Code No: R1621023 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRONICS AND DEVICES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	State the continuity equation	(2M)
	b)	List the applications of Light Emitting Diode.	(2M)
	c)	Define peak inverse voltage of a rectifier.	(2M)
	d)	Draw the h parameter model of a common collector amplifier	(3M)
	e)	Compare BJT and FET	(2M)
	f)	List different topologies in negative feedback amplifiers?	(3M)

PART -B

2.	a)	Discuss about the charge densities and Fermi level in a semiconductor having impurities	(7M)
	b)	Describe the generation and recombination of charges in semiconductor devices	(7M)
3.	a)	Discuss about the V-I characteristics of a p-n junction diode, and its temperature dependence	(7M)
	b)	What is photo diode? Explain its construction and operation	(7M)
4.	a)	Draw the circuit diagram for full-wave bridge rectifier and explain its principle of operation	(7M)
	b)	Calculate the percentage ripple for the voltage developed across a 120 μF capacitor when providing a load current of 80 mA. The full-wave rectifier operating from the 50Hz supply develops a peak rectified voltage of 24 V	(7M)
5.	a)	Prove that the transistor acts an amplifier with suitable circuit diagram	(7M)
	b)	What are the important parameters one can obtain from the input, and output characteristics of CE configuration? Discuss about them	(7M)
6.	a)	Explain the importance of FET as an amplifier	(7M)
	b)	Describe the operation of an enhancement type MOSFET	(7M)
7.	a)	Explain the effects of negative feedback on amplifier characteristics?	(7M)
	b)	Draw the circuit diagram of Colpitt's oscillator and explain its operation?	(7M)
~~~~~~

Code No: R1621023 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRONICS AND DEVICES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Define the terms Mobility and Conductivity	(2M)
	b)	Describe how diffusion and transition capacitances differ	(2M)
	c)	Define Load and Line Regulation	(2M)
	d)	Compare CE, CB and CC amplifiers	(3M)
	e)	Write the applications of Silicon control rectifiers	(3M)
	f)	What is Barkhausen Criterion?	(2M)

PART -B

2.	a)	Discuss about Fermi level in intrinsic and extrinsic semiconductor materials	(7M)
	b)	Determine the concentration of free electrons and holes in a sample of Ge at 300^0K which has a concentration of donor atoms equal to 2×10^{14} atoms/cm^3 and a concentration of acceptor atoms equal to 3×10^{14} atoms/ cm^3. Is this p – or n –type Germanium? Justify your answer.	(7M)
3.	a)	Explain principle of operation of LED, and PIN diodes	(7M)
	b)	Give the quantitative theory of p-n diode currents and hence deduce the diode equation.	(7M)
4.	a)	Explain the operation of a π- section filter, and derive expression for the ripple factor.	(7M)
	b)	A dc power supply circuit is to be designed for the given specifications: V_{dc} = 5V, I_{dc} = 200 mA. Use Si diodes and a centre tapped transformer. Assume necessary data.	(7M)
5.	a)	Give the analytical expressions for transistor characteristics	(7M)
	b)	What is thermal Runaway? How do you avoid it in amplifier circuits using BJT? Derive suitable expression to avoid it	(7M)
~~~~~~

6. a) Discuss about the transfer characteristics of JFET, and give the importance of Shockley's equation (7M)
   b) Give the construction details and characteristics of depletion type MOSFET (7M)

7. a) With the help of a suitable BJT based voltage series feedback amplifier diagram, explain the features and benefits of negative feedback in amplifiers (7M)
   b) Derive the expression for frequency of oscillation in a Hartley Oscillator. (7M)

Code No: R1621023 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRONICS AND DEVICES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What is the importance of Law of Junction (2M)
   b) Differentiate between Avalanche and Zener breakdowns. (3M)
   c) State the advantages of a bridge rectifier. (2M)
   d) Distinguish cascade and cascode amplifiers. (3M)
   e) Draw the low frequency model of a FET. (2M)
   f) Show that gain reduces with negative feedback (2M)

PART -B

2. a) State and explain the Hall Effect. Mention its applications. (7M)
   b) A sample of Ge is doped to the extent of 10^{14} donor atoms/cm^3 and 7×10^{13} acceptor atoms/cm^3. At the temperature of the sample, the resistivity of pure Ge is 60 ohm – cm. If the applied electric field is 2 V/cm, find the total conduction current density. (7M)

3. a) Explain the terms '*Avalanche breakdown*' and '*Zener breakdown and give examples.* (7M)
   b) Discuss about working principle of Varactor diode and photo diode with neat sketches (7M)

4. a) Discuss about L –section filter and derive the expression for the ripple factor. (7M)
   b) A full-wave single phase rectifier employs π- section filter consisting of two 10 μF capacitances and a 20 H choke. The transformer voltage to center tap is 300 V. The load current is 50 mA. Calculate the dc output voltage and the ripple voltage. Assume that the resistance of the choke is 200 ohms. (7M)

5. a) Derive the expression for current gain in CE configuration in terms of current gain of CB configuration (7M)
   b) With suitable sketches, explain input and output characteristics of CC configuration in detail (7M)
~~~~~~

6. a) What is the significant difference between the construction of an enhancement type MOSFET and a depletion type MOSFET? (7M)
   b) Given a depletion type MOSFET with I_{DSS} = 6 mA and Vp = - 3V, determine the drain current at V_{GS} = - 1 V, 0 V, 1V, and 2 V. Compare the difference in current levels between -1 and 0 V with the difference between 1 and 2 V. In the positive V_{GS} region, does the drain current increase at a significantly higher rate than for negative values? Is there a linear or nonlinear relationship between I_D and V_{GS}? Explain (7M)

7. a) The total harmonic distortion of an amplifier is reduced from 15% to 3% when 4% negative feedback is used. Find (i) voltage gain without feedback (ii) voltage gain with feedback (7M)
   b) Describe the crystal oscillator. What is the advantage of a crystal oscillator over an LC oscillator? (7M)

Code No: R1621023 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
BASIC ELECTRONICS AND DEVICES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Draw the energy band diagram of an Insulator, Semiconductor and a metal. (3M)
   b) Write the applications of Varactor diode (2M)
   c) What are the different types of Regulators (2M)
   d) What is thermal run away? (2M)
   e) Show that $\mu = g_m r_d$ in a Field Effect Transistor. (3M)
   f) Differentiate between an oscillator and an amplifier (2M)

PART -B

2. a) Describe the terms intrinsic and extrinsic semiconductors of both P type and N type (7M)
   b) Describe the differences between n - type and p - type semiconductor materials with suitable examples. (7M)

3. a) What are the current components in a p-n diode? Deduce the expression for diode equation. (7M)
   b) With suitable sketches explain the principle of operation of Tunnel Diode. (7M)

4. a) With suitable sketches, explain the operation of a full-wave rectifier with capacitive filter. Derive the expression for the ripple factor. (7M)
   b) A full-wave rectifier has an output dc voltage of 150 V along with unwanted ripple voltage $V_{r,rms}$ = 15 V. If a C-R-C filter is used between the rectifier and a load of 5000 ohms, calculate the ripple factor at load. Assume that filter has the component values in the same order as 15 μF, 500 ohms, and 10 μF. (7M)

5. a) With the help of the CE configuration circuit, explain input, output characteristics and various regions of the configuration in detail. (7M)
   b) Discuss about the CB configuration and its input, output characteristics in detail. (7M)

6. a) Sketch a p-channel enhancement type MOSFET with proper biasing applied and indicates the channel, the direction of electron, and the resulting depletion region. (7M)
   b) Discuss the Principle of operation and characteristics of Thyristors (7M)
~~~~~~

