Code No: RT31024 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MACHINES – III
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

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PART –A

1	a)	Can AC series motor be started on no-load? Explain.	[3M]
	b)	Define Pitch factor of a synchronous machine.	[4M]
	c)	Define voltage regulation.	[3M]
	d)	What are the advantages of load sharing?	[4M]
	e)	What is the difference between a synchronous motor and an induction motor? Explain.	[4M]
	f)	List different methods for starting of synchronous motors.	[4M]

PART -B

2	a)	Briefly explain the term rotor frequency.	[4M]
	b)	Explain the working principle of a single phase induction motor.	[8M]
	c)	Explain the need for a winding in a split phase induction motor.	[4M]
3	a)	Describe various types of A.C. generators indicating their applications.	[3M]
	b)	Explain the principle of operation of a synchronous machine.	[8M]
	c)	A 16 pole alternator has 144 slots. If the coil pitch is kept 5 slots, then calculate its pitch factor.	[5M]
4	a)	Develop a solution for regulation of a salient pole synchronous generator.	[8M]
	b)	A 550V, 55kVA, 1-Phase alternator has an effective resistance of 0.2Ω. A field current of 10 A produces an armature current of 200 A on short-circuit and an electromotive force of 450 V on open circuit. Calculate the full load regulation with 0.8 power factor lagging.	[8M]
5	a)	Explain the role of synchronous generators operation when connected to an infinite bus.	[8M]
	b)	Deduce an expression for the synchronizing torque on no load of a 3-phase synchronous machine in terms of the line voltage V, the short circuit line current I_{sc}, the electrical angle of displacement θ and the speed n in rev per sec.	[8M]

6 a) Analyze the performance of synchronous motor for development of torque. [8M]

b) A 1000 h.p., 6000V, 3 phase star connected synchronous motor has a synchronous impedance of 1.5 +j16 Ω per phase. It is excited to develop an open circuit electromotive force of 5000V. Draw the locus diagram of the current for loads upto 1250 h.p., with constant excitation. Determine the maximum value of the power factor. [8M]

7 a) Explain the working of a synchronous -induction motor. [8M]

b) What is hunting and how it can be suppressed? [8M]

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Code No: RT31024 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MACHINES – III
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	What is slip of Induction Motor?	[3M]
	b)	What factors affect the size of alternator?	[4M]
	c)	What is potier reactance?	[3M]
	d)	Define autosynchronization.	[4M]
	e)	What is pony motor?	[4M]
	f)	Explain the phenomenon of hunting.	[4M]

PART -B

2	a)	Briefly explain about induced e.m.f of rotor in a induction machine.	[4M]
	b)	Explain the constructional features of a single phase induction machine.	[8M]
	c)	What are the drawbacks of A.C. Series motor? Explain.	[4M]
3	a)	What is distribution factor?	[3M]
	b)	Discuss the effect of armature reaction in an alternator.	[8M]
	c)	Determine the frequency of a 8 pole alternator rotating at 375 R.P.M. If the no. of poles is doubled, then what will be its new frequency?	[5M]
4	a)	Explain two reaction analysis of salient pole machines with phasor diagram.	[8M]
	b)	Determine the voltage regulation of a 2000V, 1-phase alternator giving a current of 100A at unity power factor. From the synchronous impedance method test results, full load current is 100A and is produced by a short circuit by a field excitation of 2.5 A and an electromotive force of 500V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ohm.	[8M]
5	a)	What is synchronizing power and explain its role in load sharing during parallel operation?	[8M]
	b)	Calculate the maximum load of a 5000 kVA, 1 phase alternator having an equivalent reactance of 5 ohm when connected to 6600 V bus bars, if its excitation is such that the electromotive force on open circuit would be 6000V. Find the armature current and power factor at this load.	[8M]

6 a) What is a synchronous condenser? Explain its operation. [8M]

b) The input to an 11000V , 3 phase star connected synchronous motor is 60A. The effective resistance and synchronous reactance per phase are respectively 1 Ω and 30Ω. Find the power supplied to the motor, and the induced electromotive force for a power factor of 0.8 i) lagging ii) leading [8M]

7 a) What could be the reasons for failure in starting a synchronous motor? Suggest different remedies. [8M]

b) What is hunting? Why is it essential to suppress hunting? Explain. [8M]

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Code No: RT31024 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November- 2015
ELECTRICAL MACHINES – III
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Explain double revolving field theory.	[3M]
	b)	Discuss the advantages of rotating field type alternators.	[4M]
	c)	Compare between E.M.F. method and Potier Method.	[3M]
	d)	What is the effect of changing input for alternators operating in parallel?	[4M]
	e)	What is damper winding? What is its need?	[4M]
	f)	Justify how synchronous Induction motor can produce high starting torque and constant speed.	[4M]

PART -B

2	a)	What is rotor reactance in an induction machine? Explain.	[4M]
	b)	What are different types of single phase motors and what are their applications?	[8M]
	c)	What are applications of AC series motors?	[4M]
3	a)	What is armature reaction?	[3M]
	b)	Explain the load characteristics of an alternator.	[8M]
	c)	Determine the frequency of a 12 pole alternator rotating at 600 R.P.M. If the no. of poles is tripled, then what will be its new frequency?	[5M]
4	a)	Explain the merits and demerits of e.m.f and m.m.f methods. Explain the assumptions made in each case.	[8M]
	b)	A 3phase star connected alternator is rated at 1600 kVA, 13500 V. The armature effective resistance and synchronous reactance are 1.5 Ohm and 30 Ohm respectively per phase. Calculate the percentage regulation for a load of 1280 kW at power factor of 0.8 leading.	[8M]

5 a) What are the conditions to be fulfilled for running two generators in parallel? Describe methods of synchronizing two 3 phase alternators. [8M]

b) Two identical 3 phase star connected generators operating in parallel, share equally a total load of 750KW at 6000V and power factor 0.8. The synchronous reactance and resistance of each machine are respectively 50 Ohm and 2.5 Ohm respectively per phase. The field of the first generator is excited so that the armature current is 40A (lagging). Find i) armature current of second alternator, ii) power factor of each machine. [8M]

6 a) Show that the locus of power of a synchronous machine is circle? Give the coordinates of the power circle. [8M]

b) A 2000V, 3 Phase star-connected synchronous motor has an effective resistance and synchronous reactance of 0.2 ohm and 2.2 ohm per phase respectively. The input is 800 kW at normal voltage and the induced line electromotive force is 2500V. Calculate the line current and power factor. [8M]

7 a) Write short notes on methods of starting a synchronous motor. [8M]

b) Write short notes on synchronous induction motor. [8M]

