MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **VLSI DESIGN**

Branch: **Common to EEE & ECE**

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks

1. Write the equation for I_{DS} in non saturation region ?
2. What are the different MOS layers used in fabrication?
3. What is wiring capacitance?
4. What are the advantages of serial access memory?
5. Difference between PAL &PLA?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. What is Lithography?
2. What are the steps involved in IC fabrication?
3. What is Pass Transistor?
4. Sketch the stick diagram for 2 input NOR gate?
5. What is Fan in & Fan Out?
6. Explain about Inverter delays?
7. What is function of logical shifter?
8. Explain about SRAM?
9. What is Stuck-at –Fault?
10. Draw the structure of CPLD?

PART-B

Answer ALL questions of the following   5x10 Marks= 50Marks

1. With neat sketches explain BICMOS fabrication process in a P well.?

OR

2. Discuss different forms of Pull Up, mentioning Merits and Demerits of each form?

3. Draw the NMOS Enhancement and Depletion transistors using lambda based design rules?

OR

4. Discuss about the scaling of MOS Circuits in detail.

5. Design a layout diagram for two input NMOS NAND gate?

OR

6. Derive the expression for Propogation Delay τD in the case of Cascaded Pass Transistors?

7. Draw the circuit and layout for ROM and explain how the dynamic power dissipation is minimized?

OR

8. Explain how the partial products are independently computed in Parallel Multiplier?

9. Explain the architecture of FPGA with neat diagram.

OR

10. Explain the Gate level and function level of Testing?

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: <u>POWER SYSTEM OPERATION AND CONTROL</u>

Branch: EEE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**

1. What are the two assumptions for deriving the loss coefficients?
2. What are the optimization techniques for long range hydro scheduling problem?
3. How the ALFC loop is affected by AVR loop?
4. what is the relation between tie line power when they are identical?
5. Give some of the static compensators schemes.

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. Incremental fuel costs of two units A and B of a power station are $dF1/dPg1 = 0.4Pg1 + 40.0$; $dF2/dpg2 = 0.48Pg2 + 32.0$. For the minimum cost of generation of a total load of 900MW, what is the generation allocation for A and B units.
2. What are the thermal unit constraints.
3. Write the equation of optimal hydrothermal scheduling.
4. Define short range hydro scheduling problem?
5. Draw single area control block diagram.
6. What is the function of AVR?
7. Explain performance index and optimal parameter adjustment.
8. What is the tie line power deviation in terms of frequency?
9. Write the applications of synchronous condenser.
10. What are the sources of reactive power? How it is controlled?

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1. Obtain the priority list of unit commitment using full load average production cost for the given data for the load level of 900 MW. $F_1 = 392.7 + 5.544 P_1 + 0.001093 P_1^2$; $F_2 = 217 + 5.495 P_2 + 0.001358 P_2^2$; $F_3 = 65.5 + 6.695 P_3 + 0.004049 P_3^2$, P1, P2, P3 in MW ; Generation limits : $150 \leq P_1 \leq 600$ MW; $100 \leq P_2 \leq 400$ MW ; $50 \leq P_3 \leq 200$ MW. There are no other constraints on system operation. Obtain an optimum unit commitment table.

(OR)

2. Derive an expression for optimal scheduling loss less transmission.
3. Explain optimal scheduling for hydrothermal system.

(OR)

4. Explain scheduling problem and hydrothermal scheduling.
5. Explain following concepts i) Control area concept ii) Area control error.

(OR)

6. Explain isolated single area dynamic response and controlled case.
7. Define Unit commitment and Explain any four operational constraints to be considered while deciding unit commitment .

(OR)

8. With neat block diagram, explain two area load frequency control
9. The load at receiving end of a 3Φ overhead line is 30 MW, 0.8 pf lag at the line voltage of 66kV. A synchronous compensator is situated at sending end and the voltage at both ends of the line is maintained at 66kV. Calculate the MVAR of compensator. The line has a resistance and reactance of 6Ω/ph, 24 Ω/ph, respectively.

(OR)

10. Write short notes on a) STATCOM b) UPFC

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: <u>Utilization of Electrical Energy</u>

Branch: EEE

Time: 3 hours

Max. Marks: 75

PART – A

I. Answer ALL questions of the following

5x1Mark=5 Marks

1. Which motor is best suited for rolling mills?
2. What is the purpose of coating on the arc welding electrodes?
3. What is the normal life of a fluorescent tube?
4. Which place in India the diesel locomotives is manufactured?
5. What is the relation between tractive effort and adhesive weight?