7. a) Explain the nature of feedback in an emitter follower circuit. State the advantages of this circuit and mention its use. Can this circuit be used as a voltage amplifier? (7M)

   b) With the help of suitable schematic and description, show that both positive and negative feedback are used in a Wien Bridge oscillator. Establish the condition for oscillations (7M)

Code No: R1621021 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

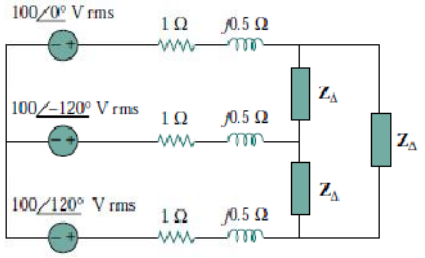
~~~~~~

PART –A

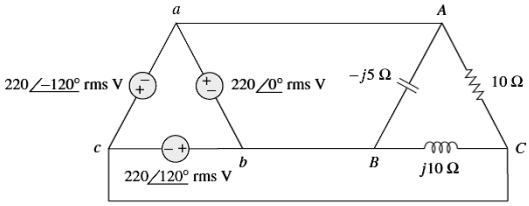
1. a) Why three phase systems are preferred over single phase systems for the transmission of power? (3M)
   b) Determine the amplitude of the line current in a three-phase system with a line voltage of 300 V that supplies 1200 W to a delta connected load at a lagging PF of 0.8; then find the phase impedance. (2M)
   c) A coil of inductance 0.04H and resistance 10 Ω is connected to a 120V, d.c. supply. Determine (i) the final value of current, (ii) the time constant of the circuit, (2M)
   d) A two-port network is described by $V_1=I_1+2V_2$, $I_2= -2I_1+0.4V_2$ Write the impedance matrix ? (2M)
   e) List the properties of RL impedance function? (3M)
   f) State and explain parseval's theorem? (2M)

PART -B

2. a) In a balanced three-phase Y-Y system, the source is an *abc* sequence of voltages and $V_{an} = 220\angle 20^0$ V rms. The line impedance per phase is $(0.6 + j1.2)\,\Omega$ while the per-phase impedance of the load is $(10 + j14)\,\Omega$. Calculate the line currents and the load voltages (7M)
   b) For the three-phase circuit shown below, find the average power absorbed by the delta-connected load with $\mathbf{Z_\Delta} = (21 + j\,24)\,\Omega$ (7M)

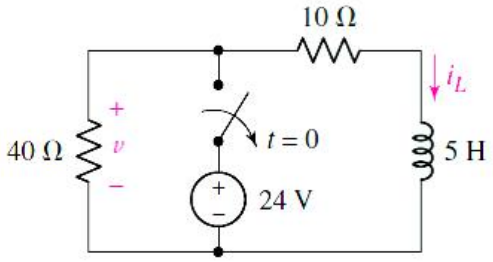


3. a) Find the line currents in the unbalanced three-phase circuit of Fig shown below and the real power absorbed by the load. (7M)

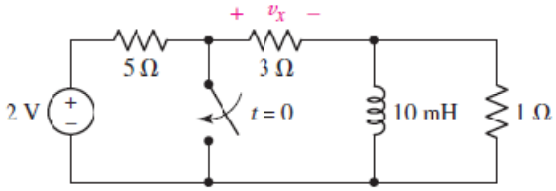


   b) The two-wattmeter method gives P_1=1200Wand P_2= -400W for a three-phase motor running on a 240-V line. Assume that the motor load is wye connected and that it draws a line current of 6 A. Calculate the pf of the motor and its phase impedance. (7M)
~~~~~~

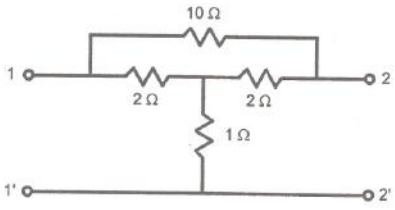
4. a) For the circuit shown, find the voltage labelled v at t = 200 ms. (7M)



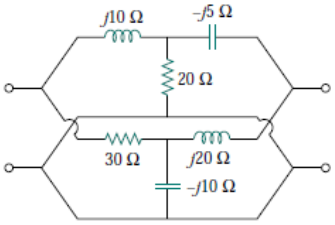
b) Obtain an expression for v_x as labelled in the circuit shown and evaluate v_x at t = 5 ms. (7M)



5. a) Obtain the ABCD parameters of the circuit shown below (7M)



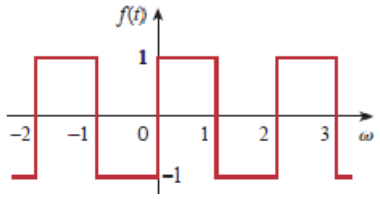
b) Determine the y parameters of the two two-ports in parallel shown in fig. (7M)



6. a) F(s) = [2 (s+1) (s+4)] / [(s+2) (s+6)] .Synthesize F(s) in two Foster forms? (7M)

b) Synthesize the following driving point immittance function $Z(s) = \dfrac{(s^2 + 2s + 6)}{s(s+3)}$ (7M)

7. a) Find the Fourier series of the square wave shown in Fig. Plot the amplitude and phase spectra. (9M)



b) State and explain the properties of Fourier transform? (5M)

Code No: R1621021 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

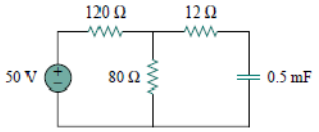
~~~~~~

PART –A

1. a) State the relationships between line and phase currents and line and phase voltages for a star-connected system (3M)

   b) Two wattmeters connected to a 3-phase motor indicate the total power input to be 12kW. The power factor is 0.6. Determine the readings of each wattmeter? (3M)

   c) Find the time constant for the *RC* circuit in Fig. (2M)



   d) Find the T parameters of two networks which are connected in cascade having individual T parameters $T_a = \begin{pmatrix} 5 & 44 \\ 1 & 9 \end{pmatrix}$ *and* $T_b = \begin{pmatrix} 1 & 6 \\ 0.5 & 4 \end{pmatrix}$. (2M)

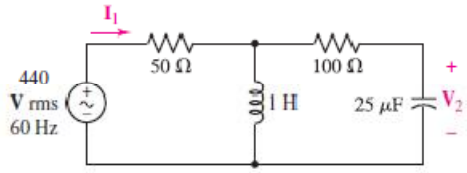
   e) List any two properties of Positive Real function? (2M)

   f) List any two properties of Fourier transform? (2M)

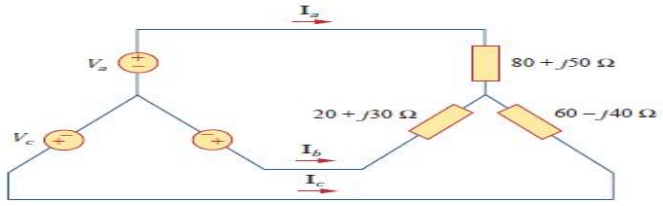
PART –B

2. a) A particular balanced three-phase system is supplying a Δconnected load with 10 kW at a leading power factor of 0.7. If the phase voltage is 208 V and the source operates at 50 V, (*i*) compute the line current; (*ii*) determine the phase impedance; (*iii*) calculate the new power factor and new total power delivered to the load if a 2.5 H inductor is connected in parallel with each phase of the load. (7M)

   b) A wattmeter is connected into the circuit shown below, so that $\mathbf{I}_1$ enters the (+) terminal of the current coil, while $\mathbf{V}_2$ is the voltage across the potential coil. Find the wattmeter reading. (7M)

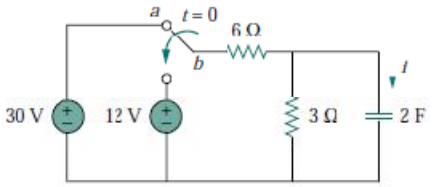


3. a) Determine the line currents for the three-phase circuit shown. $V_a = 110\angle 0^0$. Assume positive phase sequence (7M)

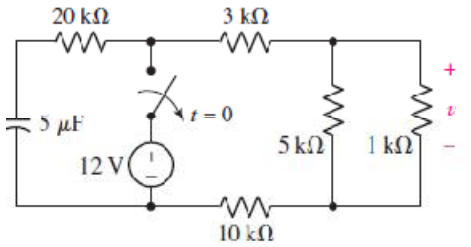


   b) A 415V, 3-phase, 4 wire, star-connected system supplies three resistive loads of 25kW, 20kW and 35kW in the red, yellow and blue phases respectively. Determine the current flowing in each of the four conductors. (7M)
~~~~~~

