq |\omega| \leq \pi$ . [16]
7. (a) Consider a signal  $x(n) = u(n)$
- i. Obtain a signal with a decimation factor '3'
  - ii. Obtain a signal with a interpolation factor '3'.
- (b) Consider a signal  $x(n) = \sin \pi n$ .  $u(n)$
- i. Obtain a signal with a decimation factor '2'
  - ii. Obtain a signal with a interpolation factor '2'. [6+10]
8. (a) What are the advantages of DSP processors over conventional microprocessors?
- (b) Explain the Implementation of convolver with single multiplier/adder. [8+8]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
**MICROPROCESSORS AND MICRO CONTROLLERS**  
**(Electrical & Electronic Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Discuss various addressing modes of 8086 with examples. [16]
2. (a) Write short notes on Assembler?  
(b) Write an assembly language program to arrange a list of numbers in ascending order (with out using the assembler)? [6+10]
3. (a) Explain the basic steps involved in an A/D converter  
(b) Explain the pin Diagram of ADC 0808/0809. [8+8]
4. (a) Explain pin diagram of 8259 PIC  
(b) Explain the interrupt sequence in 8086 system. [10+6]
5. (a) Explain digital transmission using modems?  
(b) Explain the following pins of 8251.
  - i. TxRDY
  - ii. DSR
  - iii. SYNDET/BD
  - iv. RTS[8+8]
6. (a) Draw the oscillator circuit and also draw the 8051 timing diagram.  
(b) Discuss in detail about parallel I/O ports in 8051 micro controller and explain how these ports are accessible for specific applications. [8+8]
7. (a) Explain how serial data communication is done with 8051 serial ports.  
(b) Explain with waveforms, different modes of serial data transmission modes in 8051. [8+8]
8. (a) Explain the interfacing of external data memory to 8051 using 74LS573 latch with a neat diagram and draw the waveforms.  
(b) Draw the pin diagram of 74LS573 latch and explain how you can demultiplex the address and data bus using this latch. [10+6]

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1. (a) What is the advantage of using the CPU register for temporary data storage over using a memory location?  
(b) Differentiate between maximum and minimum mode operations of 8086 processor  
(c) Discuss about the immediate addressing mode of 8086 with examples. [3+8+5]
2. (a) What are the differences between ALP and MLP?  
(b) Write a program to add two 16 bit numbers whose addition, results in a carry? [6+10]
3. (a) Write the pin diagram of DAC0800  
(b) Write an assembly language program to generate a triangular wave of frequency 500 Hz by interfacing it with 8086. The 8086 system operates at 8 MHz. The amplitude of the triangular wave should be at + 5 V. [4+12]
4. (a) Describe the procedure of interfacing static memories with a CPU.  
(b) Write a short notes on EE PROMS. [8+8]
5. (a) Explain with a neat diagram the working of 8251 PCI.  
(b) Draw the interface circuits for data conversion from
  - i. TTL to RS232C and
  - ii. RS232C to TTL[8+8]
6. (a) Discuss the advantages of micro controller based system over micro processor based system.  
(b) Enlite the relevent features of 8051 forming of micro controllers. [10+6]
7. (a) What is the use of Mode 0 of serial communication in 8051. Write a program to transmit a data 45H in mode 0.  
(b) What are the various SFRs you need while handling the Timers/Counters. Give the register formats. [8+8]
8. (a) Give the pin diagram of CD4511 7-segment display and explain how you can interface to 8051 microcontroller with a diagram.  
(b) Write an 8051 subroutine to control the 7-segment display operation. [8+8]

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1. (a) Discuss the Flag manipulation and processor control instructions of 8086  
(b) Discuss the following interface signals of 8086 in minimum mode
  - i. Address/Data bus
  - ii. Status signals
  - iii. Control signals. [8+8]
2. (a) Write an ALP to load a file from hard disk of your system into RAM system at segment address 5000H with zero relocation factor.  
(b) Write the differences between ALP and MLP. [10+6]
3. (a) Design a stepper motor controller.  
(b) Write an ALP to rotate shaft of a 4-phase stepper motor with 200 rotor teeth for rotating through an angle of  $135^\circ$  in 2 seconds. [8+8]
4. (a) Explain the bus structure of 8086 system  
(b) Explain the differences between memory and I/O interfacing. [8+8]
5. (a) Draw the internal block diagram of 8251 and explain about each block in detail.  
(b) Distinguish between Synchronous and Asynchronous data formats. [10+6]
6. Draw and discuss the formats and bit definitions of the following registers in 8051 microcontroller.
  - (a) IP
  - (b) TMOD
  - (c) TCON
  - (d) SCON [4+4+4+4]
7. (a) Explain how the timer flag interrupt and the serial port interrupt are generated.  
(b) Discuss on external interrupts?  
(c) Discuss on interrupt priority? [6+6+4]
8. (a) Explain with a neat diagram how push button and LED can be connected to 8051

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- (b) Mention any application of electromagnetic relay and explain how a electromagnetic Relay is connected to a 8051 microcontroller with diagram. [8+8]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
**MICROPROCESSORS AND MICRO CONTROLLERS**  
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**Time: 3 hours**

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**All Questions carry equal marks**