II. Answer ALL questions of the following

10x2Mark=20 Marks

1. Write the advantages of group drives.
2. What are the reasons for using load equalization in electric drives?
3. Define welding.
4. What are the advantages of Radiant heating?
5. Define Reflection factor.
6. Define Mean spherical candle power.
7. Mention the advantages of DC traction system.
8. List the different types of electric braking methods.
9. What is adhesive weight?
10. Define coefficient of adhesion.

PART-B

Answer ALL questions of the following

5x10 Marks= 50Marks

1. A 220V DC series motor takes an armature current of 20A at 800 rpm. Calculate the speed if a diverter of 0.4ohms is connected in parallel with series field and the motor remains 20A. An armature resistance is 0.5ohms, field resistance is 0.2ohms.

OR

2. Describe the selection of various types of motors for the following services. **(2+2+2+2+2)**
   a) Rolling Mills b) Textile Mills c)Cement Mill d) Paper Mill e)Lift, Cranes

3. Explain in detail about the following & List the advantages.
   a) Resistance Welding   (2 1/2M)
   b) Seam Welding   (2 1/2M)
   c) Butt Welding   (2 1/2M)
   d) Projection welding.   (2 1/2M)

OR

4. Estimate the rating of an induction furnace to melt two tones of zinc in one hour if it operates at an efficiency of 70%. Specific heat of zinc is equal to 0.1. Latent heat of fusion of zinc 26.67k-cal per kg. Melting point is 455°C. Assume the initial temperature to be 25°C.

5. a) Discuss the Laws of illumination and its limitation in actual practice.
    b) What is photometry? Describe photovoltaic method of photometry and discuss its limitations.

OR

6. a) Compare a tungsten filament lamp with fluorescent lamp in detail.
    b) What are the various types of lighting schemes? Explain with relevant diagrams.

7. a) Discuss why a DC series motor is ideally suited for traction services.
    b) State the different types of electric braking. Explain each of them in detail.

OR

8. Draw the speed-time curve of a main line service and explain how it works.

9. a) Define the term co-efficient of adhesion and explain the factors on which it depends.
    b) An electrical train weighing 200 tonnes is accelerated up a gradient of 1 in 250 at a mean acceleration of 1.5kmph upto a speed of 40kmph. Calculate
    i) The tractive effort required
    ii) The output at the end of the accelerating period. The main resistance is 4kg/tone and effective weight is 10% more than the dead weight.

OR

10. a) Define specific energy consumption and discuss the factors which effect the specific energy consumption of trains operating at a given scheduled speed.
    b) A suburban electric train has a maximum speed of 60kmph. The scheduled speed including a station stop of 20sec is 40kmph. If the acceleration is 1.5 kmph, determine the value of retardation, if the average distance between stops is 3kms.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: <u>**Embedded System Design**</u>

Branch: **Common to EEE & ECE**

Time: **3 hours**   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks

1. What is an embedded system?

2. What is actuator?

3. What is the role of a processor reset and system reset?

4. What is an operating system

5. What are various embedded system designs?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Explain the quality attribute Response in embedded system design.
2. What is meant by Quality attribute

3. What are the domain specific processors?

4. What are the advantages of memory shadowing?

5. What is embedded firmware?

6. Why RTC is required in an embedded system.

7. What is Super loop based design approach in embedded systems.

8. What is role of RTC in Embedded system?

9. What is critical section?

10. What is Non-Preemptive Scheduling

PART-B

Answer ALL questions of the following   5x10 Marks= 50Marks

1. What is embedded system, write the differences between embedded system and general computing system.

<div align="center">OR</div>

2. Write short notes on . (i) Testability and Debug ability (ii) Per unit cost and total cost.

3. What is processor architecture? What is the different processor architectures available processor/controller design? Give an example?

<div align="center">OR</div>

4. Discuss briefly Memory hierarchy and cache.

5. Explain the role of Brown out protection circuit in embedded system?

OR

6. Explain Programmable Peripheral Interfaces with block diagram.

7. Explain how multithreading can improve the performance of an application with an illustrative example?

OR

8. Explain multiprocessing, multitasking and multiprogramming and different multitasking models.

9. Explain the synchronous and asynchronous messaging mechanisms for IPC under windows kernel?

OR

10. State the task synchronization issues and explain how to overcome those problems

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Switch Gear And Protection**

Branch: EEE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks
1. What is the function of Auto reclosures?
2. What are the relays used for protection of short and long transmission line?.
3. What is the function of Translay Relay?
4. What is Equipment grounding?
5. Define BIL.

