Library - 09.30am to 12.30pm 06/12/18.

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18ELE13

First Semester B.E. Semester End Examination, Dec/Jan 2018-19

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hours Max. Marks: 100

Instructions: 1. *Answer ANY FIVE full questions choosing at least one from each unit*
2. *Questions from Unit IV and V are compulsory*

UNIT - I

			L	CO	PO	M
1	a.	What is the necessity of earthing electrical appliances? Mention the two different types of earthing in practice.	(1)	(1)	(1)	(05)
	b.	Obtain the expression for power in case of circuit containing pure resistance connected in series with pure inductance across AC supply.	(2)	(1)	(1)	(05)
	c.	A circuit consists of impedances (8+j6) Ω connected in series with two impedances (12+j16) Ω and (16-j12) Ω connected in parallel. Calculate total current supplied by the voltage source of 100 volts connected across the combination.	(3)	(1)	(1)	(10)

OR

2	a.	Following are the domestic appliances and their power consumption details. Calculate number of units of energy consumption for a month of 30 days.				

Appliances	Nos	Rating	Numbers of hours of usage per day
Tube light	04	40watts	05
Fans	04	75 watts	06
Fridge	01	300watts	04
Water Heater	01	2000watts	02
LED bulbs	05	13watts	04

If tariff per unit is Rs.5/- then calculate the energy bill. (3) (1) (1) (05)

b. Prove that voltage lags current by an angle of 90^0 when ac supply is given to pure capacitance. Draw phasor diagram. (2) (1) (1) (05)

c. When resistor and an inductor in series are connected to a 240V supply, a current of 3A flows lagging 37^0 behind the supply voltage, while the voltage across the inductor is 171V. Find the resistance of the resistor, and resistance of the inductor and reactance of the inductor. (5) (1) (1) (10)

UNIT – II

			L	CO	PO	M
3	a.	Derive an expression for the induced emf per phase in three phase alternator.	(2)	(2)	(1)	(05)
	b.	A 3 phase, 50 MVA, 12 pole, 500 rpm, star connected Synchronous generator has 48 stator slots with 15 conductors per slot with full pitched coils and distribution factor of 0.96.The flux per pole is 0.02 Wb and is distributed sinusoidally in the air gap. Find the line voltage generated.	(4)	(2)	(2)	(05)
	c.	Explain with neat sketches, the construction of the two types of three phase synchronous generators.	(2)	(2)	(1)	(10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

OR

4 a. Derive the relation between the line and phase voltages and line current and phase currents in a star connected balanced three phase system.

(3) (2) (1) (05)

b. With a neat circuit and phasor diagram show that the power consumed in a three phase system can be measured by using two watt meters.

(3) (2) (2) (05)

c. A balanced 3 phase, 440 V, 50 Hz AC supply is connected to a balanced load of 5 Ω resistance and 20 mH inductance in series in each phase. Determine the phase current, line current and the 3 phase power consumed when the load is i) star connected ii) delta connected .

(4) (2) (2) (10)

L CO PO M

UNIT - III

5 a. Draw the neat sketch of core type and shell type of transformer and explain the material used for each part and functions of each part.

(2) (3) (2) (10)

b. Find the efficiency of a 150 kVA single phase transformer at (1) full load unity power factor (2) 50% of full load 0.8 power factor, if the copper loss at full load is 1600 watts and iron loss is 1400 watts.

(4) (3) (1) (10)

OR

6 a. With neat sketch explain the constructional features of 3 phase squirrel cage induction motor.

(2) (3) (1) (10)

b. A 4 pole 50Hz induction motor has an emf in the rotor, the frequency of which is 5 Hz. Determine (1) the synchronous speed (2)the slip and (3)the speed of the motor. Mention the applications of induction motor.

(3) (3) (1) (10)

L CO PO M

UNIT - IV

7 a. Explain the working of full wave bridge rectifier with a neat sketch.

(2) (4) (1) (05)

b. Give a comparison of half wave rectifier and full wave bridge rectifier.

(2) (4) (1) (05)

c. With a neat circuit diagram explain the working of RC coupled CE amplifier and its frequency response characteristic.

