DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

Department of Electronics and Communication Engineering

IIB.Tech (EEE) Sem-I QUESTION BANK

Subject:**Basic Electronic Devices (R16)**

Faculty: **P.Poorna Priya, Assistant Professor, ECE Department**

UNIT1

1 (a)Compare conductors, Insulators and semiconductors with help of energy band Diagrams
(b)Derive the conductivity of a semiconductor
(c) Derive mass action law

2 (a)Explain Hall Effect. How can Hall Effect be used to determine some of the properties of semiconductor? And list the applications
(b)Explain about Mobility, Conductivity and Drift current with suitable diagrams

3 (a)Explain Fermi level in Intrinsic, Extrinsic semi conductors with necessary Mathematics
(b)State and prove continuity equation.

4 (a)In a Ge PN Junction at 3000 k have the following parameters LD=5x1018/cm3, LA=6x1016/cm3, n i=1.5x1010/cm3. Calculate the minority electron density in p-region and minority hole density in n-region.
(b) Explain the following terms:
(i) Potential (ii) Electron Volt. (iii) Charge density (iv) Current density.

UNIT2

1 .Explain the VI characteristics of a tunnel diode with the help of the energy band Diagram

2 (a) Explain V-I characteristics of a PN junction diode
(b)Explain the temperature dependent characteristics of PN junction diode

3 (a) Explain the operation of varactor diode with neat diagram
(b) Design a Zener diode regulator to meet following specifications. Unregulated DC input voltage V i=15±10V regulated DC output Vo=8V. IZmin=6mA,IZmax=85mA, Load current Ic=20 Ma

4 (a) Explain the Zener and Avalanche thermal breakdown mechanisms. What will be their thermal coefficients?
(b) Explain the operation of PIN diode with neat diagram

5 (a) Explain the operation of P-N junction diode and derive the expression for diode equestion.
(b) Explain the principle of operation of Varactor diode, LED and Photo diode

UNIT3

1 (a) Explain the operation of a series and shunt BJT based regulator
(b) Derive expressions for rectification efficiency, ripple factor, transformer utilization factor, form factor, peak factor of a half-wave rectifier with resistive load

2 (a) Derive expressions for rectification efficiency, ripple factor, transformer utilization factor, form factor, peak factor of a full-wave rectifier with resistive load
(b)A full wave rectifier supplies a load requiring 300V at 200mA. Calculate the transformer secondary voltage for (i) a capacitor input filter using a capacitor of 10mF, and (ii) a choke input filter using of 10H and a capacitor of 10μF.Neglect the resistance of choke

3 (a) compare the performance of inductive, L-section and _-section filters
(b)A full-wave rectified voltage of 18V peak is applied across a 500μF filter capacitor. Calculate the ripple and d.c voltages if the load takes a current of 100mA

4 (a) Construct Bridge rectifier circuit and derive equation for IDC, VDC, IRMS, VRMS, and Rectifier efficiency

(b) A diode whose internal resistance is 20ohms is to supply power to a load of 1 KΩ from 110 V (rms) source of supply. Calculate i) Peak load current ii) DC load current iii) AC load current iv) DC diode voltage v) Total input power vi) Peak Inverse voltage vii) % of regulation viii) Efficiency

5   (a) What is the regulated power supply? Explain the operation of Zener diode Regulator

(b) Why do we connect inductor in series with load and capacitor is in parallel with the load in L-section filter of rectifier circuit. Justify.

UNIT4

1   (a) a) Explain about BJT based voltage self bias.

(b)Derive h-parameter model of a BJT.

2   (a) Explain how transistor is used as an amplifier

(b) b) Consider the self-bias circuit where Vcc=22.5V, Rc=5.6 k_, R2=10 k_ and R1= 90 k_,hfe=55,VBE=0.6V.the transistor operates in active region. Determine (i) operating point (ii) stability factor

3   (a) Explain how transistor is used as an switch

b) Derive an expression for the stability factor of a CB bias circuit

4   (a) Determine the h-parameters from the characteristics of CB configuration

(b) Explain about Bias Compensation in transistor

5   (a) Determine the h-parameters from the characteristics of CE configuration

(b) An NPN transistor if _=50 is used in common emitter circuit with Vcc =10V and Rc=2k_. the bias is obtained by connecting 100k_ resistor from collector to base.Find the quiescent point and stability factor

UNIT5

1   (a) Explain about Transfer characteristics of JFET with the suitable figures

(b)Prove that $\mu = g_m r_d$ in a Field effect Transistor.

2   (a) Explain principle of operation and characteristics of power IGBT (8M)

(b) Explain low frequency model of JFET

3   (a) Explain principle of operation and characteristics of SCR

(b) Explain how JFET as an amplifier

4   (a) Explain principle of operation and characteristics of thyristor

(b) Explain about enhancement and depletion mode of MOSFET

5   (a) Explain principle of operation and characteristics of power MOSFET

(b) List out the comparisons of power devices.

UNIT6

1   (a) Explain the operation of class A push pull power amplifier and derive its conversion efficiency

(b) Mention the advantages of negative feedback.

2   (a) Find the efficiency of class A and class B of power amplifiers

(b) Draw the circuit diagram of Crystal oscillator .drive of expression for frequency of Oscillations

3   (a) Draw the circuit diagram of RC phase shift oscillator .drive of expression for frequency of oscillations

(b) Explain the operation Class A power amplifier with neat circuit diagram

4   (a) Explain the operation of wein-bridge oscillator with the help of neat circuit diagram. How is amplitude stability achieved in this circuit?

(b) Explain the operation Class C power amplifier with neat circuit diagram and its Efficiency

5   (a) Why do need three RC networks for a phase shift oscillations? Can it be two or four?

b) Draw the circuit diagram Push-full amplifiers and explain in detail

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

QUESTION BANK

UNIT-I
Balanced Three Phase Cicuits

1. a) Define phase sequence and how it is chosen. (4M)
b) Derive and explain the relationship between line voltage and phase voltage in the three phase balanced star connected system.(6M)

2.a) Write short notes on star connected three phase balanced system (4M)
b) A three phase three wire system has a balanced star connected load with a 50Ω resistance, 100 mH inductance in series with each line to the neutral point. The circuit is supplied with a balanced supply of 200V, 50 Hz. Determine the line current, total power and the power factor of the load. (6M)

3. a) Write short notes on delta connected three phase balanced system. (3M)
b) Derive and explain the relationship between line current and phase current in the three phase balanced delta connected system (7M)