II. Answer ALL questions of the following   10x2Mark=20 Marks
1. What are the types of circuit breakers based on voltage?
2. Mention any two disadvantages of SF6 circuit breaker.
3. What is the principle of differential relay?
4. Differentiate Static Relays and Electromagnetic Relays.
5. What are the disadvantages of Differential protection used for alternators?
6. What is the function of Buchholtz relay?
7. What are the methods of neutral grounding?
8. What are the disadvantages of Peterson Coil grounding?
9. What are the causes of over voltage?
10. Define Lightning and Arcing ground.

PART-B

Answer ALL questions of the following   5x10 Marks= 50Marks

1. (a) With a neat diagram explain the construction and working of Air Blast Circuit Breaker.   -
   (b) Describe the rating of circuit breakers.   -

(OR)

2. (a) With a neat diagram explain the construction and operation of Vacuum Circuit Breaker. -
   (b) In a 220 kV systems, the reactance and capacitance up to the location of the circuit breaker is 5Ω and $0.025\mu F$ respectively. A resistance of 600Ω is connected across the contacts of the circuit breaker. Determine the following:
   (i) natural frequency of oscillations
   (ii) frequency of damped oscillations
   (iii) critical value of resistance
   (iv) the value of resistance which will give frequency of damped oscillations which is equal to 1/4th the natural frequency.

3. (a) Explain MHO and offset MHO relays with R-X characteristics.

   (b) Explain construction and working of a wattmetric type induction-disc relay.

(OR)

4. (a) Determine the actual time of operation of a 5A, 3 second over current relay having a current setting of 125% and a TSM of 0.6 connected to supply circuit through a 400/5A CT when the circuit carries a fault current of 4000A. Time of operation is 3.5 seconds for the estimated value of PSM.

   (b) State and explain briefly the requirements and characteristics of protective relaying.

5. Explain a protection scheme provided against stator internal faults of an Alternator with its diagram.

   (b) A star-connected, 3-phase, 10-MVA, 6·6 kV alternator has a per phase reactance of 10% It is protected by Merz-Price circulating-current principle which is set to operate for fault currents not less than 175 A. Calculate the value of earthing resistance to be provided in order to ensure that only 10% of the alternator winding remains unprotected.

(OR)

6. (a) Explain percentage biased differential protection applied to 3-phase transformer with diagram. Also give different types of CT connections used for various combinations of transformer primary and secondary winding connections.

   (b) Describe Three-zone distance relay protection of lines using Impedance relays.

7. (a) Explain the reactance grounding with circuit diagram and phasor diagrams? List out its merits and demerits.

   (b) A 132 kV, 3-phase, 50 Hz transmission line 200 km long consist of three conductors of effective diameter 20 mm arranged in a vertical plane with 4 m spacing and regularly transposed. Find the inductance and kVA rating of the arc suppression coil in the system.

(OR)

8. (a) Explain the concept of arcing grounds in the power system and derive the necessary expressions.

   (b) Describe the effects of Ungrounded Neutral on system performance.

9. (a) What are the advantages and disadvantages of Metal oxide lightning arrester? [4M]

   (b) Describe the protection of transmission lines against direct lightning strokes. [6M]   (OR)

10. (a) Describe the construction and operation of Valve type surge arrester?
    (b) Enumerate the basic concept of insulation coordination and draw Volt-Time Characteristics.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Electrical Distribution Systems**

Branch: EEE

Time: 3 hours

Max. Marks: 75

PART – A

I. Answer ALL questions of the following

5x1Mark=5 Marks

1. Define Utilization factor.

2. Write the different primary feeder voltage levels?

3. Write the power loss relation between single phase to 3-phase?

4. Write operation of auto re-closer?

5. Define power factor.

II. Answer ALL questions of the following

10x2Mark=20 Marks

1. Explain Contribution factor and coincidence factor relation.

2. The annual peak load of a primary feeder is 2050KW at which the power loss is 80KW per phase. Assuming annual loss factor of 0.15, determine

   a) The average annual power loss

   b) the total annual energy loss

3. Draw one line diagram of typical distribution system.

4. Write advantages and disadvantages of a typical ring bus scheme

5. Give the relation between the voltage drop in single phase and voltage drop in three phases when Single phase two wire Ungrounded laterals are considered.

6. Write the total series voltage drop and power loss formulae of a feeder with uniformly distributed load.

7. What is the main objective of distribution system protection and explain it.

8. Explain the salient points in general coordination procedure.

9. Write the condition of load factor for which voltage drop is maximum.

10. Choose the best co-ordination method for the protection and explain why?

    (a) Fuse-to-circuit breaker. b) Breaker to fuse.