(2) (4) (1) (10)

L CO PO M

UNIT -V

8 a. Mention and explain in brief the ideal characteristics of OP-AMP. Explain inverting and non inverting operation of OP-AMP

(1) (5) (1) (10)

b. With neat circuit diagram explain how the OP-AMP is used to detect the zero crossing of the signal.
Mention the applications of Digital Electronics.

(2) (5) (1) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

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ELE13/23/15ELE13/23/16ELE24

Second Semester B.E. Semester End Examination, May / June 2018

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours

Max. Marks: 100

Instructions:
1. *Answer FIVE FULL questions*
2. *UNIT-III and UNIT-V are Compulsory.*
3. *Answer any one full question from remaining each unit.*
4. *Assume any missing data suitably.*

UNIT - I

a. For the circuit shown in Fig. Q1(a), find equivalent resistance between A and B. **06 M**

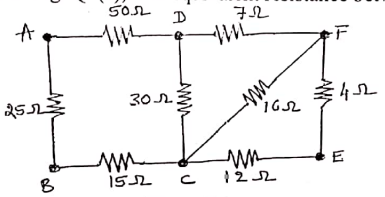

Fig. Q1(a)

(Level [2],CO[2],PO[1])

b. For the network shown in Fig. Q1(b), apply mesh analysis technique to determine current supplied by 2V source and power delivered by 5 V source. **08 M**

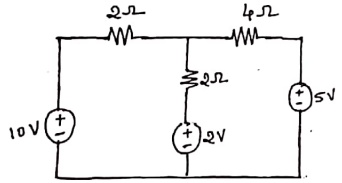

Fig. Q1(b)

(Level [3], CO [2], PO [2])

. Two electric bulbs rated 100 W, 220 V and 60 W, 220 V are connected in series across 440 V supply. Verify whether current through any of the bulb is exceeding its rated value and justify the answer. **06 M**

(Level [3], CO [2], PO [2])

OR

Explain the basic analogy between the electrical and magnetic circuits. **06 M**

(Level [2], CO [1], PO [1])

Coil A and coil B have 600 turns and 500 turns respectively. A current of 8 A in coil A produces a flux of 0.04 Wb. If the coefficient of coupling is 0.2, apply the knowledge of electromagnetic induction to determine (i) self-inductance of coil A when coil B is open (ii) Flux linkage with coil B (iii) the average emf induced in coil-B when its flux changes from zero to full value in 0.02 sec. (iv) mutual inductance. **08 M**

(Level [3], CO [1], PO [2])

An air cored solenoid 1 m in length and 10 cm in diameter has 5000 turns. Find the self-inductance and energy stored in the magnetic field if current of 2A flows through the solenoid. **06 M**

(Level [1], CO [1], PO [2])

UNIT – II

3 a. Develop an expression for the back emf in D.C motor and explain its significance. **06 M**
(Level [3], CO [3], PO [1,11])

b. Explain the 'speed V/s armature current' and 'torque V/s armature current' characteristics for DC shunt motor. **06 M**
(Level [2], CO [3], PO [1,12])

c. A 250 V shunt motor on no load runs at 1000 rpm and takes 5A. The armature resistance is 0.2 Ω and shunt field resistance is 120 Ω. Determine the speed when loaded, taking a current of 50 A. **08 M**
(Level [3], CO [3], PO [1,2])

OR

4 a. Find the value of I, V_1 and power factor of the circuit shown below. **06 M**

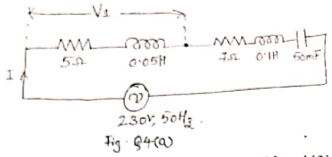

Fig. Q4(a)

(Level [3], CO [2], PO [1])

b. Two elements are connected in series across an AC source of V=100√2 sin (314t+25°) V. The current in the circuit is found to be I=10√2 sin (314t+45°) A. Determine the parameters of the circuit. **06 M**
(Level [3], CO [2], PO [1])

c. Analyze the series R-L circuit and obtain the equations for current and active power. Also draw the voltage, current and power waveforms. **08 M**
(Level [3], CO [2], PO [1,2])