4. a) The switch has been in position **a** for a long time. At t=0 it moves to position **b**. Calculate i(t) for all t>0. (7M)

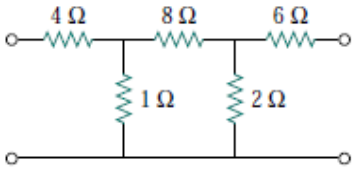


b) The switch above the 12 V source in the circuit shown has been closed for a long time. It is finally thrown open at $t = 0$. (i) Compute the circuit time constant. (*ii*) Obtain an expression for $v(t)$ valid for $t > 0$. (iii) Calculate the energy stored in the capacitor 170 ms after the switch is opened. (7M)



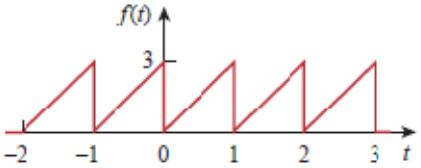
5. a) Derive the relationship between hybrid and Z parameters of two port network? (7M)

b) Find the transmission parameters for the circuit shown below (7M)



6. Realize $Z(s) = [S(S^2+2)(S^2+4)]/[(S^2+1)(S^2+3)(S^2+5)]$in all four forms. (14 M)

7. a) Determine the Fourier series of the sawtooth waveform shown in Figure (9M)



b) (a) A series RL circuit in which R = 5 Ω and L =20 mH has an applied voltage v =100 + 50 sin ωt +25 sin 3ωt (V), with ω= 500 rad/s. Find the current and the average power (5M)

Code No: R1621021 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

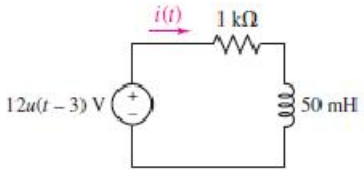
Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

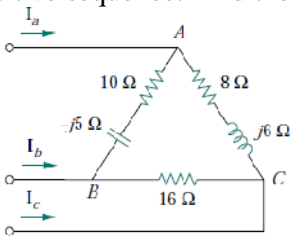
1. a) Three loads, each of resistance 50 Ω are connected in star to a 400V, 3-phase supply. Determine (i) the phase voltage, (ii) the phase current and (iii) the line current. (3M)
   b) Explain the difference between "balanced" and "unbalanced" loads? (2M)
   c) For the circuit shown, find i(t) for t=∞, 3^- and 3^+ . (3M)



   d) Write down condition for reciprocal of a two port network in terms of transmission parameters and hybrid parameters? (2M)
   e) List any two properties of LC immittance function? (2M)
   f) The voltage and current at the terminals of a circuit are V(t)=128+192cos 120Πt + 96cos(360Πt-30^0) and i(t) = 8cos(120Πt-10^0) + 3.2cos(360Πt-60^0). Find the average power absorbed by the circuit? (2M)

PART –B

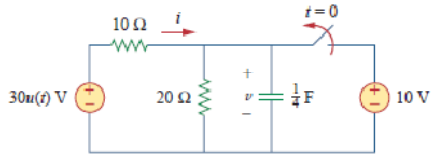
2. a) A three-phase system is constructed from a balanced Y-connected source operating at 50 Hz and having a line voltage of 210 V, and each phase of the balanced load draws 130 W at a leading power factor of 0.75. (*i*) Calculate the line current and the total power supplied to the load. (*ii*) If a purely resistive load of 1Ω is connected in parallel with each existing load, calculate the new line current and total power supplied to the load. (7M)
   b) The two-wattmeter method produces wattmeter readings P_1=1560 W and P_2=2100 W and when connected to a delta-connected load. If the line voltage is 220 V, calculate: (i) the per-phase average power, (ii) the per phase reactive power, (iii) the power factor, and (iv) the phase impedance. (7M)
3. a) The unbalanced Δ-load of Fig. is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take $\mathbf{V}_{ab}$ as reference. (7M)



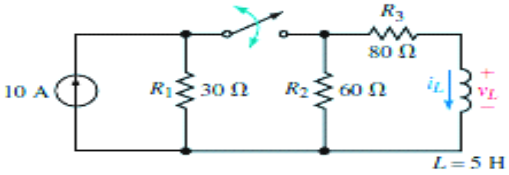
   b) Prove that two watt-meters are sufficient to measure power in three phase system? (7M)

