Code No: RT21011 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Jan - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

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 **THREE** Questions from **Part-B**

~~~~~~

PART-A

1. a) State Kirchhoff's laws?
   b) What is the function of Commutator in the D.C machines?
   c) List out the speed control methods of a DC motor? Write one demerit of each method.
   d) What are the functions of a transformer?
   e) Define slip and torque of an induction motor?
   f) Draw the V-I characteristics of a PN diode?
   g) What is a feedback amplifier?
   h) Draw the standard symbol of PNP and NPN transistor?
   (2M+3M+3M+2M+3M+3M+3M+3M)

PART-B

2. a) State and prove Kirchhoff's laws using an example.
   b) If 'n' number of resistances connected in parallel, derive the expression for the equivalent resistance? (8M+8M)

3. a) Derive the expression for the e.m.f induced in a DC machine by defining all the terms clearly?
   b) Explain the operation of 3-point starter in a DC machine? (8M+8M)

4. a) Explain principle of operation of a 1 phase transformer?
   b) Derive the expression for the regulation of a 1 phase transformer and discuss whether its value should be low or high to get the better efficiency? (8M+8M)

5. a) Explain in detail about the constructional features and operation of an alternator?
   b) Draw and explain about the torque slip characteristics of an induction motor? (8M+8M)

6. a) Explain the operation of a half wave rectifier with the help of circuit diagram?
   b) Discuss about the characteristics of an OP-AMP? (8M+8M)

7. a) Explain about the principle of operation of PNP transistor? Discuss how it is operated as an amplifier?
   b) Explain basic concept of a feedback amplifier? (8M+8M)
~~~~~~

Code No: RT21011 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Jan - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

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 **THREE** Questions from **Part-B**

~~~~~~

PART-A

1. a) State Ohm's law and write its applications.
   b) What is the need of starter in a DC machine?
   c) Write statements of Kirchhoff's laws?
   d) Write the principle of operation of transformer?
   e) What is the difference between slip-ring and squirrel cage induction motors?
   f) Draw the frequency response of a CE amplifier?
   g) Write the differences between forward biased and reverse biased PN diode?
   h) Write the expression for synchronous speed of an induction motor in terms of poles and frequency? (2M+3M+2M+3M+3M+3M+3M+3M)

PART-B

2. a) Explain the star-delta and delta-star transformation for a resistive network?
   b) Two batteries A and B with the internal resistances RA and RB are connected in parallel to supply current of 155A to a load resistance RL. Given EA = 122V, RA = 0.15 ohms and RB = 0.1 ohms and IB = 60A. Calculate EB and power drawn by the load? (8M+8M)

3. a) Explain in detail about the classification of DC generators based on the type of excitation? Give the connection diagrams.
   b) A 4 pole 220V wave connected shunt motor gives 11.19 kW when running at 1000 r.p.m and drawing armature and field current of 50A and 1A respectively. It has 540 conductors. Its resistance is 0.1 ohms. The brush drop is 1V per brush. Calculate total torque, useful torque, flux per pole, rotational losses and efficiency? (8M+8M)

4. a) What are the losses that are occur in a transformer? Explain the methods to minimize losses.
   b) The full load copper and iron losses of a 15 kVA, 1-phase transformer are 322 W and 200 W respectively. Calculate the efficiency on full load and half load when the load p.f is 0.8 lagging in each case? (8M+8M)

5. a) Derive the relation between stator supply frequency and rotor induced e.m.f frequency.
   b) A 3-phase, 2-pole 50 Hz induction motor has a slip of 4% at no-load and 6% at full load. Find: i) Synchronous speed ii) Full-load speed iii) No-load speed iv) Frequency of rotor current at stand still v) Frequency of rotor current at full load. (8M+8M)

6. a) With a neat sketch explain operation of a PN junction diode? Draw its V-I characteristics
   b) Discuss about the advantages and disadvantages of a half wave rectifier. Draw the output wave forms? (8M+8M)

7. a) Explain in detail about the differences between PNP and NPN transistors?
   b) Draw and explain the input and output characteristics for transistor CE configuration? (8M+8M)
~~~~~~

Code No: RT21011 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Jan - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