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Code No: RT31024 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MACHINES – III
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1	a)	Why single phase induction motors are not self starting?	[3M]
	b)	Define distribution factor.	[4M]
	c)	Compare between M.M.F. method and Potier Method	[3M]
	d)	Describe the effect of sudden short circuit on the performance of synchronous generator?	[4M]
	e)	What is pull out torque of a synchronous motor?	[4M]
	f)	How does a synchronous induction motor run initially? Explain?	[4M]

PART -B

2	a)	List different types of single phase induction motors. Also mention their applications.	[4M]
	b)	Explain the construction and working of a shaded pole induction motor.	[8M]
	c)	Explain double revolving field theory.	[4M]
3	a)	Define synchronous reactance.	[3M]
	b)	Explain de-magnetizing, cross magnetizing and magnetizing nature of armature reaction	[8M]
	c)	Determine the frequency of a 8 pole alternator rotating at 400 R.P.M. If the number of poles is doubled, then what will be its new frequency?	[5M]
4	a)	Describe the method of finding synchronous impedance of a given alternator.	[8M]
	b)	A 1500 KVA, 6600V 3 phase star connected alternator with a resistance of 0.4 ohm and reactance of 6 ohm per phase, delivers full load current at power factor 0.8 lagging, and normal rated voltage. Estimate the terminal voltage for the same excitation and load current at 0.8 power factor leading.	[8M]
5	a)	Derive the expression for load sharing between dissimilar alternators.	[8M]
	b)	Two synchronous generators are connected to bus-bars having a constant voltage of $10000 \angle 0^0$ V. Generator A has an induced e.m.f. of $13000 \angle 22.6^0$ V and a reactance of 2 ohm; generator B has an e.m.f of $12500 \angle 36.9^0$ V and a reactance of 3 ohms. Find the current, KW and KVAr supplied by each generator.	[8M]

6 a) With the help of a neat vector diagram, explain the operation of synchronous motor as synchronous condenser. [8M]

b) A 400-V, 6-pole, 3-phase, 50 Hz, start connected synchronous motor has a resistance and synchronous reactance of 0.5 ohm and 4 ohm per phase respectively. It takes a current of 15 A at unity power factor when operating with a certain field current. If the load torque is increased until the line current is 60 A, the field current remaining unchanged, find the gross torque developed, and the new power factor. [8M]

7 a) Why synchronous motor is not self starting? Explain various starting methods. [8M]

b) What is hunting in a synchronous motor? Explain how it can be suppressed. [8M]

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Code No: RT31021 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MEASUREMENTS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Explain the essential features of Indicating Instruments.	[4M]
	b)	What do you understand by Phantom or Fictitious loading in energy meters and why is it necessary?	[4M]
	c)	List out the limitations of AC potentiometers.	[3M]
	d)	How are detectors classified? Explain each one of them briefly.	[4M]
	e)	Explain briefly about Permeameters.	[3M]
	f)	Define resolution and Sensitivity of Digital voltmeter.	[4M]

PART -B

2	a)	Derive the torque equation of a moving iron instrument and further comment up on the nature of scale.	[8M]
	b)	The primary winding of a 1200/6A, 50 Hz current transformer has a single turn. Its secondary burden consists of a non – inductor impedance of 1.6 Ω. If the iron loss in the core is 1.6 W at full load and magnetizing mmf is 80 AT, calculate the i) flux in the core, ii) Ratio error at full load. Neglect leakage reactance.	[8M]
3	a)	Explain the working of Dynamometer type single phase power factor meter with a neat diagram.	[8M]
	b)	Explain the different sources of errors in Induction type Energy meter and how they can be adjusted/compensated.	[8M]
4	a)	Explain the working of a polar type potentiometer with a neat diagram.	[8M]
	b)	Explain how the Resistance and current can be measured using a D.C Potentiometer.	[8M]
5	a)	Explain any one method for the measurement of high resistance and explain its advantages over other methods.	[10M]
	b)	List the null/balance detectors that are commonly used for A.C. bridges and explain them briefly.	[6M]
6		Explain with a schematic diagram for the determination of Hysteresis loop by method of reversals.	[16M]
7	a)	Explain the working of Linear Ramp type Digital voltmeter with a neat schematic.	[8M]
	b)	Explain about Lissajious patterns in Cathode Ray Oscilloscope.	[8M]

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Code No: RT31021 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MEASUREMENTS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

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PART –A

1	a)	Explain about Spring control and gravity control controlling devices.	[4M]
	b)	What do you mean by Creeping error in Induction Energy meter and how it can be adjusted?	[4M]
	c)	Explain the procedure for standardizing the potentiometer.	[4M]
	d)	State the applications of Wein bridge.	[3M]
	e)	Define the following terms related to magnetic materials: i)Magnetic field strength ii) Curie temperature.	[4M]
	f)	Compare between Analog and Digital Instruments.	[3M]

PART -B

2	a)	Explain the working of Moving iron Attraction type of Instrument with a neat diagram.	[8M]
	b)	Derive the expressions for the ratio and phase angle errors of a current transformer with a neat phasor diagram.	[8M]
3	a)	Explain the working of Induction type single phase Energy meter with a neat diagram.	[8M]
	b)	A 50 A, 230V meter on full load test makes 61 revolutions in 37 seconds. If the normal disc speed is 520 revolutions per KWH, find the percentage error.	[8M]
4	a)	How does an AC potentiometer different from a DC Potentiometer.	[6M]
	b)	Explain how the calibration of Voltmeter and Wattmeter can be done using a DC Potentiometer.	[10M]
5	a)	Explain the procedure for measurement of medium resistance using Carey – Foster slide – wire bridge method and derive the necessary equation.	[10M]
	b)	Deduce the general equation or condition for bridge balance in AC Circuits.	[6M]
6	a)	Explain the operation of Ballistic Galvanometer with a neat diagram.	[8M]
	b)	Explain the AC bridge method for measurement of iron losses in ferromagnetic materials.	[8M]
7	a)	Explain the working of Successive Approximation type Digital Voltmeter with a neat diagram.	[8M]
	b)	Explain the working of Digital Tachometer with a neat block diagram.	[8M]

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Code No: RT31021 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MEASUREMENTS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Explain the significance of Eddy current damping in an indicating Instrument.	[3M]
	b)	Distinguish between the balanced and unbalanced loads.	[4M]
	c)	Explain the significance of a Potentiometer.	[3M]
	d)	Discuss the common sources of error in AC bridges. How are they eliminated?	[4M]
	e)	How are magnetic materials classified?	[4M]
	f)	List out the advantages of Digital Voltmeters.	[4M]