|''|'||||''|''|||'|
~~~~~~

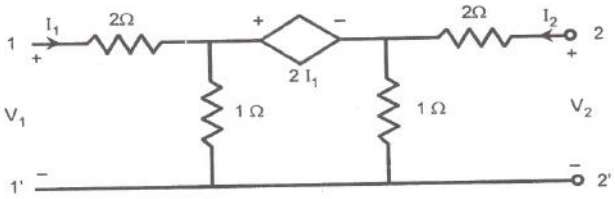
4. a) In Fig. shown, the switch has been closed for a long time and is opened at t= 0. Find i and v for all time. (7M)



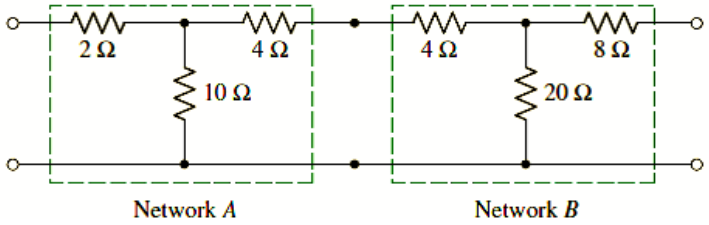
b) Refer to the circuit shown below, the switch is closed at t = 0. (i) determine equations for i_L and v_L.(ii) At t = 300 ms, open the switch and determine equations for i_L and v_L during the decay phase. (iii) Determine voltage and current at t = 100 ms and at t =350 ms. (iv) Sketch i_L and v_L (7M)



5. a) Obtain the *y* parameters for the *network* shown below. (7M)



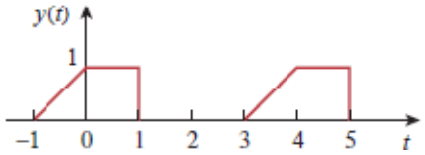
b) Find the transmission parameters for the cascaded networks shown (7M)



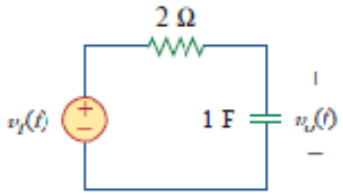
6. a) Synthesize the LC immittance function $Z(s)=2(s^2+1)(s^2+9)/s(s^2+4)$ in two Foster forms? (7M)

b) State and explain the properties of positive real function. (7M)

7. a) Obtain the exponential Fourier series for the signal in Fig. (9M)



b) Find $v_o(t)$ in the circuit shown for $v_i(t)=2e^{-3t}u(t)$. (5M)



Code No: R1621021 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

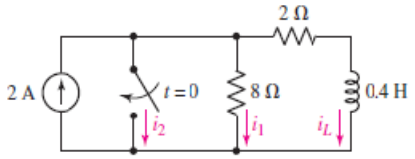
1. a) Draw the complete phasor diagram for balanced delta connected load? (2M)
   b) A 400V, 3-phase, 4 wire, star-connected system supplies three resistive loads of 15kW, 20kW and 25kW in the red, yellow and blue phases respectively. Determine the currents flowing in red and blue phase conductors. (2M)
   c) Draw the transient growth and decay curves for an $L-R$ circuit ? (3M)
   d) Write down the condition for reciprocity in terms of ABCD and hybrid parameters? (2M)
   e) List the properties of RC impedance function? (3M)
   f) What is the condition for half wave symmetry and odd symmetry of function? (2M)

PART –B

2. a) A three-phase, three-wire, ABC system, with an effective line voltage of 200 V, has three impedances of $10\angle 45^0\Omega$ in a Δ connection. Determine the line currents and draw the voltage-current phasor diagram. (7M)
   b) Show that the total power in a 3-phase, 3-wire system using the two-wattmeter method of measurement is given by the sum of the wattmeter readings. Draw a connection diagram. Draw a phasor diagram for the two-wattmeter method for a balanced load. Use the phasor diagram to derive a formula from which the power factor of a 3-phase system may be determined using only the wattmeter readings (7M)

3. a) A four-wire wye-wye circuit has $\mathbf{V}an = 120\angle 120^\circ$, $\mathbf{V}bn = 120\angle 0^\circ$ $\mathbf{V}cn = 120\angle -120^\circ$ V If the impedances are $\mathbf{Z}_{an} = 20\angle 60^\circ$, $\mathbf{Z}_{bn} = 30\angle 0^\circ$ $\mathbf{Z}cn = 40\angle 30^\circ\ \Omega$ find the current in the neutral line (5M)
   b) Three impedances of (7+j4) Ω, (3+j2) Ω and (9+j2) Ω are connected between neutral and the R, Y and B phases. The line voltage is 440V, Calculate.
   i. The line currents and
   ii. The current in the neutral wire.
   iii. Find the power consumed in each phase and the total power drawn by the circuit (9M)

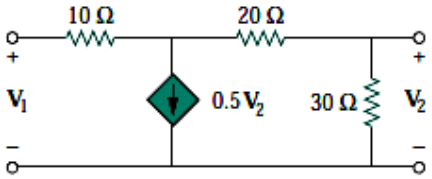
4. a) At t = 0.15 s in the circuit of Fig., find the value of (i) i_L; (ii) i_1; (iii) i_2. (7M)



   b) Derive the expression for current in a series RC circuit excited by a sinusoidal source $V=V_m \sin\omega t$ (7M)

|''|'||||''|''|||'|
~~~~~~

5. a) Obtain the z parameters for the circuit shown. (7M)



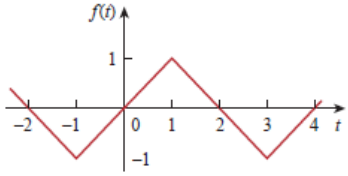
b) If h parameters of for some particular two-port is given below. Calculate y parameters. (7M)

$$h=\begin{pmatrix} 2K\Omega & -3 \\ 5 & 0.01S \end{pmatrix}$$

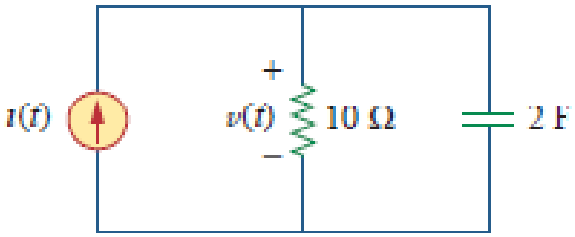
6. a) Given the driving point admittance function Y (s) = $S(S^2+1)(S^2+4) / S(S^2+2)$. (7M)
Synthesize ladder network of the first Cauer form.

b) Obtain the foster forms realization of $Z(s)=2(s+1)(s+3)/s(s+2)$ (7M)

7. a) Calculate the Fourier series for the function shown in fig. (7M)



b) Determine the average power supplied to the circuit if (7M)
$i(t)=2+10\cos(t+10^0)+6\cos(3t+35^0)$ A.



Code No: R1621024 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) State Gauss law and list its limitations. (2M)
   b) Differentiate conduction and convection current densities. (2M)
   c) State and explain the Biot-Savart's law. (2M)
   d) Find the expression for Force on a straight and a long current carrying conductor placed in a magnetic field. (3M)
   e) Differentiate self and mutual inductance. (2M)
   f) What is the Faraday's law of induction? What is the significance of the terms transformer e.m.f and generator e.m.f.? (3M)

PART -B

2. a) Derive an expression for the Electric field intensity due to a finite length line charge along the Z-axis at an arbitrary point **Q**(x,y,z) (7M)
   b) An infinite length of uniform line charge has ρ_L= 10pC/m and it lies along the Z-axis. Determine electric field **E** at (4,3,3). (7M)

3. a) Derive the boundary conditions for conductor to dielectric interface for static electromagnetic fields. (7M)
   b) If the magnetic field is $\mathbf{H}= 0.01/\mu_0\mathbf{a_x}$ A/m, what is the force on a charge of 1.0 pC moving with a velocity of $10^6\mathbf{a_x}$ m/s. (7M)

4. a) Explain about Oesterd's experiment and its applications. (7M)
   b) Compare the concepts of scalar and vector magnetic potentials. (7M)

5. a) Define Torque. Derive the expression for torque on a current loop placed in a magnetic field. (7M)
   b) A current of 10 A flows in each of two conducting wires parallel to each other. The separation between the wires is 2 cm. Find the force per unit length of one of the wires. (7M)

6. a) Derive an expression for mutual inductance between a straight long wire and a square loop wire in the same plane. (7M)
   b) Calculate the inductance of a solenoid of 2000 terns wound uniformly over a length of 0.5m in a cylindrical paper tube of 0.04m in diameter the medium is air. (7M)
~~~~~~

7. a) Starting from Faraday's law of electromagnetic induction, derive the Maxwell equation $\nabla X \boldsymbol{E} = -\frac{\partial \boldsymbol{B}}{\partial t}$ (7M)

   b) State and prove the Poynting theorem. (7M)

Code No: R1621024

R16

SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) State Coulomb's law. (2M)
   b) Explain the behavior of conductors in an electric field. (2M)
   c) Define magnetic flux density and write the Maxwell's equation related to it (2M)
   d) A conductor of 6m long , lies along z-direction with a current of 2A. Find the force experienced by the conductor if **B**=0.08 $\mathbf{a}_x$Tesla. (3M)
   e) Explain the concept of inductance in a toroid. (2M)
   f) Write Maxwell's equation in integral as well as differential forms. (3M)

PART -B

2. a) Prove that the electric field intensity is the negative gradient of potential. (7M)
   b) Derive Poisson's and Laplace's equations from the fundamentals. (7M)

3. a) Derive the boundary conditions for dielectric to dielectric interface for static electromagnetic fields. (7M)
   b) Derive an expression for equation of continuity (7M)

4. a) State Ampere's circuital law. Specify the conditions to be met for determining magnetic field strength H, based on Ampere's circuital law. (7M)
   b) Given $\mathbf{E}=E_m\sin(\omega t-\beta z)\,\mathbf{a}_y$in free space. Find the D, B and H. (7M)

5. a) Derive Lorentz force equation and explain its significance (7M)
   b) Derive the expression for Torque on a current loop placed in a magnetic field. (7M)

6. a) Derive the expression for self inductance of solenoid. (7M)
   b) A solenoid of 10 cm in length consists of 1000 turns having the cross section radius of 1 cm. Find the inductance of solenoid. What is the value of current required to maintain a flux of 1 milli-Wb in the toroid. Take μ_r= 1500. (7M)

7. a) Derive the expression for displacement current density and explain its significance. (7M)
   b) Explain in detail about Poynting vector. (7M)
~~~~~~