4.a) Draw the circuit diagram that measures the three phase power using two wattmeter method.(4M)
b) A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is $(10 + 5j)\Omega$ and the current in the phase is given by 10 $\angle 0^\circ$ A. If the source is operating with 0.9 power factor,determine phase voltage and resistance of the connecting wire.(6M)

5.a) Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase balanced delta connected system
b) A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is $(5 + 10j)\Omega$ and resistance of the connecting wire is 0.5

Ω. Given the phase voltage is 200V. Determine the line current and the total power delivered to the load (5+5)M

6.a)what are the advantages of 3-Φ system. (3M)
b)A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is having a resistance of 10Ω in parallel with 10 μF capacitor and resistance of the connecting wire is 1Ω. Given the phase voltage is 200V, 50 Hz. Determine the line current and the total power delivered to the load (7M)

UNIT-II
Unbalanced Three Phase Cicuits

1. a) Write short notes on loop method of solving three phase unbalanced circuits. (4M)
b)Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase unbalanced star connected system (6M)

2.a) Write short notes on star delta transformation technique. (4M)
b) A balanced star connected three phase generator with phase voltage 200V supplies an unbalanced star connected load with impedances$(7+5j),(4 - 9j)\&(8 - 6j)$. Determine the total complex power (6M)

3. a) Write short notes on star connected three phase unbalanced system. (3M)
b) Find the line currents in the unbalanced three-phase circuit of Fig shown below and the real power absorbed by the load……(7M)
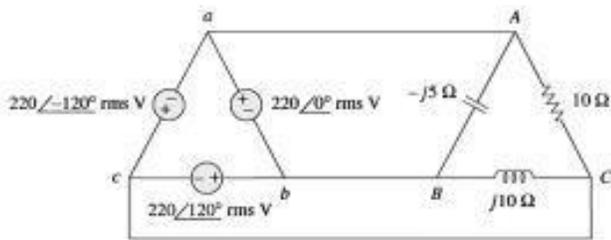
4. a) Write short notes on delta connected three phase unbalanced system. (4M)
b) A delta connected load with phase impedances$(2 + 2j), (4 - 6j)$and $(2 + 3j)$ are fed by a three phase star connected supply 100 V. Determine the total power delivered to the load.(6M)

5. a) Explain in detail about the Loop method of solving three phase unbalanced circuits (5M)
b) A three phase delta connected balanced supply 200V is connected to a star connected unbalanced load of impedances$(2 + 3j), (4 - 6j)$and $(2 - 5j)$. Find the line currents(5M)

6. a) Explain in detail about the star delta transformation technique of solving three phase unbalanced circuits (5M)

b) A three phase four wire star connected balanced supply 100V is connected to a star connected unbalanced load of impedances$(1 + 3j)$, $(8 - 6j)$ and $(1 - 3j)$. Find the current in the neutral wire. (5M)

UNIT-III
Transient Analysis in DC and AC Circuits

1.a) Define time constant and write its significance. (3M)
b) Derive the relationship for the voltage across the capacitor in the series RC circuit with sinusoidal excitations (7M)

2. a) Define steady state and transient responses. (3M)
b) Determine the voltage across the capacitor for the circuit shown in the figure below (7M)
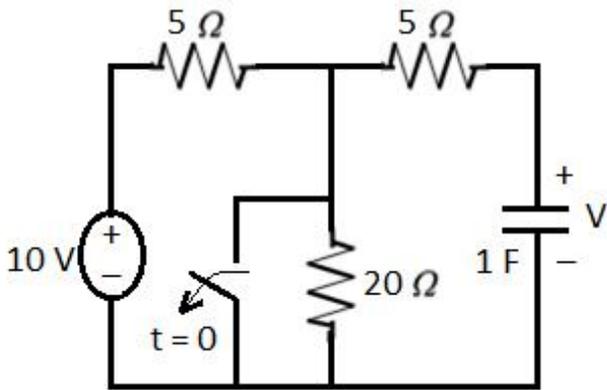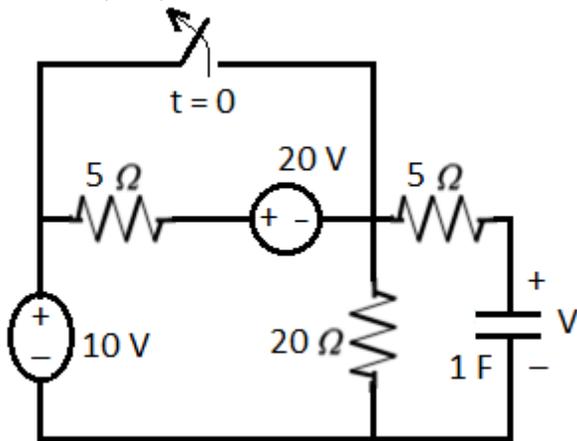

3. a) Discuss briefly about initial conditions. (4M)
b) Derive the relationship for the current in the series RL circuit with sinusoidal excitation.(6M)

4. a) Draw the time response for the voltage across the capacitor in series RC circuit with DC excitations.(3M)
b) Determine the voltage across the capacitor for the circuit shown in the figure below (7M)

5. a) Find the expression for the current in the inductor as shown in the circuit below(5M)
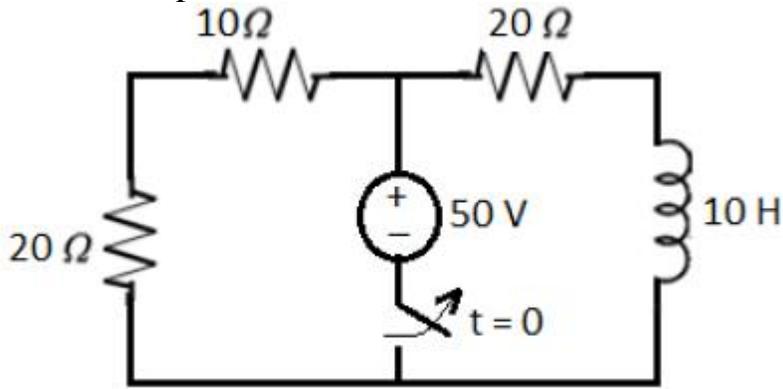
b) Derive an expression for voltage across R in an R-L-C series circuit when the circuit is excited with step voltage.(5M)