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1. Give the classification of loads and draw their characteristics.

(OR)

2. a) Write the relation between coincidence factor and diversity factor.
   b.) The input the distribution substation if 90,600MWh annually. On the peak load day of the year the peak is 30MW and the energy input that day is 300.5 MWh.Find the load factor of the year and for the peak load day

3. With neat sketches explain the various types of sub transmission systems.

(OR)

4. Explain basic design practice of secondary distribution system and also discuss about secondary banking.

5. Explain the rules to be considered to locate the Substation.

(OR)

6. What are automatic line sectonalizers? Explain the purpose and advantage of using them?

7 Explain the procedure for single line to ground fault current

(OR)

8. a) Explain the operation of re-closure.

   b) The per unit positive,negative,and zero sequence impedances of a distributed network are

   0.06,0.06 and 0.04 respectively .determine the fault current for L-L and L-L-L fault

9. How do you determine the best capacitor location? Explain.

(OR)

10. a) Explain the effect of AVR on voltage control.

    b) Write short note on the role of AVB on voltage control

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018
Subject: HIGH VOLTAGE ENGINEERING
Branch: EEE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks

1. What is electric field?
2. What is break down voltage?
3. What is the limitation of half wave rectifier?
4. What is lightning overvoltage?
5. What is BIL?

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. What are the applications of insulating materials?
2. Write the limitation of Finite Difference Method.
3. Define Ionization process
4. Define Towsend's secondary ionization coefficient.
5. Draw the circuit of full wave rectifier
6. Define voltage regulation.
7. Define lightning phenomena.
8. What is direct stroke?
9. Define loss tangent.
10. Why testing is required for electrical apparatus?.

PART-B

Answer ALL questions of the following   5x10 Marks= 50Marks

1. Explain the applications of insulating materials in capacitors and circuit breakers.
(OR)
2. Explain Finite Element Method. Also mention the merits and demerits.

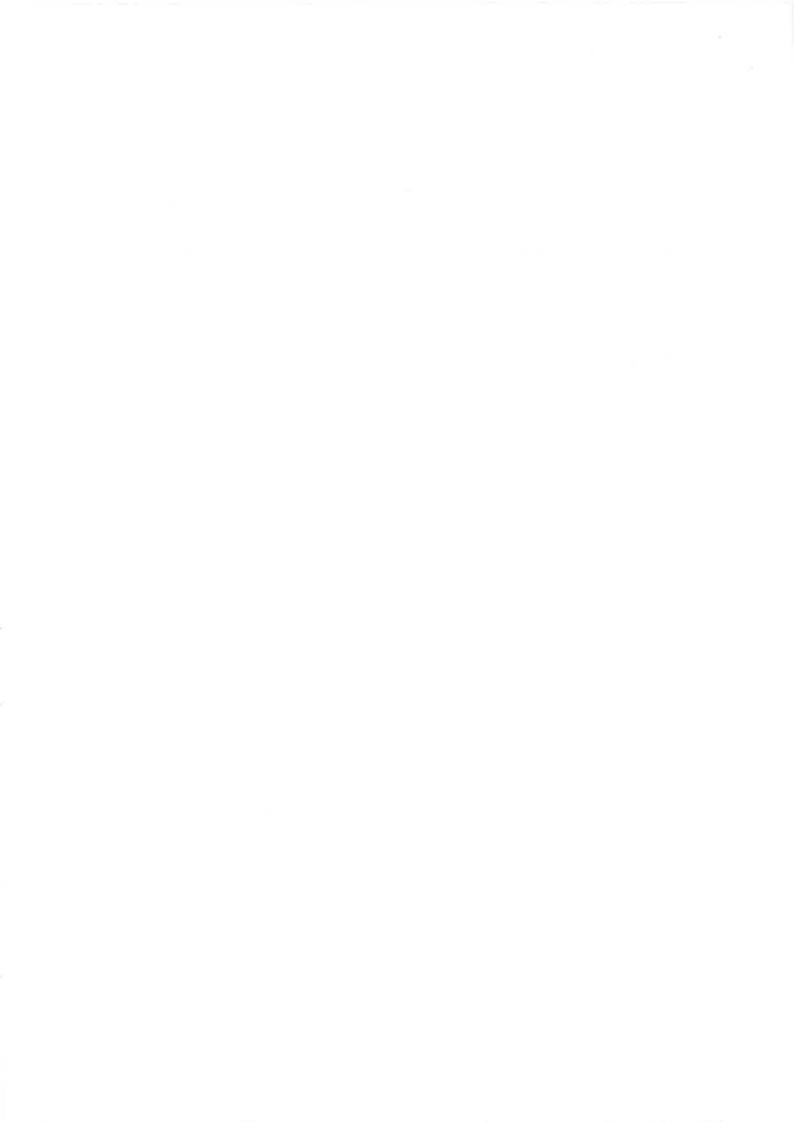3. Explain Paschen's law. Also explain ionization by collision process
(OR)
4. Explain about conduction and breakdown in commercial liquids.