Code No: R1621024 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Define electric field intensity and electric flux density. (2M)
   b) Show that the displacement current in the dielectric of parallel-plate capacitor is equal to the conductor current in its leads. (3M)
   c) Derive the magnetic fields due to a circular loop of conductor. (3M)
   d) Find the expression for force between two straight long and parallel current carryingconductors. (2M)
   e) A solenoid with air core has 1000 turns of wire. Its length is 800 mm and core radius is 60mm. Then find the inductance of it. (2M)
   f) Define Poynting theorem and Pointing vector. (2M)

PART -B

2. a) State Guass law. Explain any two applications of Guass law in detail. (7M)
   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 first principle. (7M)

3. a) Derive an expression for capacitance of a parallel plate capacitor containing two dielectrics with the dielectric interface parallel to the conducting plates. (7M)
   b) Find the capacitance of two parallel plates 30cmX30cm separated by 5 mm in air. And also find the energy stored by the capacitor if it is charged to a potential difference of 500 volts. (7M)

4. a) state Ampere's circuital law and explain any two applications of it. (7M)
   b) A circular loop located on $x^2 + y^2 = 9$, $Z = 0$ carries a direct current of 10 A along $\boldsymbol{a}_{\varphi}$. Determine Hat (0,0,4) and (0,0,-4). (7M)

5. a) Explain the concepts of magnetic dipole and dipole moment in detail. (7M)
   b) In a magnetic flux density of $B=\mathbf{a}_x+3\mathbf{a}_y Wb/m^2$, a current element $10\mathbf{a}_z$ mA-m is placed. Find the force on the current element. (7M)

6. a) Derive the expression for energy density in a magnetic field. (7M)
   b) Obtain an expression for the self-inductance of a toroid of a circular cross-section, with *N* closely spaced turns. (7M)
~~~~~~

7. a) Derive Maxwell's equations for time varying fields from their basics. (7M)

   b) A conducting circular loop of radius 20 cm lies in the z=0 plane in a magnetic field B =10cos **377t** $\mathbf{a_z}$mWb/m^2. Calculate the induced voltage in the loop. (7M)

Code No: R1621024 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What are the applications of Laplace's and Poison's equations? (2M)
   b) State the boundary conditions between two dielectrics (2M)
   c) State Ampere's circuital law and explain any one of its applications. (3M)
   d) Find the expression for the torque on a current loop placed in a magnetic field. (2M)
   e) A solenoid with 300 turns is 300 mm long and 30 mm in diameter. If the current flowing is 500mA, find the inductance. (2M)
   f) What is the inconsistency in Ampere's law? How it is rectified by Maxwell? (3M)

PART -B

2. a) State and explain Gauss law in differential form and also list the limitations of Gauss's law. (7M)
   b) 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 E at the point (0, 0, 6) m. (7M)

3. a) Derive the expressions for energy stored and energy density in a static electric field. (7M)
   b) Find the capacitance of two parallel plates 30cmX30cm separated by 6 mm in air. And also find the energy stored by the capacitor if it is charged to a potential difference of 600 volts. (7M)

4. a) Derive the expression for magnetic field intensity due to a straight current carrying filament. (7M)
   b) Derive Ohm's law in point form and explain (7M)

5. a) Derive the expression for Torque on a current loop placed in a magnetic field. (7M)
   b) A toroid coil of 600 turns has a mean radius of 50cm and radius for the winding of 4cm. Find the value of average self-inductance with an iron core of μ_r=900. (7M)

6. a) Drive the expression for mutual inductance between a straight long wire and a square loop wire in the same plane. (7M)
   b) Derive the expression for energy density in a magnetic field. (7M)

7. a) Explain how the concept of displacement current was introduced by Maxwell to account for the production of magnetic field in the empty space. (7M)
   b) Compare Maxwell Equations for free space and sinusoidal variations. (7M)
~~~~~~

Code No: R1621022 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL MACHINES – I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any F**OUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What is a doubly-excited magnetic system? Mention two examples. 2M
   b) What is the function of compensating winding? 2M
   c) What are the drawbacks of field flux control method? 2M
   d) What is meant by all day efficiency? When it is used 3M
   e) Explain why in testing of large transformers the open-circuit test is carried out with the high-voltage winding open and the short-circuit test with the low-voltage winding shorted. 2M
   f) What are the salient features of delta-star connected three-phase transformer? 3M

PART -B

2. a) Describe the process of voltage build up in self-excited generators. 7M
   b) For a singly excited magnetic system, derive the expression for the magnetic energy stored in terms of reluctance. 7M

3. a) What are the losses that occur in dc machines? Derive the condition for maximum efficiency in a dc generator. 7M
   b) A dc shunt motor is running at 1200 rpm and it has an armature resistance of 0.15 Ω. The current taken by the armature is 60 A when the applied voltage is 220 V. If the load is increased by 30%, find the variation in the speed. 7M

4. a) Explain with the help of a neat sketch the principle of operation of a four-point starter. 8M
   b) A 240 V shunt motor has an armature resistance of 0.2 Ω and takes armature current of 20 A on full-load. The electromagnetic torque being constant, by how much must the flux be reduced to increase the speed by 40%? 6M

5. a) Distinguish between core-type and shell-type transformer. Why is the low-voltage winding placed near the core? Why is the core of a transformer laminated? 7M
   b) A 50 kVA, 3.3 kV/230 V single-phase transformer has an impedance of 4.2% and a copper loss of 1.8% at full load. Calculate the ohmic value of resistance, reactance and impedance referred to the primary side. Estimate the primary short circuit current, assuming the supply voltage to be maintained at constant value. 7M
~~~~~~

6. a) Discuss about Sumpner's test on a single-phase transformer. 7M

   b) A 400/100 V, 5 kVA, single-phase two winding transformer is to be used as an auto-transformer to supply 400 V from a 500 V voltage source. When tested as a two winding transformer at rated load and 0.8 p.f. lagging, its efficiency was found to be 0.95. 7M
      (i) Determine its kVA rating as an Auto-transformer.
      (ii) Find its efficiency as an auto-transformer at rated load and at 0.8 p.f. lagging.

7. a) What is inrush phenomena in transformer? Discuss qualitatively this phenomena if single-phase transformer is switched on at the instant applied voltage is maximum positive. 7M

   b) Draw the connection diagrams and explain the features of Y-Y, Y-Δ, Δ-Y and Δ-Δ three-phase connections. 7M

Code No: R1621022 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL MACHINES – I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What is a singly-excited magnetic system? Mention two examples. 2M
   b) Enumerate the various losses in a dc machine. 2M
   c) Explain the function of no-volt release in a three-point starter. 2M
   d) Why is the transformer core laminated? 3M
   e) Why is it preferable to install two or more transformers in parallel than one large unit? 2M
   f) Discuss whether the winding should be tapped on h.v. side or l.v. side. 3M

PART -B

2. a) Name the different parts of a dc machine and state the function of each part. 7M
   b) A short-shunt dc compund generator supplies 150 A at 100 V. The resistance of armature, series field and shunt field windings are 0.04, 0.03 and 60 Ω respectively. Find the e.m.f generated. Also find the e.m.f generated if same machine is connected as a long shunt machine. 7M

3. a) Explain the function of compensating windings in dc machines. 7M
   b) A 11 kW, 240 V shunt motor has an armature resistance of 0.5 Ω and a field resistance of 200 Ω. At no-load and rated voltage, the speed is 1250 rpm and the armature current is 3 A. At full-load and rated voltage, the line current is 48 A and because of armature reaction, the flux is 4% less than its no-load value. Determine the (i) developed torque at no-load (ii) full-load speed and (iii) developed torque at full-load. 7M

4. a) Explain with diagram how Hopkinson's test is performed on dc machines. What are the advantages and disadvantages of this test? 7M
   b) An engine room ventilator fan series motor has a total resistance of 0.5 Ω and runs from a 110 V supply at 1000 rpm when the current is 28 A. What resistance in series with the motor will reduce the speed to 750 rpm? The load torque is proportional to the square of the speed and the field strength can be assumed to be proportional to the current. 7M

5. a) Define voltage regulation of a transformer. Derive an expression for voltage regulation under lagging p.f. load. 7M
   b) A single-phase transformer supplies a load of 20 kVA at a p.f. of 0.8 (lagging). The iron loss of the transformer is 200 W and the copper losses at this load is 180 W. Calculate (i) the efficiency (ii) the new efficiency if the load is now changed to 30 kVA at a p.f. of 0.9 (lagging). 7M
~~~~~~