6. a)Derive an expression for current in the series RL transient circuit with DC Excitations(5M)

b) Find the expression for the current in the switch as shown in the figure below(5M)
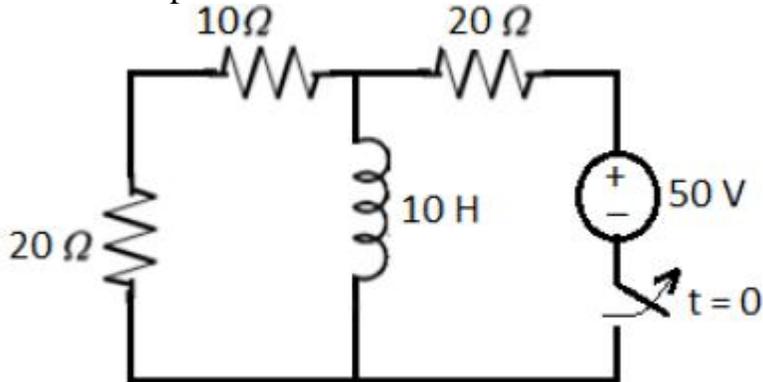
UNIT-IV
Two Port Networks

1. a) Define symmetrical property in two port networks and write the same for h, z, y parameters.(4M)

b) Derive the condition for the reciprocal property in two port networks in case of impedance parameters.(6M)

2. a) Write the reciprocal conditions for ABCD, h and Y parameters. (3M)

b) Determine the admittance parameters for the network shown in the figure below (7M)
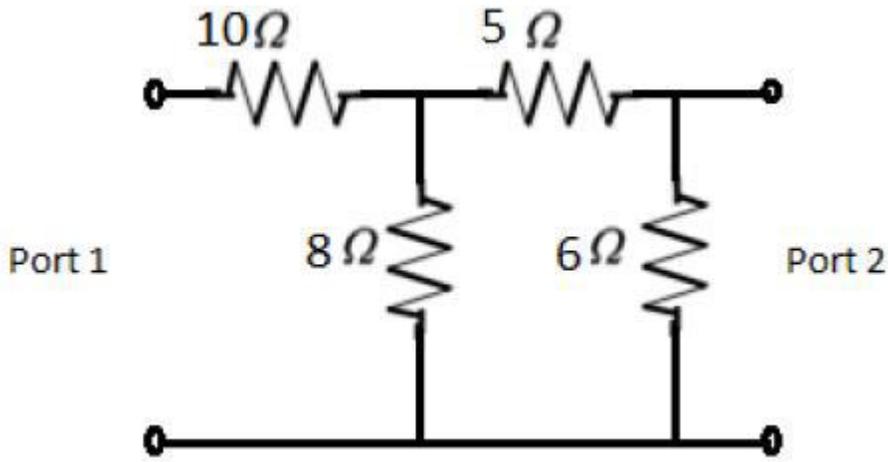
3. a) Express Z-parameters in terms of Y-parameters (4M)

b) Derive the condition for the symmetrical property in two port networks in case of hybrid parameters(6M)

4. a) Express Y-parameters in terms of Z-parameters (4M)

b)Determine the transmission parameters for the network shown in the figure below
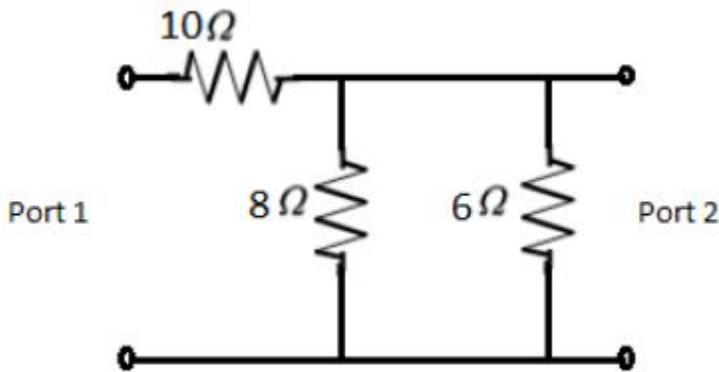
(4M)

5.a) Derive the condition for the reciprocal property in two port networks in case of ABCD parameters

(3M)

b) Determine the impedance parameters for the network shown in the figure below(7M)

6.a) Why Z-parameters are known as open circuit parameters and Y- parameters are short circuit parameters.(4M)

b)Express transmission parameters in terms of Z-Parameters and Y-parameters.(6M)

UNIT-V
Network Synthesis

1.a) Write short notes in LC immittance functions. (4M)
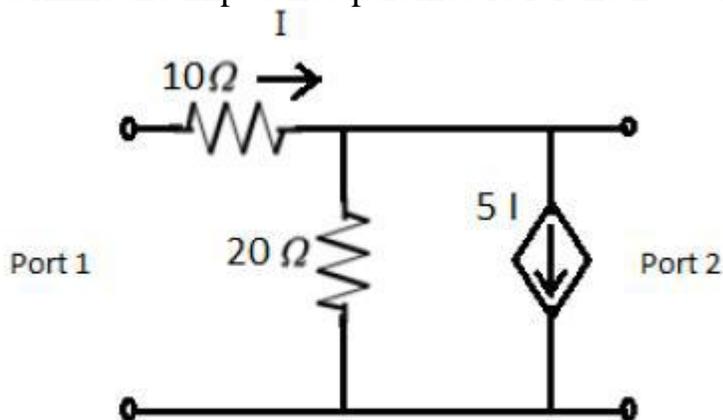b) Explain in detail about the Cauer method of network synthesis. (6M)

2.a) Write short notes on positive real functions. (4M)
b) What is RL admittance function? Explain with an example.(6M)

3. a) Write short notes on R.L impedance functions (4M)
b) Explain in detail about different procedures of network synthesis. (6M)

4. e) Write short notes on RC admittance functions. (4M)
b) What is RL impedance function? Explain with an example.(6M)

5.a) Explain in detail about the Foster method of network synthesis (5M)
b) What is RC admittance function? Explain with an example(5M)

6.a) Explain in detail about the Network synthesis procedure. (5M)
b) What is LC immitance function? Explain with an example(5M)

UNIT-VI
Fourier Analysis and Transforms

1.a) Discuss briefly about Fourier integrals. (4M)
b) Explain the exponential form of Fourier series and explain different parameters (6M)

2.a) Discuss the properties of Fourier transform. (5M)
c) Write a short note on condition of symmetry. (5M)

3.a) Discuss briefly about phase angle spectra. (3M)
b) Explain the trigonometric form of Fourier series and explain different parameters (7M)