PART -B

2	a)	Derive the equation for deflection of a Dynamometer type of instruments which can be used for both DC and AC.	[8M]
	b)	What are the advantages of Instrument transformers over Ammeter shunts and Voltmeter multipliers?	[8M]
3	a)	Explain with a neat circuit of Dynamometer type Wattmeter and derive the equation for deflection.	[10M]
	b)	List the various types of errors in dynamometer type Wattmeter's.	[6M]
4	a)	Explain the working of Crompton Potentiometer with a neat diagram.	[8M]
	b)	Explain the standardization procedure for the AC Potentiometer. Explain how AC Potentiometer can be used for the measurement of self inductance of a coil.	[8M]
5	a)	Explain with a neat diagram for the measurement of Inductance using Hay bridge and also derive the relation for inductance under balanced condition using a neat phasor diagram.	[10M]
	b)	Explain the Dissipation factor of a lossy dielectric. How can it be measured?	[6M]
6		Explain the construction and working of Grassot flux meter with a neat diagram and also prove that "the change in the value of flux is directly proportional to the change in deflection" in this case.	[16M]
7	a)	Explain the working of Dual slope Integrating type Digital Voltmeter with a neat schematic diagram.	[8M]
	b)	Explain the working of Digital frequency meter with a neat block diagram.	[8M]

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Code No: RT31021 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MEASUREMENTS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Define the following terms related to Instrument transformers i)Transformation ratio ii)Turns Ratio	[4M]
	b)	Define LPF and UPF wattmeter's and give their significance.	[4M]
	c)	What are the applications of self balancing Potentiometers?	[3M]
	d)	From the point of measurement, how can resistances be classified.	[4M]
	e)	List the precautions needed to be taken in Magnetic testing.	[4M]
	f)	Explain the basic block diagram of a Digital voltmeter.	[3M]

PART -B

2	a)	Explain with a neat diagram the Quadrant type of Electrostatic Instrument.	[8M]
	b)	A moving coil milli ammeter having a resistance of 10Ω gives full scale deflection when a current of 5 mA is passed through it. Explain how this instrument can be used for measurement of i) Current up to 1A, ii) Voltage up to 5 V.	[8M]
3	a)	Explain how a power measurement range can be extended with a wattmeter in conjunction with an instrument transformer.	[8M]
	b)	A single phase KWh meter makes 500 revolutions per KWh. It is found, on testing, as making 40 revolutions in 58 seconds at 5 KW full load. Find out the percentage error.	[8M]
4	a)	Explain the working of Gall Co-ordinate type Potentiometer with a neat diagram.	[10M]
	b)	Explain how the Voltage and power can be measured using a dc Potentiometer.	[6M]
5	a)	Explain the procedure of measuring a low resistance with the help of Kelvin's double bridge. Derive the necessary relation for finding the unknown resistance under balanced condition of the bridge.	[10M]
	b)	Explain the importance of Wagner's earthing device.	[6M]
6	a)	Explain the AC Potentiometer method for measurement of iron losses in ferromagnetic materials.	[8M]
	b)	Give the merits and demerits of ring and bar specimens that are commonly used in magnetic testing of materials.	[8M]
7	a)	List the general specifications of Digital Voltmeters.	[8M]
	b)	Explain the basic scheme of Digital multimeter along with its advantages.	[8M]

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Code No: RT31026 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
LINEAR & DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Make a comparison between an ideal Op-amp and a practical Op-amp.	[4M]
	b)	Explain the different methods used to increase the input resistance of an op-amp.	[4M]
	c)	Define the Op-Amp parameters: (i) Input offset voltage, V_{io} (ii) Input bias current, I_{io}.	[3M]
	d)	Write about 566 voltage controlled oscillator.	[4M]
	e)	Differentiate between active and passive filters.	[3M]
	f)	List important specifications of Digital to Analog converters indicating their typical values.	[4M]

PART –B

2	a)	The common mode input of a certain differential amplifier, having differential gain of 125 is 4 sin 200πt V. determine the common mode output if CMMR 60dB.	[4M]
	b)	Analyze a dual input and unbalanced output BJT differential amplifier.	[8M]
	c)	For an op-amp PSRR is 70dB (min), CMRR is 10^5 and $A_d = 10^5$. The output voltage changes by 20V in 4 sec. Calculate (i) common mode gain (ii) slew rate.	[4M]
3	a)	An Op-Amp has a slew rate of 2V/μ sec. What is the maximum frequency of an output signal of peak value 5V at which the distortion sets in due to the slew rate limitation?	[4M]
	b)	Explain the parameters that should be considered for ac and dc applications of an Op-Amp.	[8M]
	c)	Draw a neat circuit diagram of an integrator circuit. Explain its functioning with the Input-Output wave forms.	[4M]
4	a)	What are the three differential amplifier configurations? Compare and contrast these configurations.	[8M]
	b)	What is an instrumentation amplifier? Draw a three Op-Amp dc instrumentation amplifier and derive the expression for its output.	[8M]
5	a)	Draw the circuit of an Astable multivibrator using Op-Amp and derive the expression for its frequency of oscillations. How will you modify this circuit to have independent control of ON and OFF time durations?	[8M]
	b)	What is a three terminal regulator? Draw a fixed voltage regulator circuit and explain its operation. Explain how the IC 7805 can be used as a current source.	[8M]

6 a) With the aid of a circuit diagram, explain the principle of operation of second-order low pass active filter. [8M]

b) Draw a band – pass filter circuit with its frequency response curve. Explain its working. [8M]

7 a) Draw the circuit diagram of dual slope integration A to D converter and state its advantages. Explain its operation with waveforms. What parameters decide its conversion speed and accuracy? [8M]

b) Discuss the following type ADCs: [8M]
i) Ramp type ADC and ii) Servo tracking ADC.

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Code No: RT31026 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
LINEAR & DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Briefly explain about FET differential amplifier.	[3M]
	b)	Explain the term 'Slew rate' and how it affects the frequency response of an Op-Amp.	[4M]
	c)	Explain tracking range and capture range of a PLL.	[4M]
	d)	Explain how IC 7805 can be used as a current source.	[4M]
	e)	Draw the frequency response characteristics of a notch filter.	[3M]
	f)	Define the terms 'Accuracy', 'Percentage Resolution' and 'settling time' of an Analog to Digital converter.	[4M]

PART -B

2	a)	Draw the circuit of BJT differential amplifier and suggest ways to improve CMRR.	[4M]
	b)	Consider a BJT current mirror with a nominal current transfer ratio of unity. Let the transistors have Is = 10^{-15}A, β =100 and V_A=100V.For I_{REF} =1mA find I_0 when V_O = 5V also find the output resistance.	[8M]
	c)	Write about level translator circuit.	[4M]
3	a)	Define the terms: PSRR, CMRR, input bias current & input offset voltage. Explain the difference between slew rate and transient response.	[3M]
	b)	Write about 78XX–79XX voltage regulators and explain about their use in dual power supply.	[8M]
	c)	Draw and explain the working of an op amp with offset-voltage compensating network.	[5M]
4	a)	With the help of a neat circuit diagram, explain the working of a logarithmic amplifier. Derive the expression for its output voltage.	[8M]
	b)	Draw the circuit of an Astable multivibrator using Op-Amp and derive the expression for its frequency of oscillations. How will you modify this circuit to have independent control of ON and OFF time durations?	[8M]
5	a)	Discuss with relevant circuits and waveforms the working of Monostable multivibrator using 555 timer.	[8M]
	b)	Draw the block diagram of a 565 PLL IC and explain its working.	[8M]