5. Explain the working of CockRoft-walton circuit by specifying ripple voltage.
(OR)
6. Explain the analysis of impulse generator circuit of series RLC type.

7. Explain about surge arrester with its characteristics.
(OR)

8. Explain the mechanism of lightning strokes. Also explain the mathematical model for lightning.

9. Explain about the partial discharge measurement to find DC resistivity of a material
(OR)
10. Explain testing of surge arresters.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: DIGITAL SIGNAL PROCESSING

Branch: EEE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**

1. What is the purpose of Anti Aliasing Filter in Digital Signal Processing system?

2. Write an expression for Discrete Fourier Transform.

3. What is order equation for the low pass Butterworth analog filter?

4. Give any two advantages of FIR filter.

5. What do you mean by decimation?

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. Determine whether the following systems are time invariant or not

   i.$y(n)= x(n)+x(n-1)$,   ii.$y(n)= x^2(n)$

2. State the multiplication property of the Z-transform.

3. Find the linear convolution of the sequences $x(n)= \{1,3\}$ and $h(n)= \{2,1\}$.

4. What are the applications of FFT Algorithm?

5. Obtain the transfer function of the IIR filter whose difference equation is given by

   $y(n)= 0.9y(n-1)+0.1x(n)$.

6. Give the difference between recursive and non recursive filters.

7. What are the properties of FIR filter?

8. Give the expression for resonant filter used in frequency sampling realization.

9. Define Dead Band.

10. What is the necessity of the low pass filter in decimation process?

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1. a. Check the stability and causality of the given system difference equation

   $y(n) - y(n-1)= x(n)+x(n-1)$.   (4M)

   b. Obtain the direct form and cascade form for the system described by a difference equation

   $y(n) = \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) + x(n) - x(n-1)$ (6M)

(OR)

2. Find the inverse Z-transform of $X(z) = \dfrac{z(z+1)}{(z-1)^3(z-2)}$ for ROC: $|z|>2$ using partial fraction expansion method.

3. a. Compute the eight-point DFT of the sequence x(n) ={1,1,1,1,0,0,0,0} Using the radix-2 decimation-in-time algorithm.

  b. Explain overlap-add method for linear FIR filtering of a long sequence.

(OR)

4. a. Find the IDFT of the sequence X(k) = {4, 1- j2.414, 0, 1-j0.414, 0, 1+j0.414, 0, 1+j2.414} using DIF algorithm.   (8M)

  b. Draw the 4-point radix-2 DIT-FFT butterfly structure for DFT.   (2M)

5. Determine the system function $H(z)$ of the Chebyshev's low pass digital filter with the specifications

  α_p= 1 dB ripple in the pass band $0 \leq \omega \leq 0.2\,\pi$

  α_s = 15 dB ripple in the stop band $0.3\pi \leq \omega \leq \pi$

  using bilinear transformation (assume T= 1 sec).

(OR)

6. Convert the analog filter H(s) = 0.5(s+4)/ (s+1)(s+2) using impulse invariant transformation with T= 0.314 sec.

7. Design an ideal FIR Low pass filter with a frequency response

  $$H_d(e^{jw}) = 1 \qquad \frac{\pi}{4} \leq |w| \leq \pi$$

  $$= 0 \qquad |w| < \frac{\pi}{4}$$

  Find the values of $h(n)$ for N=11 using rectangular window.

  Find $H(z)$ and determine the magnitude response.

(OR)

8. Design an ideal FIR high pass filter with a frequency response

  $$H_d(e^{jw}) = 1 \qquad \frac{\pi}{4} \leq |w| \leq \pi$$

  $$= 0 \qquad |w| < \frac{\pi}{4}$$

  Find the values of $h(n)$ for N=7 using hamming window.

  Find $H(z)$ and determine the magnitude response.

9. Explain the limit cycle oscillations due to product round off and overflow errors.

(OR)

10. Discuss the procedure to implement digital filter bank using multirate signal processing.