4. a) Discuss briefly about Fourier transform. (4M)
b) Find V0 (t) in the circuit if the input voltage Vi (t) is given as (6M)

$$V_i(t) = \sum_{\substack{n=1 \\ (odd)}}^{\infty} \left[\frac{10}{n\pi} \sin 2nt - \frac{10}{n^2\pi^2} \cos 2nt \right].$$
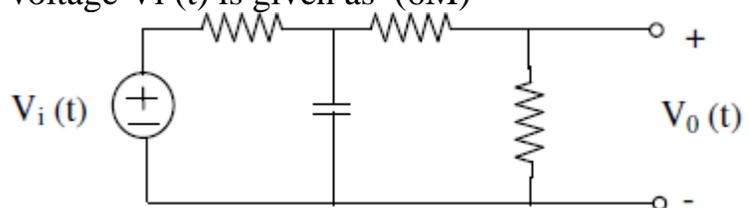
5.a) Explain different symmetry conditions in the Fourier series (4M)

b) Determine the effective voltage, effective current and average power supplied to a passive network if the applied voltage in volts is $V(t) = 150 + 80 \sin (15t+35^0) + 40 \sin (45t+48^0)$ and the resulting current in amps is $i(t) = 10 \sin (15t + 55^0) + 4 \sin (45t+78^0)$.(6M)

6.a) Discuss briefly about line spectra. (4M)

b) Explain the properties of Fourier transforms. (6M)

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

QUESTION BANK (ELECTRICAL MACHINES-1)

Academic Year : **2018-19**
Name of the Faculty : **G.JAGADEESH**
Designation : **Assistant Professor**
Department : **Electrical &Electronics Engineering**
Year/Semester : **II YEAR –I SEMESTER**
Subject : **ELECTRICAL MACHINES – I**

Unit-1

1a) Explain briefly the principle of energy conversion?. 4m
1b) Explain with the help of a neat block diagram about an electromechanical energy conversion device?6m

2)Explain the (i) singly excited system (ii) Multi – excited system?5m+5m

3a)Explain construction of dc machine?5m
3b) Explain the principle of operation of DC generator?5m

5a)explain the function of brushes in dc machine?3m
5b) What is the function of a commutator in Dc Generator?Classify the types of windings in DC machines and number of parallel paths ? 7m

6a) Explain the construction of DC generator?5M

6b) Explain the occ of DC shunt generator?5M

Unit-2

1a)Explain emf equation of dc generator?5m
1b)An 8 pole lap wound armature rotated at 350 rpm is required to generate 260v..the useful flux per pole is .05wb.if the armature has 120 slots, calculate the no of conductors per slot?5m

2a) explain armature reaction ,demagnatising effect?5m
2b) explain cross magnetizing effect in dc generator?5m

3a) what are the methods to eliminate armature reaction in dc generator?5m
3b) a series generator delivers a current of 100a at 250a.its armature and series field resistances
   are 0.1 ohm and 0.55 ohm respectively .find
   i)armature current 2) generated emf? 5m

4a) A 440V shunt motor takes 105A (Armature current) from the supply and runs at 1000 r.p.m. Its armature resistance is 0.15 ohm. If the total torque developed is unchanged, calculate the speed and armature current if the magnetic field is reduced to 70% of the initial value?5m

4b) A 250V, 4-pole, shunt motor has two-circuit armature winding with 500 conductors. The armature   circuit resistance is 0.25 ohms, field resistance is 100 ohms and the flux per pole is 0.03Wb. If the motor draws 14.5A from the mains, compute the speed and the internal (gross) torque developed. Neglect armature reaction? [5m

5a) Explain faradays laws of electromagnetic induction laws?4m
5b) explain the torque and emf equation of dc motor?6m

6a) Draw the characteristics of separately-excited, shunt motors?5M
6b) Draw the characteristics of series and compound motors?5M

Unit-3

1a)What is the necessity of starter?
1b)Describe a four-point starter with a neat sketch? 4+6 M

 2a) what are the draw backs of 3 point starter?4m
2b)Explain the working principle of a 3 point starter of a dc shunt motor with neat diagram? 6M

3 a) Explain the Speed control by armature voltage?5m
3b) Explain the speed control by field control method?5m

4. a) Explain the brake test on DC shunt motor?5m
4b) Explain the swinburnes test with necessary equations?5m

5a) Briefly explain the regenerative test?5m
5b) describe the significance of Hopkinson test with required model calculations?5m

6a) Explain about retardation test?5m
6b) Explain the concept of separation of losses concept for DC machines?5m

Unit-4

1a)Define transformer and its principle of operation?5m
1b) Derive the emf equation of transformer?5m

2a) Draw the phasor diagram of transformer on no load?5m
2b) Explain why a transformer cannot be operated on DC supply?5m

3a) Draw the phasor diagram of transformer operating at unity power factor?5m
3b) Explain the operation of transformer operating at lagging and leading power factor with phasor diagrams?5m

4a) Draw the equivalent diagram of single phase transformer with necessary equations?5m
4b) What is voltage regulation?5m

5a) Derive the voltage regulation of transformer from the phasor diagram?5m

5b) Explain the losses of transformer?5m

Unit-5

1a) List out various tests performed on transformers and explain the significance of each test?5m

1b) Explain why open circuit test should be performed on LV side and short circuit test performed on HV side?5m

2a) Explain OC test on transformer with circuit diagram and state all formulae?

2b) Explain the SC test with circuit diagram and all equations?5m

3a) Explain how sumpners test is conducted?5m

3b) what is parallel operation of transformers?5m

4a) what is auto transformer and explain its advantages?5m

4b) Draw the equivalent circuit of auto transformer with necessary formulae?5m

5a) Explain and separate the losses in a transformer?5m

5b) Distinguish between two winding transformer with auto transformer?5m

Unit-6

1a) Explain why poly phase connections are better than single phase?3m

1b) Explain star-star and star delta connections of 3 phase transformers?7m

2a) Draw delta-star and delta –delta connections of 3 phase transformers?5m

2b) What is open delta and explain its significance?5m

3a) Derive third harmonics in phase voltages of 3 phase transformers?5m

3b) Determine the value of Zp for 3 phase transformer?5m

4a) Determine Zs and Zt of 3 phase transformer ?5m

4b) Explain about transients in switching of 3 phase transformers?5m

5a) Explain the on load and off load tap changers for transformers?5m

5b) Define the significance of scott connection and draw the circuit diagram?5m

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

Question Bank II EEE I Semester

B Tech II Year I Sem   **Subject: Electromagnetic fields**

UNIT 1

1. a) A circular ring of charge with radius 5m lied in z = 0 plane with centre at origin. If the line charge density is 10 nC/m. Find the pint charge a placed at the origin. Which will produce same E at the point (0, 0, 6) m.

    b) Determine the electric field intensity due to infinite line charge, at a point perpendicular to its plane and at a gives distance from the line charge from firsprinciple.