6 a) Explain the operation of an All-pass filter. Explain why it is known as phase shift circuit. [8M]

b) Design a band-pass active filter of second order with a mid-band voltage gain AR VR=50. Center frequency fR 0R=200 Hz and Bandwidth=20 Hz. [8M]

7 a) Write a short note on performance specifications of a digital to analog converter. [8M]

b) Draw the circuit of weighted resistor DAC and derive expression for output analog voltage Vo. [8M]

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Code No: RT31026 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
LINEAR & DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

*****

PART –A

1	a)	Draw the BJT current mirror circuit and briefly explain its operation.	[4M]
	b)	Explain the different methods used to increase the input resistance of an op-amp.	[4M]
	c)	Sketch and explain the circuit operation of log and antilog amplifiers.	[4M]
	d)	Derive expression for o/p voltage 'V_0' of dual -slope A/D converter.	[4M]
	e)	Explain different configurations of an active filter.	[3M]
	f)	Compare different types of ADCs.	[3M]

PART -B

2	a)	Draw the block diagram of the operational amplifier and briefly write about each block.	[8M]
	b)	Analyze the circuit of a BJT differential amplifier with emitter resistance.	[8M]
3	a)	Write about large signal voltage gain of op-amp.	[3M]
	b)	Define the Op-Amp parameters: (i) Input offset voltage, Vio (ii) Input bias current, Iio with a practical setup explain how these parameters can be measured.	[8M]
	c)	Explain frequency compensation techniques used in Op-Amps.	[5M]
4	a)	Design a differentiator to differentiate an input signal thatvaries in frequency from 10 Hz to about 1 KHz. If a sinewave of 1 V peak at 1000 Hz is applied to this differentiator, draw the output waveforms.	[8M]
	b)	Define the terms Upper and Lower Tripping Points of a Schmitt trigger. What is the significance of the two parameters? Explain the operation of a Schmitt trigger circuit using Comparator.	[8M]
5	a)	Draw the circuit of 555 timer IC in Astable mode to get output waveform with 50% duty cycle.	[6M]
	b)	Define the terms: i) free-running frequency f_0 , (ii) lock range, (iii) capture range, and (iv) pull-in time, pertaining to PLL.	
6	a)	Explain the term 'frequency scaling' with suitable example.	[8M]
	b)	Design a wide band pass filter with f_L = 200 Hz, f_H = 1KHz and a pass band gain = 4. Draw the frequency response and calculate 'Q' factor for the filter.	[8M]
7	a)	Explain the operation of a multiplying DAC and mention its applications.	[8M]
	b)	Describe AD 670 microprocessor compatible flash converter.	[8M]

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Code No: RT31026 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
LINEAR & DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

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PART –A

1	a)	Write about current repeater circuits.	[3M]
	b)	For an op-amp having slew rate of 3 V/ μsec, what is the maximum closed loop voltage gain that can be used when the input signal varies by 0.4V in 12 μ sec.	[4M]
	c)	Draw and explain the ideal voltage transfer characteristics of an op-amp.	[3M]
	d)	Write briefly about FSK demodulators.	[4M]
	e)	Explain the function of Wide band reject filter.	[4M]
	f)	Write about the basic Digital to Analog Conversion techniques.	[4M]

PART -B

2	a)	Explain the operation of the BJT differential amplifier with constant current source.	[4M]
	b)	Analyze the BJT differential amplifier with dual input and balanced output.	[8M]
	c)	Write about cascade differential amplifier.	[4M]
3	a)	Write about the large signal operation of an op-amp.	[3M]
	b)	Write about the advantages and disadvantages of 78xx and 79xx series regulators.	[8M]
	c)	Draw and explain the working of an op amp with offset-voltage compensating network.	[5M]
4	a)	Define the terms Upper and Lower Tripping Points of a Schmitt trigger. What is the significance of the two parameters? Explain the operation of a Schmitt trigger circuit using Comparator.	[8M]
	b)	Draw a neat circuit diagram of an integrator circuit. Explain its functioning with the Input-Output wave forms. Derive the output voltage V_0 of an integrator circuit.	[8M]
5	a)	What is the principle of PLL? Draw the block schematic and explain the same.	[8M]
	b)	Discuss about any two applications of 555 timer monostable multivibrator.	[8M]
6	a)	Design a second order low-pass Butterworth filter with a cut-off frequency of 12KHz and unity gain at low frequency. Also determine the voltage transfer function magnitude in dB at 15Hz for the filter.	[8M]
	b)	Given a bandpass filter with resonant frequency fr of 1000 Hz and a bandwidth of 3000Hz; Find its (i) quality factor, (ii) lower cutoff frequency and higher cutoff frequency.	[8M]
7	a)	Sketch and explain the transfer characteristic of a DAC with necessary equations.	[7M]
	b)	Give the schematic circuit diagram of successive approximation type A/D converter and explain the operation of this system.	[9M]

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Code No: RT31022 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to EEE, AME and MINE)

Time: 3 hours Max. Marks: 70

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

PART –A

1	a)	What is Income Demand? How do you determine it?	[3M]
	b)	What do you mean by Opportunity Cost? Give examples.	[4M]
	c)	Explain Monopoly competition.	[4M]
	d)	What is the difference between Partnership and Sole trade?	[3M]
	e)	What do you mean by Journal? Explain.	[4M]
	f)	Write a short note on Capital and types of capital.	[4M]

PART -B

2	a)	What is Law of Demand? What are its assumptions?	[8M]
	b)	Describe any four methods of Demand forecasting.	[8M]
3	a)	Explain the internal and external economics of large scale.	[8M]
	b)	From the following information, calculate Break Even Sales in terms of value and volume.	[8M]

	Rs.
Sales	10,00,000
Units sold	5,000
Variable cost / unit	100
Fixed Cost	2,00,000

4	a)	What is Perfect Competition? Describe its features.	[8M]
	b)	Explain Market Skimming Pricing.	[8M]
5	a)	Discuss the salient features of a Joint Stock Company and its merits.	[8M]
	b)	Illustrate the different phases in Business Cycles.	[8M]
6	a)	Define Capital budgeting. Explain its importance.	[8M]
	b)	Explain briefly Net Present Value technique of capital budgeting.	[8M]

7 Prepare final accounts for Munni Lal for the year ended 31st March 2012 form the following Trial Balance. [16M]

Account	**Debit (Rs.)**	**Credit (Rs.)**
Cash in hand	10,000	
Purchases	2,00,000	
Sales		3,10,000
Returns Inward	5,000	
Returns outward		10,000
Wages	8,000	
Power	2,000	
Factory Rent	5,000	
Opening Stock	10,000	
Buildings	50,000	
Land	70,000	
Machinery	40,000	
Patents	5,000	
Salaries	8,000	
General Expenses	2,000	
Insurance	3,000	
Drawings	8,000	
Capital		95,000
Debtors	4,000	
Creditors		15,000
Total:	**4,30,000**	**4,30,000**

Adjustments:

1. Closing Stock Rs. 10,000
2. Depreciate machinery, buildings and patents at 10% p.a
3. Outstanding salaries Rs. 3,000
4. Prepaid insurance Rs. 300
5. Wages outstanding Rs. 1,000.