UNIT - III

5 a. Prove that two wattmeters are sufficient to measure three phase power. **07 M**
(Level [3], CO [2], PO [2])

b. A balanced 3-phase star connected load of 150 kW takes a leading current of 100 A when line voltage of 1100 V, 50 Hz is applied. Estimate the values of per phase circuit elements of the load. **06 M**
(Level [3], CO [2], PO [2])

c. Develop the expression for emf generated in three phase alternator. **07 M**
(Level [3], CO [3], PO [2])

UNIT - IV

[illegible] losses that occur in the transformer. How to minimize **05 M**

OR

7 a. A 3 phase 6-pole 50 Hz induction motor has a slip of 2% at no load and 4% at full load. Find (i) Synchronous speed (ii) No Load speed (iii) Full load speed (iv) Rotor frequency at no load and full load. **10 M**
(Level [2], CO [3], PO [1,2])

b. Explain the concept of rotating magnetic field in 3 phase Induction motor with help relevant diagrams. **10 M**
(Level [3], CO [3], PO [1])

UNIT -V

8 a. What is the necessity of earthing? Explain pipe earthing with neat diagram. **08 M**
(Level [2], CO [5], PO [1])

b. Explain with neat diagram, the working of electrodynamometer type wattmeter. **06 M**
(Level [2], CO [5], PO [1])

c. Compare fluorescent, CFL and LED lamps in terms of performance, cost and environmental effects. **06 M**
(Level [2], CO [5], PO [1])

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ELN25 / 16ELN25

Second Semester B.E. Makeup Examination, June 2018

BASIC ELECTRONICS

ime: 3 Hours | Max. Marks: 100

Instructions: 1. *Answer compulsorily Unit II and Unit V questions.*
2. *Answer any one full question each from Unit I, III and IV.*

UNIT – I

a. Explain no-load condition of a Zener regulator with the help of a neat circuit diagram and equations. **10 M**

(Level [2], CO [1], PO [1])

b. In the bridge rectifier circuit, transformer secondary ac voltage is 12V. Load resistance is 12 kΩ. Find the values of V_{rms}, I_{rms}, V_{dc}, I_{dc} and PIV. Use ideal diodes. **10 M**

(Level [1], CO [1], PO [1])

OR

a. For a Zener diode voltage regulator, if $V_Z = 9V$, series resistor $R_S = 1k\Omega$ and load $R_L = 5k\Omega$, the input voltage varies from 25V to 40V, find the maximum and minimum values of Zener current. **10 M**

(Level [3], CO [1], PO [1])

b. Analyze the frequency response of a single stage RC coupled CE amplifier. Explain the significance of 3-dB frequency and bandwidth. **10 M**

(Level [2], CO [1], PO [1])

UNIT – II

a. Derive the expression for gain with feedback. Discuss the effect of negative feedback on gain, input resistance, output resistance and bandwidth of an amplifier. **10 M**

(Level [2], CO [2], PO [1])

b. Explain the Barkhausen criteria in oscillators. **10 M**
An RC phase-shift oscillator with R = 8kΩ, generates frequency of 400kHz. Find the required value of C.

(Level [2], CO [2], PO [1])

UNIT – III

a. With a neat block diagram, explain various blocks of an op-amp. Design a non-inverting amplifier to provide a gain of 19. **10 M**

(Level [2], CO [3], PO [1])

b. List the characteristics of an ideal op-amp. **10 M**
Explain monostable mode of operation of timer IC 555

(Level [1], CO [3], PO [1])

OR

a. Explain how op-amp can be used as inverting adder. **10 M**

(Level [2], CO [3], PO [1])

b. Find the CMRR of an Op-amp with common mode gain =0.2 and difference mode gain = 50. Explain astable mode of operation of timer IC 555. **10 M**

(Level [2], CO [3], PO [1])