2..   a) Prove that the electric field intensity is the negative gradient of potential.
        b) State and explain Gauss law. What are the limitations of Gauss law?

3.   a) Briefly explain about Coulomb's Law.
        b) Two point charges $2x10^{-2}$ C located at (1,2,4), $2x10^{-2}$C located at (1,2,-3) & $4x10^{-2}$ C located at (2,0,6) are placed in air. Find the force vector on charge Q1 .

4   .a) Derive the Maxwell's first equation
        b) Calculate the force on a unit positive charge at $2x10^{-2}$ P(x=2m, y=0) due to the charges Q1 at origin and Q2 at (x=1m, y=0) where Q1=1000 Pico coulombs Q2= -2000 Pico coulombs.

5.   a)Calculate the Electric Field Intensity due to a straight conductor.
        b) Derive torque equation on an electric dipole in an electric field

UNIT 2

1. a) Derive the energy stored and energy density in a static electric field.

    b) A parallel plate capacitor consists of two square metal plates with 500 mm side and separated by 10 mm. A slab of sulpher (ϵ_r) 6mm thick is placed on the lower plate and air gap of 4 mm. Find the capacitance of the capacitor.

2.   a) Explain in detail about Polarization and derive the relation between D, E & P.
        b) Explain in detail about Equation of continuity.

3.   a) Derive the equations for Conduction and Convection current densities.
        b) Explain in detail about Ohm's law in point form

4.   a) Explain and derive the boundary conditions for a dielectric-dielectric interface.
        b) A capacitor consists of two infinite parallel conducting plates 10cm apart. The space between conductors consists of two layers, each of 5cm thick. One layer has ϵ_r = 10 and the other layer is an air. If the potential difference of 125V is applied to the capacitor, Find: Magnitude of *D* and *E.*

5.a) Derive the condition that exist of the boundary between two perfect dielectrics   separated by a sharp boundary.
 b) Using Laplace equations, obtain the expression to the capacity of a parallel plate condenser.

UNIT 3

1. Using Biot- Savart's law, derive an expression for inductance per unit length of a long coaxial cable with radii of inner and outer conductors as 'a' and 'b' (b>a) respectively.

2. a) Derive the Maxwell's third equation and explain its importance.

b) A square loop 10 cm on a side has 500 turns that are closely and tightly wound and carries a current of 120 A. Determine the magnetic flux density at the centre of the loop

3. a) Show that $\nabla .B = 0$

   b) Explain in detail about Biot-Savart's law.

4. Find the Magnetic Field Induction due to a rectangular loop using Ampere's law.

b) Find the magnetic field of current in a straight circular cylindrical conductor of radius a..

5. a) State and Explain Ampere's Law.

b) In the region 0<r<2 in cylindrical coordinate system. A current density is given by J $= 6e^{-r}a_z$ A/m2, find MFI.

UNIT 4

1. a) Derive the force equation between two parallel conductors.

b) Derive torque equation when a current loop placed in magnetic field.

2. a) Derive the force on a straight and a long current carrying conductor in a magnetic field.

b) A single phase circuit comprises two parallel conductors A & B, each 1cm diameter and spaced 1m apart. The conductors carrying current of +100 & -100 Amps respectively. Determine the field intensity at the surface of each conductor and also in space exactly mid way between A & B.

3.a) Explain in detail about Lorentz force equation

b) Derive torque equation when a current loop placed in magnetic field.

4. a) A circuit carrying a direct current of 8A forms a regular hexagon inscribed in a circle of radius 0f 1.5 m. Calculate the magnetic flux density at the centre of the hexagon. Assume the medium to be free space

5. Find the magnetic field intensity at centre of a square of sides equal to 10 m and carrying a current equal to 75 A.

UNIT 5

1. a) A solenoid having a mean diameter of 20 cm & length of 50 cm having 1000 turns. The coil is placed coaxially inside the other solenoid having a mean diameter of 60 cm and number of turns equal to 2000 and length of the outer solenoid is equal to that of inner solenoid. Compute L1, L2 & M, neglect magnetic leakage medium and medium is air.

b) Explain in detail about energy stored and energy density in a magnetic field.

2. a) Evaluate the inductance of a solenoid of 2800 turns wound uniformly over a length 0.6m on a cylindrical paper tube 4 cm in diameter and the medium is air.

   b) Derive the mutual inductance between a straight long wire and a square loop wire   in the same plane.

3. a) A solenoid with 300 turns, 300mm long & 30 mm diameter, if the current is 500 mA and assume $= 1_r\lceil$. Find (1) Inductance (2) Energy stored in solenoid.

b) Explain and Derive self inductance of a toroid

4. Explain and derive self inductance of a long solenoid

5. Derive the expression for mutual inductance between straight long wire and the square loop in the same plane.

UNIT 6

1.   a) Derive Maxwell's fourth equation, Curl (E)$= -\frac{\partial B}{\partial t}$.

2) Show that the curl of the magnetic and electric field intensities enclosed by a closed surface will lead to the power transferred through the surface.

3. a) Show that the displacement current density will be equal to the rate of change of electric flux density in time varying field.
b) Explain in detail about statically and dynamically induced EMFs.

4. State and explain in detail about Poynting Theorem.
b) Explain briefly about Maxwell's equations for different cases.

5. A parallel plate capacitor with plate area of 5cm$_2$ and plate separation of 3mm has a voltage $50sin$ 10$_3$t V applied to its plates. calculate displacement current assume $\in_0=2\in$

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

II B.TECH - I SEM Question Bank

Subject Name: MEFA   **Branch: EEE**   **Faculty: Mrs.K.Chandrika**

UNIT-1

1. Define Managerial Economics. Explain its Nature And Scope.
2. Discuss the importance of Managerial Economics in decision making.
3. What is Managerial Economics? Explain its focus areas.
4. Explain the role of a Managerial Economist in a Business Firm.
5. Define 'Demand' and explain the types of demand?
6 Explain the price elasticity of demand ? and explain the measures of price elasticity of demand?
7 What is Demand Forecasting? Explain the various methods involved in demand forecasting?
8 Define the concept of supply and explain the law of supply ?.