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Code No: RT31022 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to EEE, AME and MINE)

Time: 3 hours Max. Marks: 70

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

PART –A

1	a)	What are the Determinants of Demand?	[3M]
	b)	Explain about Production Function.	[4M]
	c)	What is Monopolistic Competition?	[4M]
	d)	What do you mean by Unlimited Liability?	[3M]
	e)	What do you understand by Ledger?	[4M]
	f)	What is Net Present Value (NPV)? Explain.	[4M]

PART -B

2	a)	Define Managerial Economics and discuss its scope.	[8M]
	b)	Illustrate the types of Elasticity of Demand.	[8M]
3	a)	Explain the Law of Variable proportions.	[8M]
	b)	Describe Break-Even Point with the help of diagram and its uses in decision making.	[8M]
4	a)	What is Monopoly? State its features.	[8M]
	b)	Examine some of the Internet pricing methods used today.	[8M]
5	a)	Examine the merits and demerits of Partnership.	[8M]
	b)	What do you understand by Business Cycles? What are its causes?	[8M]
6	a)	What is Capital budgeting? What is its significance?	[8M]
	b)	Discuss Pay Back Period of capital budgeting.	[8M]

7 The following Trial balance was extracted from the books of M/S M.S. Bros. on March 31, 2003. You are required to prepare a Trading account and Profit and Loss account for the year ended March 31, 2003 and a Balance sheet as on that date. The closing stock amounted to Rs. 14,220. [16M]

Particulars	**Debit (Rs.)**	**Credit (Rs.)**
Debtors	12,000	
Creditors		7,900
Capital		30,000
Drawings	2,900	
Rent and Rates	250	
Trade expenses	670	
Purchases	8,640	
Sales		14,290
Returns Outwards		280
Returns Inwards	190	
Carriage Inwards	250	
Wages	2,920	
Salaries	1,200	
Stock (April 1st 2002)	3,100	
Discount received		240
Discount allowed	180	
Bad Debts	200	
Plant and Machinery	2,510	
Furniture and Fittings	1,800	
Cash in hand	500	
Cash at Bank	15,400	
Total:	**52,710**	**52,710**

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Code No: RT31022 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to EEE, AME and MINE)

Time: 3 hours Max. Marks: 70

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

PART –A

1	a)	Define Demand, explain the types of Demand.	[3M]
	b)	What do you mean by Imputed Costs?	[4M]
	c)	Explain about Perfect Competition.	[4M]
	d)	Explain about Private Ltd Company.	[3M]
	e)	Write notes on Trial Balance.	[4M]
	f)	What is Accounting Rate of Return (ARR)? How it is calculated?	[4M]

PART -B

2	a)	Define Demand. What are the determinants of demand?	[8M]
	b)	Explain the different types of Price elasticity.	[8M]
3	a)	Explain Fixed Costs and Variable Costs with examples.	[8M]
	b)	Discuss the managerial uses of Break-Even analysis.	[8M]
4	a)	What are the features of Monopolistic competition?	[8M]
	b)	Explain Transaction based pricing and Priority pricing.	[8M]
5	a)	State the features merits and demerits of Sole Trade.	[8M]
	b)	What are Business Cycles?	[8M]
6	a)	Explain the importance of Capital budgeting in financial decisions.	[8M]
	b)	Why are the Traditional methods of capital budgeting still popular?	[8M]

7 From the following Trial balance of Giri Traders, prepare final accounts for the year ended 31-12-2013. [16M]

Particulars	**Debit (Rs.)**	**Credit (Rs.)**
Capital		3,00,000
Cash	5,000	
Purchases	19,000	
Purchases returns		500
Sales		20,000
Wages	1,000	
Salaries	800	
Factory Insurance	200	
Rent	650	
Carriage	150	
Office expenses	200	
Carriage outwards	200	
Machinery	8,000	
Furniture	6,000	
Discount allowed	250	
Discount received		1,500
Goodwill	3,550	
Opening Stock	1,500	
Debtors	8,500	
Creditors		3,000
Total:	**55,000**	**55,000**

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Code No: RT31022 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to EEE, AME and MINE)

Time: 3 hours Max. Marks: 70

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

PART –A

1	a)	Write a short note on Law of Demand.	[3M]
	b)	What are Isoquants and Isocosts?	[4M]
	c)	Write a short note on the features of Oligopoly.	[4M]
	d)	Explain the concept of Sole Trader and the limitations of sole trading.	[3M]
	e)	Write a short note on Liquidity Ratio.	[4M]
	f)	Write a short note on internal Rate of Return (IRR).	[4M]

PART -B

2	a)	With the help of a diagram, show the Demand curve and explain why it slopes downwards.	[8M]
	b)	Explain the quantitative methods used in Demand forecasting.	[8M]
3	a)	Explain the managerial uses of Production function.	[8M]
	b)	Calculate the BEP in units and rupees using the following details: • Selling price per unit Rs. 100 • Variable cost per unit Rs. 60 • Fixed costs Rs. 20,000 • Actual sales Rs. 2,00,000	[8M]
4	a)	How is price determined under Perfect competition?	[8M]
	b)	State the conditions in which Market Skimming pricing can be followed.	[8M]
5	a)	Distinguish between Public Ltd Company and Private Ltd Company.	[8M]
	b)	Discuss the causes of Business Cycles.	[8M]
6	a)	Illustrate Traditional Methods of capital budgeting.	[8M]
	b)	The cost of a project is Rs. 2, 40,000 and the annual cash inflows for the next five years are Rs. 60,000. What is the Payback period for the project?	[8M]

7 From the following balances, prepare Trading and Profit and Loss Account and Balance Sheet: [16M]

Particulars	**Debit (Rs.)**	**Credit (Rs.)**
Machinery	3,500	
Debtors	2,700	
Drawings	900	
Purchases	9,500	
Wages	5,000	
Bank	1,500	
Opening Stock	2,000	
Rent	450	
Sundry expenses	200	
Carriage	150	
Capital		10,000
Creditors		1,400
Sales		14,500

Closing Stock was Rs. 300.