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 **THREE** Questions from **Part-B**

~~~~~~

PART-A

1. a) What is back e.m.f in a DC machine?
   b) State ohm's law? What is the limitation of ohm's law?
   c) What is the function of no volt coil in a three point starter?
   d) Draw the output waveforms of half wave and bridge rectifiers?
   e) Write the volt-ampere relationships of R, L and C elements?
   f) What are the advantages with feedback amplifier?
   g) Write the applications of DC series motor?
   h) What is the difference between inverting and non-inverting OP-AMP?
   (2M+3M+3M+2M+3M+3M+3M+3M)

PART-B

2. a) Two resistances when they are in series have an equivalent resistance of 9 ohms and when connected in parallel have an equivalent resistance of 2 ohms. Find the two resistances. ?
   b) Two coils A and B are kept in parallel planes, such that 70% of the flux produced by coil A links with coil B. Coil A has 10,000 turns and coil B has 12,000 turns. A current of 5A in coil A produces a flux of 0.04 mWb while a current of 4A in coil B produces a flux of 0.08 mWb. Calculate self inductance of each coil and the mutual inductance? (8M+8M)

3. a) Derive the torque equation of a DC motor?
   b) Explain the Swinburne's test to determine the efficiency of a DC machine. (8M+8M)

4. a) Derive the e.m.f equation of a single phase transformer?
   b) The no load current of a transformer is 10 A at a power factor of 0.25 lagging, when connected to 400V, 50 Hz supply. Calculate magnetizing component of no-load current, iron loss and maximum value of the flux in the core. Assume primary winding turns as 500? (8M+8M)

5. a) Explain the operation an induction motor. Discuss the applications of induction motor.
   b) Explain in detail about the working principle of a three phase alternator? (8M+8M)

6. a) Explain about the principle of operation of a full wave rectifier with the help of circuit diagram?
   b) Explain about the operation of an Op-AMP in the inverting and non inverting modes of operations? (8M+8M)

7. a) Explain about the operation of a transistor as amplifier with a neat of circuit diagram?
   b) Draw and explain the circuit diagram of a common emitter amplifier and draw its charcteristics? (8M+8M)
~~~~~~

Code No: RT21011 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, AME, MM, PE, PCE)

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 **THREE** Questions from **Part-B**

~~~~~~

PART-A

1. a) What is the need of star-delta and delta-star transformation?
   b) What are the applications of DC compound motors?
   c) What is meant by slip of an induction motor?
   d) Write the principle of operation of transformer?
   e) Define torque in a DC motor?
   f) Draw the slip-torque characteristics of induction motor?
   g) What are the advantages of Swinburne's test?
   h) What are the disadvantages of feedback amplifier? (3M+3M+3M+3M+3M+3M+2M+2M)

PART-B

2. a) A coil takes 4 amperes when connected to 24 A dc supply. If this coil is connected to 40 V, 50 Hz AC supply then same amount of power is consumed. Calculate inductance of the coil and phase angle between voltage and current.
   b) Three resistances 2 ohms, 4 ohms and 6 ohms are connected in series across 24V supply. Find the voltages across three resistors and current through each resistor. (8M+8M)

3. a) A 1500 kW, 550V, 10 pole generator runs at 150 r.p.m. There are 2500 lap connected conductors and the full load copper losses are 25KW. The air gap flux density has a uniform value of 0.9wb/m2. Calculate the no load terminal voltage and the area of the pole shoe?
   b) Draw the circuit diagram of DC series generator and write the relations between voltages and currents? Write its applications. (8M+8M)

4. a) What are the various losses in a transformer? Derive a condition for maximum efficiency of the transformer.
   b) A 20 kVA transformer has its maximum efficiency of 0.98 at 15 kVA at p.f is equal to one. The iron loss is 350 W. Calculate the efficiency at full load0.8 p.f lagging and unity power factor? (8M+8M)

5. a) Explain the synchronous impedance method for determine regulation of an alternator?
   b) Sketch and explain the typical torque slip characteristics of an induction motor? (8M+8M)

6. a) Explain in detail about any two applications of an OP-AMP?
   b) Discuss about the differences between half wave rectifier and full wave rectifier by using the output waveforms? (8M+8M)

7. a) Explain the differences between the NPN and PNP transistor.
   b) Derive the output voltage and current expressions of a CE amplifier? (8M+8M)
~~~~~~