UNIT-II

1. Define iso quant and costs and explain types of iso quants.
2. Define 'Cost'. How are costs classified? Explain any five important cost concepts useful for managerial decisions.
3. a)Define the concept of COBB-Douglas and leontief production function ?
   b)explain the concept of law of variable proportinal theory with suitable diagram?
4) explain the economies of scale and returns to scale with tabular diagram?
5   a) State and explain Break-Even analysis and explain its importance.
   b) What are its limitations? Use suitable diagrams.
6   You are required to calculate.
      i)   Margin of Safety
      ii)   Total sales
      iii)   Variable cost from the following figures;
      Fixed costs Rs. 12, 000;   Profit   Rs. 1, 000;   Break-Even Sales Rs.60, 000
4. a) The information about Raj and Co., are given below.
      i)   Profit-Volume Ratio (P/V Ratio) is 20%
      ii)   Fixed costs Rs. 36000
      iii)   Selling price per Unit Rs. 150
   b) Calculate:
      a.   BEP (in Rs.)   b) BEP (in Units)   c) Variable Cost per Unit   d) Selling Price per Unit
5. A company reported the following results for two periods.

Period	Sales	Profit
I	Rs.20,00,000	Rs.2,00,000
II	Rs.25,00,000	Rs.3,00,000

      Ascertain the BEP, P/V Ratio, Fixed cost and Margin of Safety.
6. Sales are Rs. 1, 10,000 Yielding a profit of Rs. 4,000 in period-I; Sales are
    Rs. 1, 50,000 with a profit of Rs. 12,000 in period-II. Determine BEP and Fixed Cost.
7. The P/V Ratio of Matrix Books Ltd is 40% and the Margin of safety is 30%. You are required to work out the BEP and Net Profit, if the Sales Volume is Rs.14,000

8. A Company prepares a budget to produce 3, 00,000 Units, with fixed costs as Rs. 15, 00,000 and average variable cost of Rs.10 per unit. The selling price is to Yield 20% profit on Cost. You are required to calculate
   a) P/V Ratio   b) BEP in Rs and in Units.

9. You are given the following information about two companies in 2000

Particulars	Company A	Company B
Sales	Rs.50,00,000	Rs.50,00,000
Fixed Expenses	Rs.12,00,000	Rs.17,00,000
Variable Expenses	Rs.35,00,000	Rs.30,00,000

   You are required to Calculate (For Both Companies)
   1) BEP (in Rs.)   2) P/V Ratio   3) Margin of safety

UNIT-III

1. a) What is perfect competition? What are its features?
   b) How is market price determined under conditions of Perfect Market Competition?
2. a) Explain in detail, the important features of perfect competition
   b) How can determine the price under monopoly?
3. a) Explain the features of Monopoly.
   b) How can a get profits under short and long run under monoploy with suitable diagram?
4. What are the features of Monopolistic Competition? How can a firm attain equilibrium position?
5. Compare and contrast between Perfect competition and Monopoly.
6. Explain in detail about Maris and Williamson's models.
7. a) What are the causes for the emergence of Monopoly?
   b) How is the equilibrium position attained by a monopolist under varying cost conditions? Explain briefly on Limit Pricing, Market Skimming,?
8. Write in detail about Internet Pricing- Flat rate pricing, Usage Sensitive, Transaction based pricing, Priority pricing.

UNIT-IV

1. a) What are the different types of Business organizations?
   b) What are the features of Sole trader form of Organization?
2. a)Explain the features and phases cof business cycles in detail?
   b)Define the concept of patnership firm and types of partners?
3. a) What are the salient features of Partnership firm .
   b) What are the advantages and limitations of partnership firm?
4. a) What do you mean by Joint Stock Company? What are the salient features?
   b) Describe the advantages and disadvantages of Joint Stock Companies?
5. a) Analyses the Formation of Joint Stock Company?
   b) What are the different types of companies?
6. Distinguish between the Joint Stock Company and Partnership.
7. What are the objectives behind starting public sector enterprises in the country? To what extent have they fulfilled these objectives?
8. Analyse the problems of the public sector enterprises and suggest remedial measures for their improvement.

UNIT-V

1. Give a brief account on the important records of Accounting under Double Entry System and discuss briefly the scope of each?
2. Explain the purpose of preparing the following accounts/statements and also elaborate the various items that appear in each of them.
   a) Trading Account   b) Profit & Loss Account   c) Balance Sheet
3. Explain the following adjustments and illustrate suitably with assumed data.
   a) Closing stock   b) Outstanding expenses   c) Prepaid Income   d) Bad debts
4. (a) Define the concepts 'Accounting', Financial Accounting and Accounting System'.
   (b) Explain the main objectives of Accounting and its important functions.
5. What do you understand by Double Entry Book Keeping? What are its advantages?
6. What is Trial Balance? Why it is prepared?

Illustration I

Journalize the following transactions and post them into Ledgers
Jan 1. Commenced business with a capital of Rs. 10000
,,   2. Bought Furniture for cash Rs. 3000
,,   3. Bought goods for cash from 'B' Rs. 500
,,   4. Sold goods for cash to A Rs. 1000
,,   5. Purchased goods from C on credit Rs.2000
,,   6. Goods sold to D on credit Rs. 1500
,,   8. Bought machinery for Rs. 3000 paying Cash
,,   12. Paid trade expenses Rs. 50
,,   18. Paid for Advertising to Apple Advertising Ltd. Rs. 1000
,,   19. Cash deposited into bank Rs. 500
,,   20. Received interest Rs. 500
,,   24. Paid insurance premium Rs. 200
,,   30. Paid rent Rs. 500
,,   30. Paid salary to P Rs.100

Illustration-III
During January 2003 Narayan transacted the following business.

Date	Transactions	Amount

2003		
Jan.1	Commenced business with cash	40000
,, 2	Purchased goods on credit from Shyam	30000
,, 3	Received goods from Murthy as advance for goods ordered by him	3000
,, 4	Paid Wages	500
,, 5	Goods returned to shyam	200
,, 6	Goods sold to Kamal	10000
,, 7	Goods returned by Kamal	500
,, 8	Paid into Bank	500
,, 9	Goods sold for Cash	750
,, 10	Bought goods for cash	1000.
,, 11	Paid salaries	700
,, 12	Withdrew cash for personal use	1000

Journalize the above transactions and prepare cash Account

Illustration V:

From the following list of balances prepare a Trial Balance as on 30-6-2003

		Rs.			Rs.
i	Opening Stock	1800	xiii	Plant	750
ii	Wages	1000	xiv	Machinery tools	180
iii	Sales	12000	xv	Lighting	230
iv	Bank loan	440	xvi	Creditors	800
v	Coal coke	300	xvii	Capital	4000
vi	Purchases	7500	xviii	Misc. receipts	60
vii	Repairs	200	xix	Office salaries	250
viii	Carriage	150	xx	Office furniture	60
ix	Income tax	150	xxi	Patents	100
x	Debtors	2000	xxii	Goodwill	1500
xi	Leasehold premises	600	xxiii	Cash at bank	510
xii	Cash in hand	20			

Illustration VI

Prepare a Trial Balance from the following Data for the year 2003.