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Code No: RT31023 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) Give the advantages of bundled conductors. [3M]

b) Define voltage regulation and efficiency of transmission lines. [3M]

c) What do you mean by surge impedance and surge impedance loading of transmission line? [4M]

d) What is reflection & refraction coefficient of current and voltage wave of transmission line when receiving end is open circuited. [4M]

e) What is skin effect? On what factors does it depend? [4M]

f) Define String efficiency of suspension insulator string. List the methods to improve it? [4M]

PART –B

2 a) Derive the expression for inductance of a three phase double circuit line. [8M]

b) Three conductors of three phase line are arranged at corners of triangle of sides 2m, 3.2m and 4m. The diameter of the conductor is 2.5cm. Calculate the inductance and capacitance of a three phase three wire system. [8M]

3 a) Show how regulation and transmission efficiency are determined for medium lines using end condenser method and illustrate your answer with suitable vector diagram. [6M]

b) A three phase transmission line is 135 km long. The series impedance is Z=0.04 + j 0.95 ohm per phase per km, and shunt admittance is Y=j 5.1×10^{-6} mho per phase per km. The sending end voltage is 132 kV and the sending end current is 154 A at 0.9 power factor lagging. Determine the voltage, current and power at the receiving end and the voltage regulation using medium line-T model. [10M]

4 a) Derive expressions for ABCD constants for lossless long transmission line. Assume distributed parameters for the line. [8M]

b) A three - phase overhead transmission line has series impedance per phase of $250\angle80^0$ ohms and a total shunt admittance of $0.0019\angle90^0$ siemen per phase. The line delivers a load of 100MW at 0.8 p.f lagging and 200kV between the lines. Calculate the sending-end voltage and current by the rigorous method. [8M]

5 a) Derive the travelling wave equations in a lossless transmission line. [6M]

b) The ends of two long transmission lines, A and C are connected by a cable B, 1km long. The surge impedances of A, B, C are 400, 50 and 500 ohms respectively. A rectangular voltage wave of 25 kV magnitude and of infinite length is initiated in A and travels to C, determine the first and second voltages impressed on C. [10M]

6 a) Explain in brief about shunt compensation in power systems. [8M]

b) Explain the principle of operation and working of synchronous capacitors in power system for improvement of power factor. [8M]

7 a) What is sag template? Explain the construction of pin type insulator. [8M]

b) Derive the expression for string efficiency of a string of 3- insulators. [8M]

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Code No: RT31023 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Give the list of various types of conductors.	[3M]
	b)	What are the differences between nominal-T and nominal-π methods?	[3M]
	c)	What are ABCD constants of long transmission line?	[4M]
	d)	What are types of power system transients?	[4M]
	e)	What are the factors affecting corona?	[4M]
	f)	What are stringing chart and sag template?	[4M]

PART –B

2	a)	What are bundled conductors? Discuss the advantages of bundled conductors, when used for overhead lines.	[6M]
	b)	A 3-phase, 50 Hz, 66 kV overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 3m sides and the diameter of each conductor is 1.5 cm. Determine the inductance and capacitance per phase, if the length of line is 100 km. And also calculate the charging current.	[10M]
3	a)	Define A, B, C and D constants of a transmission line? What are their values in short lines?	[6M]
	b)	A 3-phase, 3km long line delivers 3000 kW at a power factor of 0.8 lagging to a load. If the voltage at the supply end is 11 kV, determine the voltage at the load end, percentage regulation, sending end power factor and the efficiency of transmission. The resistance and reactance per km of each conductor are 0.4 ohm and 0.3 ohm respectively.	[10M]
4	a)	Derive the expressions for voltage and current distribution over a long line. Explain the significance of characteristic impedance loading in connection with the long lines. Deduce the above voltage and current relations in the hyperbolic form and obtain the element values of an equivalent to represent the long lines.	[8M]
	b)	A 220 kV, 3-phase transmission line has impedance per phase of (60 + j 200) ohm and an admittance of (0 + j 0.0015) mho. Determine i) Sending end voltage and ii) Sending end current when receiving end current is 200 amps at 0.95 p.f lagging.	[8M]

Code No: RT31023 **R13** SET - 2

5 a) When the transmission line is terminated by the capacitive load, how do you find out the expressions of reflected voltage and current wave? [8M]

b) Step wave of 110 kV travels through a line having a surge impedance of 350Ω. The line is terminated by an inductance of 5000μH. Find the voltage across the inductance and reflected voltage wave. [8M]

6 a) What are skin and proximity effects on transmission lines? [6M]

b) Find the critical disruptive voltage and the critical voltages for local and general corona on a 3- phase overhead transmission line, consisting of 3-stranded copper conductors spaced 2.5 m apart at the corners of an equilateral triangle. Air temperature and pressure are 21^0C and 73.6 cm of Hg respectively. Take conductor diameter 10.4 mm, irregularity factor 0.85, local and general surface factors 0.7 and 0.8 respectively. [10M]

7 a) Explain the various methods used for improving string efficiency. [10M]

b) An overhead line has a span of 250 m. Find the weight of conductor if the ultimate strength is 5758kg, sag is 1.5 m and factor of safety is 2. [6M]

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Code No: RT31023 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	Define GMD and GMR for transmission lines.	[3M]
	b)	Give the classification of overhead transmission lines.	[3M]
	c)	Define wave length & velocity of propagation of waves.	[4M]
	d)	What are the factors that cause a travelling wave?	[4M]
	e)	What is meant by Ferranti effect?	[4M]
	f)	Write down the expression for sag when supports are at equal and unequal levels.	[4M]

PART –B

2	a)	Briefly discuss the various types of conductor material used for over head transmission lines.	[8M]
	b)	What is the method of images? How can it be used to take into account the presence ground in calculating the capacitance of a single phase line?	[8M]
3		Find the ABCD parameters of a 3-phase, 80km, 50Hz transmission line with series impedance of (0.15 + j 0.28) ohm per km and a shunt admittance of $j5x10^{-4}$ mho per km for the both Π and T networks.	[16M]
4	a)	Explain characteristic impedance and surge impedance loading of long lines.	[6M]
	b)	A three-phase, 50 Hz, 150 km long transmission line has three conductors each of 0.7 cm radius spaced at the corners of triangle of sides 2 m, 3.5m and 4.5m. The resistance of each conductor is 0.4 ohms per km and the line delivers 50 MVA at 132 kV and at a lagging p.f. of 0.85. Determine ABCD constants as long line (both real and complex angle methods).	[10M]
5	a)	Explain the variation of current and voltage on an overhead line when one end of the line is short circuited and at the other end a source of constant voltage V is switched in.	[8M]
	b)	A 500 kV, 2 μsec, duration rectangular surge passes through a line having surge impedance of 350 Ω and approaches a station at which the concentrated earth capacitance is 3×10^3 pF. Calculate the maximum value of surge transmitted to the second line.	[8M]