6. a) Explain why parallel operation of transformer is necessary. State the essential and desirable conditions which would be satisfied before two single-phase transformers may be operated in parallel. 7M
   b) The OC test (LV side) and SC test (HV side) results of a single-phase 6 kVA, 250/500 V transformer are 250 V, 1.2 A, 80 W and 25 V, 10 A, 95 W respectively. Determine the circuit parameters referred to LV side and also calculate the regulation and efficiency of the transformer at full-load and half-load at 0.5 p.f. lagging. 7M

7. a) What are the advantages of a single three-phase transformer over three single-phase transformer banks of the same kVA rating? State the difference between a three-phase transformer bank and a three-phase transformer unit. 7M
   b) Explain about on load and off load tap changers provided in a 3- phase transformers 7M

Code No: R1621022 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL MACHINES – I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	What are the conditions under which electro-magnetic torque will exist in a doubly-excited system?	2M
	b)	Why are interpoles designed to provide m.m.f. more than the armature m.m.f. in the commutating zone?	3M
	c)	What is the difference between 3-point and 4-point starter?	2M
	d)	Discuss how core flux in an ideal transformer is independent of load current.	2M
	e)	In Sumpner's test, the reading of the wattmeter recording the core losses, remains unaffected when low-voltage is injected in the secondary series circuit. Explain.	3M
	f)	What are the applications of open delta connection?	2M

PART -B

2.	a)	What are the different types of dc generators according to the ways in which field are excited? Show the connection diagram of each type.	7M
	b)	A 4-pole lap wound dc shunt generator has a useful flux per pole of 0.07Wb, the armature winding consists of 220 turns each of 0.004 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m. and the armature current is 50 A.	7M
3.	a)	Explain the principle of torque production in a dc motor and derive an expression for it.	7M
	b)	A 15 kW, 230 V shunt generator having an armature resistance of 0.15 Ω and a field resistance of 230 Ω delivers full-load at rated voltage and 750 rpm. The machine is now run as a motor while taking 15 kW at 230 V. What is the speed of the motor? Neglect brush contact drop.	7M
4.	a)	Explain field control method for speed control of a dc shunt machine.	7M
	b)	A 250 V dc shunt motor has a field resistance of 200 Ω and an armature resistance of 0.8 Ω. It is operating at full-load, drawing an armature current 30 A and by inserting resistance in the field circuit, the speed is increased to 1200 rpm. If the load torque is linearly proportional to speed, find the value of external resistance in the field circuit.	7M
~~~~~~

5. a) Draw the exact equivalent circuit of a transformer and derive the equivalent circuits referred to primary and secondary. Describe the various parameters involved in it. 7M
   b) A 200 V/400V, 50 Hz transformer has peak flux density of 1.1 Wb/m^2 in the core and the net area of cross section of the core is 0.02 sqm. If the current density in the conductor is 3 A/mm^2 and conductor diameter of primary coil is 3 mm. Determine the kVA rating of the transformer and the number of primary and secondary turns. 7M

6. a) In an auto-transformer, the power transferred from primary to secondary circuit is partly by conduction and partly by induction. Explain. 6M
   b) A 10 kVA, 500/250 V, 50 Hz single-phase transformer gave the following test data: 8M
   OC Test (LV side): 250 V, 1.0 A, 80 W
   SC Test (HV side): 25 V, 12 A, 100 W
   Where LV refers to the low voltage and HV refers to high voltage side. Determine the following:
      (i) Equivalent circuit referred to LV side
      (ii) Secondary load voltage at 0.8 p.f. lagging with full-load current

7. a) Explain with the help of connection and phasor diagrams how a Scott connection is used to obtain two-phase supply from three-phase supply. 7M
   b) Why are tappings provided in transformers? Explain with the help of connection diagrams the operation of off-load tap changer. 7M

Code No: R1621022 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL MACHINES – I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	What is importance of field flashing and critical speed in a dc generator	2M
	b)	What are the two functions of a commutator in dc machines?	2M
	c)	For a dc motor, the field flux speed control method is called a constant power drive method. Explain.	2M
	d)	Distinguish between step-up and step-down transformers.	2M
	e)	Distinguish clearly the difference between a resistive potential divider and Auto-transformer.	2M
	f)	Mention any two applications of three-winding transformers.	2M

PART -B

2.	a)	Explain the principle of operation of a dc generator and derive its emf equation.	7M
	b)	Draw and explain fully the general block diagram representation of an electromechanical energy-conversion device.	7M
3.	a)	Draw and explain speed-torque and torque-current characteristics of (i) a dc shunt motor and (ii) a dc series motor.	7M
	b)	A 480 V, 20 kW shunt motor takes 2.5 A when running at no-load. Taking the armature resistance to be 0.6 Ω, field resistance to be 800 Ω and brush drop 2 V, find the full-load efficiency.	7M
4.	a)	Explain with diagram how retardation test is performed on dc machine.	7M
	b)	A 400 V dc shunt motor has an armature and shunt-filed resistance of 0.3 and 200 Ω respectively. It takes full-load current of 50 A and runs at 1000 rpm. Calculate the speed of the motor when a 100 Ω resistor is connected in series with the field winding, the load torque remaining same. Assume that field flux is proportional to the field current.	7M
5.	a)	Draw and explain the phasor diagram of a single-phase transformer with lagging p.f. load and leading p.f. load.	7M
	b)	A 25 kVA, 440/110 V, 50 Hz single-phase step-down transformer is designed to work with 1.5 V per turn with a flux density not exceeding 1.35 T. Determine (i) the required number of turns on the primary and secondary windings respectively, (ii) the cross-sectional area of the iron core, and (iii) the secondary current.	7M
~~~~~~

6. a) Explain how parameters of transformer equivalent circuit can be found from open circuit and short circuit tests. 7M
   b) A 20 kVA, 4000/200V, 50Hz transformer with an equivalent impedance of 0.02 Ω is to operate in parallel with a 15 kVA, 4000/200 V, 50 Hz transformer with an equivalent impedance of 0.025 Ω. The two transformers are connected in parallel and made to carry a load of 25 kVA. Assume both the impedances to have the same angle. 7M
      (i) Find the individual load currents
      (ii) What percent of the rated capacity is used in each transformer?