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1. (a) Discuss about the interface signals of the 8086 processor in maximum mode  
(b) Discuss SBB, AAD, TEST, SCAS instructions of 8086. [8+8]
2. (a) Explain various DEbUG commands for troubleshooting executable programs?  
(b) Write an ALP to perform BCD addition of two 16 bit numbers. [8+8]
3. (a) Explain briefly interfacing of key board controller with 8086.  
(b) Explain I / O modes of operation of 8255. [10+6]
4. (a) Draw and discuss the status register of 8257?  
(b) Discuss the priorities of DMA request inputs of 8257? [8+8]
5. (a) Write the sequence of events for 8251 initialization with necessary 8086 instructions.  
(b) Draw and explain the block diagram of 8251. [8+8]
6. (a) Draw and explain the capacities of internal and external Program memory and internal and external data memory?  
(b) Define PUSH and POP instructions and give examples. Explain the stack operation. [8+8]
7. (a) Write 8051 program to initialize timer 1 in mode 0.  
(b) Give the formats of the registers which are used for the counters/timers. [8+8]
8. (a) What are the advantages of digital processing over analog processing?  
(b) Draw the circuit diagram for ADC AD571 and DAC Interfacing with micro-controller 8051.  
(c) Discuss on selecting an Analog-to-digital converter? [2+6+8]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
**MANAGEMENT SCIENCE**  
 ( Common to Electrical & Electronic Engineering, Electronics &  
 Communication Engineering, Chemical Engineering, Electronics & Control  
 Engineering, Electronics & Telematics, Electronics & Computer Engineering  
 and Instrumentation & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
 All Questions carry equal marks

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1. Describe the nature and importance of management in modern business context. [16]
2. “Organisation structure refers to the differentiation and integration of activities, authority, roles and relationships”. Explain. [16]
3. Define Plant layout. Explain the objectives of the good plant layout. [16]
4. Describe the various types of store registers. [16]
5. Highlight the significance of job description in selection. [16]
6. A project consist of 10 activities as detailed below. Draw the network. [16]

Job	Immediate Predecessor(s)
A	-
B	A
C	A
D	A
E	B
F	C
G	D
H	D
I	E,F,G
J	H,I

7. Do you agree with the statement “A company should go in for available internal skills and a policy of promotion from within always.” Justify. [16]
8. What do you understand by total quality management? How does this concept differ from quality control techniques? [16]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
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Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
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1. Name and describe the various levels of management with their functions. [16]
2. "Organisation structure refers to the differentiation and integration of activities, authority, roles and relationships". Explain. [16]
3. What are the objectives of method study? [16]
4. Explain the following terms with the help of a neat diagram.
  - (a) Economic order quantity and Lead time
  - (b) Safety stock and Re-order point
  - (c) Maximum inventory and Minimum inventory
  - (d) Average inventory and Inventory consumption trend. [4×4]
5. Discuss the merits and demerits of Payment by Time and Payment by Results. [16]
6. The jobs of a project with the respective time estimates are given in table.

Jobs	$T_o$	$T_m$	$T_p$
1-2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	7
4-5	3	6	15
6-7	3	9	27
5-8	1	4	7
7-8	4	19	28

- (a) Draw the network and calculate the following:
  - i. Variance of each job
  - ii. Length of the project
  - iii. Variance of project.

- (b) What is probability that the jobs on the critical path will be completed by the due date 42 days [8+8]

7. Can strategic management fail? Can it be prevented? [16]

8. Write short notes on:

- (a) Capability Maturity Model (CMM)
- (b) Just-in-Time (JIT)
- (c) Balanced Scored Card. [5+5+6]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
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 and Instrumentation & Control Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. What are the basic leadership styles and their corresponding effective and ineffective styles? [16]
2. What are different types of teams in an organisation? [16]
3. What is plant layout? Explain the advantages of a good layout. [16]
4. A manufacturer purchases items in lots of 800 units which is a four months' requirement. The cost per unit is Rs. 100 and the ordering cost is Rs. 120 per order. The inventory carrying cost is estimated as 20% of the average inventory. Find the economic lot size and the number of orders to be placed in a year. [16]
5. How is it different from personnel management. [16]
6. Given the cost and time data for a particular project . Determine the optimal cost schedule for the project by drawing project schedule Vs total cost. Overhead cost is Rs. 50 per day. [16]

Activity	Normal		Crash	
	Time(days)	Cost(Rs)	Time(days)	Cost(Rs)
1-2	3	180	1	220
2-3	4	130	2	180
2-4	7	80	3	120
3-4	5	80	2	140

7. Differentiate between horizontal and vertical growth strategy. How do these differ from concentric diversification? [16]
8. Write short notes on following:
  - (a) Enterprise Resource Planning (ERP)
  - (b) Business Process Outsourcing (BPO). [8+8]

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**III B.Tech II Semester Regular Examinations, Apr/May 2009**  
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Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
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1. What are the Mayo's Hawthorne experiments? Why are they significant even to-day? [16]
2. Define organisation. Explain the importance of organisation in an industry. [16]
3. Name and describe the various tools and techniques used in layout planning. [16]
4. What is inventory control? Give a brief classification of inventories. [16]
5. What environmental change will be the most difficult for HR group to manage? [16]
6. The jobs of a project with the respective time estimates are given in table.

Jobs	$T_o$	$T_m$	$T_p$
1-2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	7
4-5	3	6	15
6-7	3	9	27
5-8	1	4	7
7-8	4	19	28

- (a) Draw the network and calculate the following:

- i. Variance of each job
- ii. Length of the project
- iii. Variance of project.

- (b) What is probability that the jobs on the critical path will be completed by the due date 42 days [8+8]

7. Distinguish between strategic and operational planning. [16]
8. Is re-engineering another fad or does it offer something of lasting value? [16]

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Set No. 4

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