6 a) Explain the phenomenon of corona. How can the corona loss be minimized in transmission lines? [8M]

b) A certain 3-phase equilaterally spaced transmission line has a total corona loss of 55 kW at 110 kV and a loss of 110 kW at 120 kV. What is the disruptive critical voltage between lines? What is the corona loss at 125 kV? [8M]

7 An overhead line has the following data: span length 185m, difference in levels of supports 5m, conductor diameter 1.82cm, weight per unit length of conductor 2.5kg/m, wind pressure 49kg/m^2 of projected area. Maximum tensile stress of the conductor 4250kg/cm^2. Factor of safety 5. Calculate the allowable sag in meters at the lower support. [16M]

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Code No: RT31023 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1	a)	What is the effect of ground on capacitance?	[3M]
	b)	What are ABCD constants for short transmission lines?	[3M]
	c)	What do you mean by incident, reflected and reflected waves?	[4M]
	d)	What are reflection and refraction coefficients of current and voltage wave of transmission line when receiving end is short circuited?	[4M]
	e)	What are the advantages of corona?	[4M]
	f)	Write down the expression for working stress and vertical sag.	[4M]

PART –B

2	a)	Derive the expression of capacitance for 2 wire and 3 wire systems.	[8M]
	b)	Calculate the capacitance of a conductor per phase of a three-phase 400 km long line, with the conductors spaced at the corners of an equilateral triangle of side 4 m and the diameter of each conductor being 2.5cm.	[8M]
3	a)	Explain the effect of power factor on regulation and efficiency.	[8M]
	b)	A single-phase, 11 kV line with a length of 15 km is to transmit 500 kVA. The inductive reactance of the line is 0.6 Ω per km and the resistance is 0.25Ω per km. Calculate the efficiency and regulation for a p.f of 0.75 lag.	[8M]
4	a)	With reference to long transmission line, give physical interpretation of the terms of characteristic impedance and propagation constant? What is meant by surge impedance?	[8M]
	b)	Determine ABCD constant for 3-phase, 50 Hz transmission line 200 km long having the following distributed parameters. L= 1.20×10^{-3} H/km, C= 8×10^{-9} F/km, R = 0.15 Ω/km, G=0.	[8M]

5 a) When the transmission line is terminated through a resistance, how do you find out the expressions of reflection and refraction coefficient? [8M]

b) An overhead transmission line with surge impedance 400 ohms is 300 km long. One end of this line is short circuited and at the other end a source of 11 KV is suddenly switched in. Calculate the current at the source end 0.005 sec after the voltage is applied. [8M]

6 a) What is corona? Explain the theory of corona formation in detail. [6M]

b) What is Ferranti effect? Prove with mathematical expression the actual phenomenon that occurs in Ferranti effect. [6M]

c) What is skin effect? [4M]

7 a) What is guard ring which is being used in the suspension string type insulator? Deduce the relation for determining the capacitance formed by the ring. [8M]

b) A three phase over head line is being supported by three discs suspension insulators, the potential across the first and second insulators are 12 and 18 kV respectively. Calculate (i) the line voltage, (ii) the ratio of capacitance between pin and earth to self-capacitance of each unit, (iii) the string efficiency. [8M]

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Code No: RT31023 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

*****

PART –A

1 a) Give the advantages of bundled conductors. [3M]

b) Define voltage regulation and efficiency of transmission lines. [3M]

c) What do you mean by surge impedance and surge impedance loading of transmission line? [4M]

d) What is reflection & refraction coefficient of current and voltage wave of transmission line when receiving end is open circuited. [4M]

e) What is skin effect? On what factors does it depend? [4M]

f) Define String efficiency of suspension insulator string. List the methods to improve it? [4M]

PART –B

2 a) Derive the expression for inductance of a three phase double circuit line. [8M]

b) Three conductors of three phase line are arranged at corners of triangle of sides 2m, 3.2m and 4m. The diameter of the conductor is 2.5cm. Calculate the inductance and capacitance of a three phase three wire system. [8M]

3 a) Show how regulation and transmission efficiency are determined for medium lines using end condenser method and illustrate your answer with suitable vector diagram. [6M]

b) A three phase transmission line is 135 km long. The series impedance is Z=0.04 + j 0.95 ohm per phase per km, and shunt admittance is Y=j 5.1×10^{-6} mho per phase per km. The sending end voltage is 132 kV and the sending end current is 154 A at 0.9 power factor lagging. Determine the voltage, current and power at the receiving end and the voltage regulation using medium line-T model. [10M]

4 a) Derive expressions for ABCD constants for lossless long transmission line. Assume distributed parameters for the line. [8M]

b) A three - phase overhead transmission line has series impedance per phase of $250\angle80^0$ ohms and a total shunt admittance of $0.0019\angle90^0$ siemen per phase. The line delivers a load of 100MW at 0.8 p.f lagging and 200kV between the lines. Calculate the sending-end voltage and current by the rigorous method. [8M]

5 a) Derive the travelling wave equations in a lossless transmission line. [6M]

b) The ends of two long transmission lines, A and C are connected by a cable B, 1km long. The surge impedances of A, B, C are 400, 50 and 500 ohms respectively. A rectangular voltage wave of 25 kV magnitude and of infinite length is initiated in A and travels to C, determine the first and second voltages impressed on C. [10M]

6 a) Explain in brief about shunt compensation in power systems. [8M]

b) Explain the principle of operation and working of synchronous capacitors in power system for improvement of power factor. [8M]

7 a) What is sag template? Explain the construction of pin type insulator. [8M]

b) Derive the expression for string efficiency of a string of 3- insulators. [8M]

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Code No: RT31023 **R13** SET - 2

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Give the list of various types of conductors.	[3M]
	b)	What are the differences between nominal-T and nominal-π methods?	[3M]
	c)	What are ABCD constants of long transmission line?	[4M]
	d)	What are types of power system transients?	[4M]
	e)	What are the factors affecting corona?	[4M]
	f)	What are stringing chart and sag template?	[4M]