7. a) Explain with the help of connection diagrams the operation of on-load tap changer. 7M
   b) Explain the open-delta connection with a suitable diagram. What are the uses of this connection? 7M

Code No: R1621026 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE, EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1. a) State the features of Managerial economics. 3M
   b) Define production function. 2M
   c) What is price discrimination? 2M
   d) What are the advantages and limitations of partnership firm? 3M
   e) Explain the significance of double entry system 2M
   f) Define functional flow system analysis 2M

PART -B

2. a) Discuss the importance of managerial economics in decision making. 7M
   b) What is cross elasticity of demand? Is it positive for substitute or complements? Illustrate in a diagram relating to the demand for coffee to the price of tea. 7M

3. a) Why does law of diminishing returns operate? Illustrate with assumed data. 7M
   b) The P/V ratio of Lakshmi books Ltd is Rs. 40% and the margin of safety Rs. 30. Calculate BEP and Net Profit. If the sales volume is Rs. 14000/-. 7M

4. How a firm attains equilibrium in the short run and in the long run under conditions of perfect competition? Explain. 14M

5. Small is beautiful'. Do you think, this is the reason for the survival of the sole trader from of business organization? Support your answer with suitable examples. 14M

6. How ratios are classified for the purpose of financial analysis? With assumed data illustrate any two types of ratios under each category. 14M

7. a) What is meant by discounting and time value of money? How is it useful in capital budgeting? 7M
   b) ABC company is considering the purchase of two machines A and B each costing Rs:50,000/-.Earnings after taxes are expected to be as under : 7M

Year	1	2	3	4	5
Machine A	5,000	15,000	20,000	30,000	20,000
Machine B	15,000	20,000	25,000	15,000	10,000

Estimate the two alternatives according to
i.ARR method ii.NPV method a discount rate of 10%.
~~~~~~

Code No: R1621026 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE, EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Give the criteria for a good demand forecasting method.	3M
	b)	Differentiate between Isoquants and Isocosts.	2M
	c)	Explain the feature of Oligopoly market?	2M
	d)	What are the different types of companies?	2M
	e)	List various types of financial statements.	3M
	f)	What is profitability index	2M

PART -B

2.	a)	Explain the role of a Managerial Economist in a Business Firm.	7M
	b)	Explain various types of Elasticity of demand.	7M
3.	a)	Describe law of variable proportions in detail.	7M
	b)	Discuss the concept of Cost-Volume-Profit analysis	7M
4.	a)	Describe Cobb-Douglas production function.	7M
	b)	Discuss the price determining system in perfect competition market	7M
5.		What are business cycles? Explain its phases in detail.	14M
6.		What is double entry book keeping? Explain scope of important records of Accounting under Double entry system.	14M
7.		A company has an investment opportunity costing Rs.1,50,000 with the following expected net cash flow.	14M

Year	Cash Flow After Tax
1	16,000
2	34,000
3	44,000
4	54,000
5	54,000

Using 10% as the rate of discount determine the following:
i. Pay -back method
ii. NPV method
~~~~~~

Code No: R1621026 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE, EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	What is the importance of elasticity of demand?	3M
	b)	Define margin of safety.	2M
	c)	List the important features of market structures.	2M
	d)	What is the need of public enterprises?	2M
	e)	Define Ledger.	2M
	f)	Explain the concept of capital budgeting	3M

PART -B

2.	a)	What is law of demand? Explain various factors that determine the demand for a computer.	7M
	b)	Discuss statistical methods of demand forecasting.	7M
3.	a)	Explain Cobb-Douglas Production function.	7M
	b)	Describe the BEP with the help of a diagram and its uses in business decision making.	7M
4.	a)	What is perfect competition? State its features and how the price is determined in this market structure.	7M
	b)	Explain the concepts of flat rate pricing and usage sensitive pricing	7M
5.		Write short notes on (i)public company (ii) Government Company (iii) Private Company.	14M
6.		What is Funds flow statement? Discuss the significance of funds flow statement as a tool of financial analysis.	14M
7.		Examine the following proposals and evaluate them based on: i. ARR method(ARR on original investment) ii.NPV method Initial investment is Rs.12,00,000/- each for all the two projects, discount factor is 10 %	14M

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

Code No: R1621026 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE ,EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Differentiate between short term and long term demand forecasting methods.	2M
	b)	Define cost. How are costs classified?	2M
	c)	List the features of Monopoly competition.	3M
	d)	What is partnership deed?	2M
	e)	What is double entry book keeping?	2M
	f)	Explain time value of money.	3M

PART -B

2.	a)	Discuss the nature of problems studied in managerial economics. What is the importance of the study of such problems in business management?	7M
	b)	What is promotional elasticity of demand? How does it differ from cross elasticity of demand?	7M
3.		A Company reported the following results for two years	14M

Year	Sales	Profit
I	Rs. 40,00,000	Rs. 4,00,000
II	Rs. 50,00,000	Rs. 6,00,000

Calculate BEP, PV ratio, fixes cost and Margin of Safety.

4.	a)	Explain the concept of Return to Scale and Economics of Scale	7M
	b)	Explain Market Skimming and priority pricing methods.	7M
5.		Define a joint stock company & explain its basic features, advantages & disadvantages	14M
~~~~~~

6. Calculate current ratio, debt-equity ratio and proprietary ratio with the help of following information 14M

Particulars	Amount (Rs.)	Particulars	Amount(Rs.)
Cash&Bank balances	10,00,000	Capital(6,00,000 shares of Rs.10/-)	60,00,000
Marketable securities	6,00,000	Reserves &Surplus	30,00,000
Inventory	8,00,000	Profit &loss A/c Cumulative	4,00,000
Debtors	20,00,000	Debentures	40,00,000
Creditors	10,00,000	Long term loan	20,00,000
Bills payable	2,00,000	Long term public deposits accepted	20,00,000
		Fixed assets	80,00,000

7. Compare and contrast the NPV and ARR methods of evaluating investment proposals and illustrate with examples. 14M

Code No: R1621025 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
THERMAL AND HYDRO PRIME MOVERS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1. a) State the function of a carburetor in a petrol engine. (2M)
   b) A quantity of steam at 10bar and 0.85 dryness occupies 0.15m^3. The steam is heated at constant pressure to raise its temperature up to 300^{0}C. determine the change in internal energy and the heat supplied (3M)
   c) Define work ratio and thermal efficiency of a gas turbine plant. (2M)
   d) Identify the two important functions of the volute casing of a centrifugal pump. (2M)
   e) Define volumetric efficiency of a turbine. (3M)
   f) Define and explain the significance of Diversity factor. (2M)

PART -B

2. a) Compare the relative advantages and disadvantages of four-stroke and two-stroke cycle engines. (7M)
   b) Discuss with suitable sketch the magneto-ignition system used in petrol engines. (7M)

3. a) Explain with the help of neat sketch a single-stage impulse turbine. Also explain the pressure and velocity variations along the axial direction. (7M)
   b) Explain with the help of a neat sketch, Reheat-Rankine cycle. Derive its expression for the efficiency. (7M)

4. a) Describe with neat sketches the working of a simple constant pressure open cycle gas turbine. (5M)
   b) In a gas turbine plant, air is compressed from 1bar and 15^{0}C through a pressure ratio of 4:1. It is then heated to 650^{0}C in a combustion chamber and expanded back to a pressure of 1bar in a turbine. Calculate the cycle efficiency and work ratio, if a perfect heat exchanger is used. Assume isentropic efficiency of the turbine and compressor as 85% and 80% respectively. (9M)

5. a) Using the impulse-momentum principle, derive an expression for the force exerted by a moving jet of fluid on a stationary curved vane. (7M)
   b) A jet of water moves smoothly over the surface of a curved vane. Analyse the forces acting on the vane and determine the resultant force in magnitude and direction. Assume shockless flow at entry and exit. (7M)
~~~~~~

6. a) Draw a net sketch of a Pelton wheel installation and briefly indicate the functions of each component? (8M)
   b) Distinguish in detail between impulse and reaction turbines. (6M)