	Rs.		Rs.
Freehold property	10800	Discount received	150
Capital	40000	Returns inwards	1590
Returns outwards	2520	Office expenses	5100

Sales	80410	Bad debts	1310
Purchases	67350	Carriage outwards(sales exp)	1590
Depreciation on furniture	1200	Carriage inwards	1450
Insurance	3300	Salaries	4950
Opening stock	14360	Book debts	11070
Creditors for expenses	400	Cash at bank	2610
Creditors	4700		

Illustration: VII

The following is the Trial Balance of Abhiram, was prepared on 31st March 2006. Prepare Trading and Profit& Loss Account and Balance Sheet.

	Debit Rs.	Credit Rs.
Capital	------	22000
Opening stock	10000	------
Debtors and Creditors	8000	12000
Machinery	20000	-------
Cash at Bank	2000	-------
Bank overdraft	------	14000
Sales returns and Purchases returns	4000	8000
Trade expenses	12000	-------
Purchases and Sales	26000	44000
Wages	10000	-------
Salaries	12000	-------
Bills payable	-------	10600
Bank deposits	6600	-------
TOTAL	110600	110600

Closing Stock was valued at Rs.60, 000

1. Explain the meaning of the 'Analysis of Financial Statements'. Discuss briefly the different type of analysis.
2. How are ratios classified for the purpose of financial analysis? With assumed data, illustrate any two types of ratios under each category
3. As a financial analyst, what precautions would you take while interpreting ratios meaningfully?
4. What are the limitations of Ratio Analysis? Does ratio analysis really measure the financial performance of a company?

UNIT-VI

1. What are the components of Working capital? Explain each of them.

2. a) What is the important of capital?

    b) What factors determine the working capital requirements of company?

3. a) What is the importance of Capital budgeting?

    b) How do the discounting models differ from non-discounting models?

4. Explain in detail about traditional and modern techniques of Capital Budgeting.

5. Examine the following three proposals and evaluate them based on

    a) PBP Method

b) ARR Method. (ARR on original Investment)

Initial Investment is Rs.10, 00,000/- each for all the three projects.

	Cash inflows (Rs.)		
Year	Project-A	Project-B	Project-B
1.	5,00,000	6,00,000	2,00,000
2.	5,00,000	2,00,000	2,00,000
3.	2,00,000	2,00,000	6,00,000
4.	-------	3,00,000	4,00,000

6. Determine the Pay Back Period for the information given below

   a) The project cost is Rs. 20,000

   b) The life of the project is 5 years

   c) The cash flows for the 5 years are Rs.10,000, Rs.12,000; Rs.13,000; Rs.11,000; and Rs. 10,000 respectively and

   d) Tax rate is 20%

7. Calculate the Net present value (NPV) of the two projects X and Y. Suggest which of the two projects should be accepted assuming a discount rate of 10%

Item	Project-A	Project-B
Initial Investment	Rs. 80,000	Rs. 1,20,000
Life Period	5 Years	5 Years
Scrap Value	Rs.4,000	Rs.8,000
(Annual Cash Inflows)	(CFAT)	(CFAT)
Year: 1	Rs.24,000	Rs.70,000
,, 2	Rs.36,000	Rs.50,000
,, 3	Rs.14,000	Rs.24,000
,, 4	Rs.10,000	Rs.8,000
,, 5	Rs.8,000	Rs.8,000

8. A Company has at hand two proposals for consideration. The cost of the proposals in both the cases is Rs. 5, 00,000 each. A discount factor of 12% may be used to evaluate the proposals. Cash inflows after taxes are as under.

Year	Proposals X(Rs.)	Proposals Y(Rs.)
1	1,50,000	50,000
2	2,00,000	1,50,000
3	2,50,000	2,00,000
4	1,50,000	3,00,000
5	1,00,000	2,00,000

Which one will you recommend under NPV method

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

QUESTION BANK

SUBJECT: T&HPM(EEE)   SEM: II-I

FACULTY: B.USHA RANI (CIVIL DEPT)

UNIT-1

1.a). Compare the difference between S.I engine and C.I engine? (4M)

b). Discuss the difference between theoretical and actual valve timing diagram of a diesel engine? (6M)

2.a). State the functions of carburetor with a neat sketch? (4M)

b). Explain the working principle of 4-stroke S.I engine with a neat sketch? (6M)

3.a). Compare the difference between 2-stroke and 4-stroke engine? (4M)

b). Draw the block diagram of 4-stroke engine and explain its parts? (6M)

4.a).Define the following: i) bore ii) stroke length iii) clearance volume iv) swept Volume (4M)

b). Discuss the relative advantages and disadvantages of air cooling and water cooling systems? (6M)

5 a Discuss the suitable sketches magneto-ignition system used in petrol engine? (6M)

B . A two-stroke cycle internal combustion engine has a meran effective pressure of 6 bar. The speed of the engine is 1000 r.p.m.if the diameter of piston and stroke are 110 mm and 140 mm respectively,find the indicated power developed.(6M)

6 a). State the purpose of lubrication? (4M)

b). Describe Valve -Timing Diagram?(6M)

7 a. State the advantages and disadvantages of battery and magneto-ignition system? (6M)

 b. **)**. Describe Port- Timing Diagram? ((4 M)

UNIT – 2

1.a). Give the differences between Rankine cycle and Carnot cycle? (4M)

b). A single stage steam turbine is supplied with steam at 5 bar, 200 degrees C at the rate of 50 kg/min. It expands into condenser at a pressure of 0.2 bar. The blade speed is 400m/s. the nozzles are inclined at an angle of 20 degrees to the plane of the wheel and the outlet blade angle is 30 degrees. Neglecting friction losses, determine the power developed, blade efficiency and stage efficiency. (6M)

2.a). Discuss the advantages of steam turbines over steam engines? (4M)

b). Explain the working principle of impulse and reaction turbine? (6M)

3.a). Describe the different operations of Rankine cycle. Derive also the expression for its efficiency? (6M)

b). Define the properties of steam turbine? (4M)

4.a). Derive the velocity triangles for simple impulse and reaction turbine? (6M)

b). State the advantages of regenerative cycle and simple rankine cycle? (4M)