PART –B

2	a)	What are bundled conductors? Discuss the advantages of bundled conductors, when used for overhead lines.	[6M]
	b)	A 3-phase, 50 Hz, 66 kV overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 3m sides and the diameter of each conductor is 1.5 cm. Determine the inductance and capacitance per phase, if the length of line is 100 km. And also calculate the charging current.	[10M]
3	a)	Define A, B, C and D constants of a transmission line? What are their values in short lines?	[6M]
	b)	A 3-phase, 3km long line delivers 3000 kW at a power factor of 0.8 lagging to a load. If the voltage at the supply end is 11 kV, determine the voltage at the load end, percentage regulation, sending end power factor and the efficiency of transmission. The resistance and reactance per km of each conductor are 0.4 ohm and 0.3 ohm respectively.	[10M]
4	a)	Derive the expressions for voltage and current distribution over a long line. Explain the significance of characteristic impedance loading in connection with the long lines. Deduce the above voltage and current relations in the hyperbolic form and obtain the element values of an equivalent to represent the long lines.	[8M]
	b)	A 220 kV, 3-phase transmission line has impedance per phase of (60 + j 200) ohm and an admittance of (0 + j 0.0015) mho. Determine i) Sending end voltage and ii) Sending end current when receiving end current is 200 amps at 0.95 p.f lagging.	[8M]

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5 a) When the transmission line is terminated by the capacitive load, how do you find out the expressions of reflected voltage and current wave? [8M]

b) Step wave of 110 kV travels through a line having a surge impedance of 350Ω. The line is terminated by an inductance of 5000μH. Find the voltage across the inductance and reflected voltage wave. [8M]

6 a) What are skin and proximity effects on transmission lines? [6M]

b) Find the critical disruptive voltage and the critical voltages for local and general corona on a 3- phase overhead transmission line, consisting of 3-stranded copper conductors spaced 2.5 m apart at the corners of an equilateral triangle. Air temperature and pressure are 21^0C and 73.6 cm of Hg respectively. Take conductor diameter 10.4 mm, irregularity factor 0.85, local and general surface factors 0.7 and 0.8 respectively. [10M]

7 a) Explain the various methods used for improving string efficiency. [10M]

b) An overhead line has a span of 250 m. Find the weight of conductor if the ultimate strength is 5758kg, sag is 1.5 m and factor of safety is 2. [6M]

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Code No: RT31023 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November - 2015
POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define GMD and GMR for transmission lines.	[3M]
	b)	Give the classification of overhead transmission lines.	[3M]
	c)	Define wave length & velocity of propagation of waves.	[4M]
	d)	What are the factors that cause a travelling wave?	[4M]
	e)	What is meant by Ferranti effect?	[4M]
	f)	Write down the expression for sag when supports are at equal and unequal levels.	[4M]

PART –B

2	a)	Briefly discuss the various types of conductor material used for over head transmission lines.	[8M]
	b)	What is the method of images? How can it be used to take into account the presence ground in calculating the capacitance of a single phase line?	[8M]
3		Find the ABCD parameters of a 3-phase, 80km, 50Hz transmission line with series impedance of (0.15 + j 0.28) ohm per km and a shunt admittance of $j5x10^{-4}$ mho per km for the both Π and T networks.	[16M]
4	a)	Explain characteristic impedance and surge impedance loading of long lines.	[6M]
	b)	A three-phase, 50 Hz, 150 km long transmission line has three conductors each of 0.7 cm radius spaced at the corners of triangle of sides 2 m, 3.5m and 4.5m. The resistance of each conductor is 0.4 ohms per km and the line delivers 50 MVA at 132 kV and at a lagging p.f. of 0.85. Determine ABCD constants as long line (both real and complex angle methods).	[10M]
5	a)	Explain the variation of current and voltage on an overhead line when one end of the line is short circuited and at the other end a source of constant voltage V is switched in.	[8M]
	b)	A 500 kV, 2 μsec, duration rectangular surge passes through a line having surge impedance of 350 Ω and approaches a station at which the concentrated earth capacitance is 3×10^3 pF. Calculate the maximum value of surge transmitted to the second line.	[8M]

6 a) Explain the phenomenon of corona. How can the corona loss be minimized in transmission lines? [8M]

b) A certain 3-phase equilaterally spaced transmission line has a total corona loss of 55 kW at 110 kV and a loss of 110 kW at 120 kV. What is the disruptive critical voltage between lines? What is the corona loss at 125 kV? [8M]

7 An overhead line has the following data: span length 185m, difference in levels of supports 5m, conductor diameter 1.82cm, weight per unit length of conductor 2.5kg/m, wind pressure 49kg/m^2 of projected area. Maximum tensile stress of the conductor 4250kg/cm^2. Factor of safety 5. Calculate the allowable sag in meters at the lower support. [16M]

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Code No: RT31023 **R13** SET - 4

III B. Tech I Semester Regular Examinations, November - 2015

POWER SYSTEMS-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. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What is the effect of ground on capacitance?	[3M]
	b)	What are ABCD constants for short transmission lines?	[3M]
	c)	What do you mean by incident, reflected and reflected waves?	[4M]
	d)	What are reflection and refraction coefficients of current and voltage wave of transmission line when receiving end is short circuited?	[4M]
	e)	What are the advantages of corona?	[4M]
	f)	Write down the expression for working stress and vertical sag.	[4M]

PART –B

2	a)	Derive the expression of capacitance for 2 wire and 3 wire systems.	[8M]
	b)	Calculate the capacitance of a conductor per phase of a three-phase 400 km long line, with the conductors spaced at the corners of an equilateral triangle of side 4 m and the diameter of each conductor being 2.5cm.	[8M]
3	a)	Explain the effect of power factor on regulation and efficiency.	[8M]
	b)	A single-phase, 11 kV line with a length of 15 km is to transmit 500 kVA. The inductive reactance of the line is 0.6 Ω per km and the resistance is 0.25Ω per km. Calculate the efficiency and regulation for a p.f of 0.75 lag.	[8M]
4	a)	With reference to long transmission line, give physical interpretation of the terms of characteristic impedance and propagation constant? What is meant by surge impedance?	[8M]
	b)	Determine ABCD constant for 3-phase, 50 Hz transmission line 200 km long having the following distributed parameters. L= 1.20×10^{-3} H/km, C= 8×10^{-9} F/km, R = 0.15 Ω/km, G=0.	[8M]

5 a) When the transmission line is terminated through a resistance, how do you find out the expressions of reflection and refraction coefficient? [8M]

b) An overhead transmission line with surge impedance 400 ohms is 300 km long. One end of this line is short circuited and at the other end a source of 11 KV is suddenly switched in. Calculate the current at the source end 0.005 sec after the voltage is applied. [8M]

6 a) What is corona? Explain the theory of corona formation in detail. [6M]

b) What is Ferranti effect? Prove with mathematical expression the actual phenomenon that occurs in Ferranti effect. [6M]

c) What is skin effect? [4M]

7 a) What is guard ring which is being used in the suspension string type insulator? Deduce the relation for determining the capacitance formed by the ring. [8M]

b) A three phase over head line is being supported by three discs suspension insulators, the potential across the first and second insulators are 12 and 18 kV respectively. Calculate (i) the line voltage, (ii) the ratio of capacitance between pin and earth to self-capacitance of each unit, (iii) the string efficiency. [8M]

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