7. a) Explain elaborately about pumped storage plants. (5M)
   b) A run-of-river hydel power plant with an installed capacity of 15000kW operates at 20% load factor when it serves as a peak load station. What should be the minimum discharge in the stream so that it may serve as the base load station? The plant efficiency may be taken as 80% when working under a head of 15m. Also calculate the maximum load factor of the plant when the discharge in the stream is $30m^3/s$. (9M)

Code No: R1621025 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
THERMAL AND HYDRO PRIME MOVERS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1. a) State the purposes of lubrication. (2M)
   b) One kg of steam at 18bar and 280^0C undergoes a constant pressure process until the quality of steam becomes 0.5 dry. Find the work done, the heat transferred and the change in entropy. (3M)
   c) Explain and draw the T-s diagram representing the actual gas turbine cycle. (3M)
   d) Define manometric efficiency of a centrifugal pump. (2M)
   e) What do you understand by mechanical efficiency of a turbine. (2M)
   f) Define and explain the significance of Utilization factor. (2M)

PART -B

2. a) Discuss the difference between theoretical and actual valve timing diagrams of a diesel engine. (6M)
   b) Explain briefly the following methods of cooling I.C. engines: i) Air cooling; ii) Liquid cooling. State their advantages and disadvantages. (8M)

3. a) Explain velocity compounded impulse steam turbine showing pressure and velocity variations along the axis of the turbine. (6M)
   b) Describe briefly the Rankine cycle using superheated steam and show in what respect this cycle differs from Carnot cycle between the same temperatures. (8M)

4. a) Derive the expression for the optimum pressure ratio giving the mass, specific output in a simple gas turbine cycle. (6M)
   b) A gas turbine plant works in temperature limits of 300K and 900K and the pressure limits are 1bar and 4bar. The internal efficiency of the compressor is 0.8 and that of the turbine is 0.85. Estimate the thermal efficiency of the plant and the power available in kilowatts, if the air consumption is 1 kg/s. the heating value of the fuel is 42000kJ/kg. (8M)

5. a) A horizontal jet of water strikes a flat vane inclined to the jet at an angle θ. Obtain the components of the force of impact of jet in the direction of jet and normal to it if the vane is stationary. (7M)
   b) Describe with a sketch the installation and operation of a centrifugal pump. (7M)

6. a) Explain with the help of a diagram, the essential features of a Kaplan turbine installation. (7M)
   b) What are the functions governing a hydraulic turbine? Explain with a sketch the governing mechanism of an impulse turbine. (7M)
~~~~~~

7. a) Explain firm power and secondary power in detail (5M)

   b) Two turbo-generators each of capacity 25000kW have been installed at a hydel power station. During a certain period the load on the hydel plant varies from 15000kW to 40000kW. Calculate i) The load factor; ii)The plant factor and iii)The utilization factor (9M)

Code No: R1621025 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
THERMAL AND HYDRO PRIME MOVERS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Why do we feel the necessity of cooling an I.C. engine?	(2M)
	b)	Steam at a pressure of 6bar and dryness 0.8 is heated at a constant volume to a pressure of 7bar. Determine the final dryness fraction and heat absorbed by 1kg of steam.	(3M)
	c)	Enumerate the various uses of gas turbines.	(2M)
	d)	What are the operating characteristics of a centrifugal pump?	(2M)
	e)	Define hydraulic efficiency of a turbine.	(3M)
	f)	Define and explain the significance of Capacity factor.	(2M)

PART -B

2.	a)	State the relative advantages and disadvantages of battery and magneto-ignition systems.	(7M)
	b)	Discuss with the help of suitable sketch the dry pump lubrication	(7M)
3.	a)	Explain the pressure compounded impulse steam turbine showing pressure and velocity variations along the axis of the turbine.	(6M)
	b)	Prove that the efficiency of a Rankine cycle using superheated steam is greater than the efficiency of a corresponding Rankine cycle using steam without superheat. Both the cycles operate between the same boiler and condenser pressure limits.	(8M)
4.	a)	Describe with neat diagram a closed cycle gas turbine. State also its merits and demerits.	(6M)
	b)	A gas turbine unit receives air at 100kPa and 300K and compresses it adiabatically to 620kPa with efficiency of the compressor 88%. The fuel has a heating value of 44180kJ/kg and the fuel/air ratio is 0.017kg fuel/kg air. The turbine internal efficiency is 90%. Calculate the compressor work, turbine work and thermal efficiency.	(8M)
5.	a)	Derive equations for the force of impact of a fluid jet on a series of normal flat vanes mounted on a wheel. Consider that the vane velocity is less than the jet velocity	(5M)
	b)	How are centrifugal pumps classified? Describe with sketches the operation of a i) Multi-stage pump ii) Double suction pump	(9M)
~~~~~~

6. a) With the help of velocity triangles derive expressions for power developed, hydraulic efficiency and overall efficiency of a Francis runner (6M)
   b) What are the requirements of a good turbine governor? Explain with a sketch the governing mechanism of a reaction turbine. (8M)

7. a) What do you understand by hydro electric power plant? What are its elements? Discuss them one by one with neat sketches. (7M)
   b) Explain briefly how the power available for a hydel project can be estimated. (7M)

Code No: R1621025 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
THERMAL AND HYDRO PRIME MOVERS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1. a) Explain the following terms as applied to I. C. engines: compression ratio and piston speed. (2M)
   b) Steam at a pressure of 5bar and a temperature of 200^0C expands isentropically to a pressure 0.7bar. Find the final dryness of steam by using steam tables. (2M)
   c) What do you mean by term `gas turbine`? How are gas turbines classified? (3M)
   d) Why the centrifugal pump impeller vanes backward curved? (2M)
   e) Define overall efficiency of a turbine. (3M)
   f) Define and explain the significance of load factor. (2M)

PART -B

2. a) Describe a simple carburetor with a neat sketch and also state its limitations. (7M)
   b) Discuss with the help of suitable sketch, the wet pump lubrication (7M)

3. a) Draw the Rankine cycle on T-s diagram using dry saturated steam and obtain an expression for the Rankine cycle efficiency. (6M)
   b) In a De Laval turbine, the steam issues from the nozzles with a velocity of 850m/s. the nozzle angle is 20^0. Mean blade velocity is 350m/s. The blade are equiangular. The mass flow rate is 1000kg/min. friction factor is 0.8. determine (8M)
      i) Blade efficiency
      ii) Stage efficiency, if nozzle efficiency is 93%.

4. a) Discuss briefly the methods employed for improvement of thermal efficiency of open cycle gas turbine plant. (6M)
   b) A gas turbine takes in air at 27^0C and 1 bar. The pressure ratio is 4 and the maximum temperature in the cycle is 560^0C. The compressor and turbine efficiencies are 0.83 and 0.85 respectively. Determine the overall efficiency if the refrigerator effectiveness is 0.75. (8M)

5. a) A horizontal jet of water strikes a flat vane inclined to the jet at an angle θ. Obtain the components of the force of impact of jet in the direction of jet and normal to it if the vane moves in the direction of the jet with a certain velocity less than the jet velocity. (7M)
   b) Describe with the help of diagrams the variable speed and constant speed performance curves of a centrifugal pump. (7M)
~~~~~~

6. a) With the help of velocity triangles derive expressions for power developed, hydraulic efficiency and overall efficiency of a Kaplan runner (8M)
   b) Distinguish between operating speed and runaway speed of a hydraulic turbine. How are they evaluated? (6M)

7. a) Explain in detail about load-duration curve? How is it prepared? (7M)
   b) Show that capacity factor is equal to the product of the load factor and the utilization factor. (7M)