5.a). State the methods of of increasing the thermal efficiency of a Rankine cycle? (6M)

b). What do u mean by compounding of steam turbines? Discuss various methods of compounding steam turbines? (4M)

6.a). Derive the expression for maximum blade efficiency in a single-stage impulse turbine? (6M)

b). Explain about the re-heat cycle with the neat sketch. (4M)

7.a). Explain the various operations of a Carnot cycle. Also represent it on T-S and H-E diagram? (6M)

b). A closed system of constant volume experiences a temperature rise of 25 degrees C when a certain process occurs. The heat transferred in the process is 30kJ. The specific heat and constant volume for the pure substance comprising system is 1.2kJ/kg C and the system contains 2.5 kgs of the substance. Determine i) change in internal energy, ii) work done. (4M)

UNIT-3

1.a). What are the merits and demerits of gas turbines over steam turbines? (4M)

b). Describe with neat diagram a closed cycle gas turbine and also derive the expression of thermal efficiency of the closed cycle. State also its merits and demerits over open cycle gas turbines. (8M)

2.a). List out the applications of gas turbines. (4M)

b). Discuss the difference between open cycle and closed cycle gas turbine? (8M)

3.a). Derive an expression of air standard efficiency for the open cycle gas turbine with the neat sketch and indicate the operations on P-V and T-S diagram. (8M)

b). Write a short note on fuels used in gas turbines? (3M)

4.a). Enumerate the various uses of gas turbines? (3M)

b). The gas turbine has an overall pressure of 5:1 and a maximum cycle temperature of 550 degrees C. the turbine drives the compressor and an electric generator, the mechanical efficiency of the drive being 97%. The ambient temperature is 20 degrees C and the isentropic efficiencies for the compressor and turbine are 0.8 and 0.83 respectively. Calculate the power output in kW for an air flow of 15kg/s. calculate also the thermal efficiency and the work ratio. Neglect changes in kinetic energy and the loss of pressure in combustion chamber. (8M)

5.a). Define the terms efficiency, work ratio and optimum pressure ratio for simple gas turbine cycle? (4M)

b). Define the different types of efficiencies? (4M)

6.a). Describe with neat sketches the working of a simple constant pressure open cycle gas turbine? (8M)

b). Define cycle and classify the different types of gas power cycles? (4M)

7.a). What are the methods to improve the efficiency of gas turbines? (4M)

b). Explain with a neat sketch the working of a constant volume combustion turbine? (8M)

UNIT – 4

1) **a.** Derive an expression for force exerted by a jet on a stationary flat plate held normal to the jet .
   b. what are the applications of impulse – momentum equation ?

2) **a .** Derive an expression for force exerted by a jet on a stationary flat plate   held   inclined to the jet .

   b. Derive an expression for force exerted by a jet on a curved vertical plate.

3) **a.** Derive an expression for force exerted by a jet on a stationary curved plate when jet strikes the curved plate at the centre.

   b. Derive an expression for force exerted on a moving curved plate when jet   strikes the curved plate at the centre.

4) a. Derive an expression for force exerted on a moving curved plate when jet strikes the curved plate at one end tangentially when the plate is unsymmetrical.

b. Derive an expression for force exerted on a stationary moving plate when jet strikes the curved plate at one end tangentially when the plate is unsymmetrical.

5) a. using the impulse – momentum principle , derive an expression for the force exerted by a moving jet of fluid on a stationary curve .

b. Derive an expression for work done on a moving flat plate.

6) a. Derive an expression for work done on a moving inclined plane .

b. Derive an expression for work done on a moving curve plane .

7) a. Define impact of jet on vanes.

b. Draw the inlet velocity triangle and outlet triangle.

UNIT - 5

1)   a) A pelton wheel is to be designed to the following specifications:
        power 11948 kW ,Head 381m,speed 750 rpm, overall efficiency 86% Jet diameter
        not to exceed 1/8 times the wheel diameter. Determine 1) The wheel diameter 2) the
        number of jets required 3) The diameter of the jet.

        b) A pelton wheel having a mean bucket diameter of 1m is running at 1000 rpm. The net
        head on the pelton wheel is 700m.if the side clearance angle is 15^0 and discharge through
        nozzle is 0.1 m^3/s, determine power available at the nozzle and hydraulic   efficiency of the
        turbine.

2)   a) Classify the hydraulic turbines.
        b) What are the parameters to be considered while designing the Pelton wheel?

3)   a) Draw the main characteristic of pelton wheel and explain them in brief.
        b) The jet of water coming out of nozzle strikes the buckets of a pelton wheel which
     when stationary would defect the jet through 165°. The velocity of water at exist is 0.9 times   at
     the inlet and the bucket speed is 0.45 times the jet speed. If the speed of the pelton wheel is 300

rpm and the effective head is 150m, determine (1) Hydraulic efficiency (2) Diameter of the pelton wheel. Take co-efficient of velocity $c_v =0.98$.

4) a) A pelton wheel has a mean bucket speed of 12m/s diameter and is supplied with water at the rate of $0.7m^3$/s under a head of 30m. If the buckets deflect the jet through an angle of 160°, find the power and the efficiency of the turbine.
   b) Explain the sketch the governing mechanism of a reaction turbine.

5) a) Explain the working principle of Kaplan turbine with a neat diagram.
   b) Differences b/w Impulse turbines and reaction turbines.

6) a) Draw a neat sketch of pelton wheel installation and briefly indicate the functions of each component?   b) Draw a neat diagram of the operating characteristics curves of pelton, Francis, Kalpan and Propeller turbines. Discuss then practical importance of these curves.

7) a) Explain with the help of a diagram, the essential features of Kaplan turbine installation.
   b) With the help of velocity triangles derive expressions for power developed, hydraulic efficiency and overall efficiency of a Kaplan runner.

Unit – 6

1) a. Explain about the load curve .(4M)

   b. with a neat sketch explain the working of a simple hydro electric power plant identify all the components and explain their functionality   (6M)

2) a. Explain the term diversity factor. .(5M)

   b. explain about the duration curve . .(5M)

3) a. Explain about the pumped storage system in detailed. (5M)

   b. Distinguish between a base load power plant and a peak load power plant. (5M)

4) Differentiate between firm power and secondary power. (10 M)

5) a. Explain the working principle of a centrifugal pump.

   b. Derive expression for maximum blade efficiency in a single-stage impulse turbine.

6) a. Explain about the multistage centrifugal pumps.

   b. draw the operating characteristics curves of centrifugal pump and explain then in brief