UNIT – IV

5	a.	What is Universal gate? Realize AND, OR and NOT gates using NAND gates only. (Level [2], CO [4], PO [1])	10 M
	b.	State and prove De' Morgan's theorem & lence simplify the booker expression. (Level [2], CO [4], PO [1])	10 M
		OR	
	a.	Design and implement a full adder with the help of truth table and equations. (Level [3], CO [4], PO [1])	10 M
	b.	Explain the block diagram of 8085 microprocessor. (Level [2], CO [4], PO [1])	10 M
		UNIT –V	
	a.	With a neat block diagram, explain a digital communication system. (Level [2], CO [5], PO [1])	10 M
	b.	Compare amplitude and frequency modulation techniques. (Level [2], CO [5], PO [1])	10 M

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15ELN15/ELN15/16ELN15

First Semester B.E. Semester End Examination, Dec/Jan 2017-18

BASIC ELECTRONICS ENGINEERING

Time: 3 Hours Max. Marks: 100

Instructions: 1. *Answer compulsorily Unit II and Unit V questions.*
2. *Answer any one full question each from Unit I, III and IV*

UNIT – I

1 a. Explain the behavior of junction diode in its forward bias and reverse bias mode and draw its Volt-Ampere characteristics. **10 M**

(Level [2], CO [1], PO [1])

b. Explain the nature of the input and output characteristics of a transistor in common emitter configuration. **10 M**

(Level [2], CO [1], PO [1])

OR

2 a. Explain the breakdown mechanism in Zener diode. Also explain the parameters of Zener diode with the help of its VI characteristics. **10 M**

(Level [2], CO [1], PO [1])

b. Draw a neat circuit diagram and the input-output waveforms of a Bridge rectifier. **10 M**
A Bridge rectifier has a load of 2KΩ. The a.c. voltage applied is 200V, 50Hz. Assuming ideal diodes, calculate
(i) Average load voltage
(ii) Average load current
(iii) Ripple factor
(iv) What is new ripple factor if a capacitor of 500 μF is connected across the load?

(Level [3], CO [1], PO [1])

UNIT – II

3 a. Discuss the advantages of negative feedback. **10 M**
With a negative feedback, an amplifier gives an output of 10V with an input of 0.5V. When feedback is removed, it requires 0.25V for the same output. Calculate
(i) Gain without feedback
(ii) Feedback fraction

(Level [L3], CO [2], PO [1])

b. Explain with a neat circuit diagram, the working of a RC phase shift oscillator using BJT. **10 M**
A RC phase shift oscillator uses R=16KΩ. Find the value of the capacitance to produce a frequency of 800KHz.

(Level [L2], CO [2], PO [1])

UNIT – III

4 a. (i) Explain the application of an Op-Amp as an Inverting Amplifier. **10 M**
(ii) Explain the various modes of operation of IC 555 timer.

(Level [2], CO [3], PO [1])

b. Design an adder circuit using an Op-amp to get the output expression as **10 M**
$V_O = -(0.1V_1+V_2+5V_3)$, where V_1, V_2 and V_3 are the inputs. (Assume suitable data)

(Level [3], CO [3], PO [1])

OR

5 a. What is an Op-Amp? Identify the various blocks that form the Op-Amp. **10 M**
Design an inverting amplifier to provide a voltage gain of -20.

(Level [2], CO [3], PO [1])

b. (i) Determine the output voltage if an input of 10 μV is applied to a non-inverting amplifier. Assume the input resistance to be 10KΩ and feedback resistance to be 90KΩ. 10 M
(ii) Explain astable mode of operation using 555 timer.

(Level [2], CO [3], PO [1])

UNIT – IV

6 a. What are universal gates? Implement OR gate using NAND gates. 10 M
Realize a logic circuit to add two binary bits. Provide the necessary truth table and the logic expressions.

(Level [L3], CO [4], PO [1])

b. What is a microprocessor? Explain with a block diagram. 10M
Also explain the classification of instruction set of 8085 with examples.

(Level [L2], CO [4], PO [1])

OR

7 a. What is a Flip-Flop? 10M
Simplify the following logic expressions using Boolean algebra and implement the reduced expression using basic gates.

$\overline{(A+B)(A+C)(B+C)}$

(Level [L2], CO [4], PO [1])

b. Explain the following terms. 10M
(i)ALU (ii) RAM (iii) PROM (iv) EPROM (v) Flag register

(Level [L2], CO [4], PO [1])

UNIT –V

8 a. What is modulation? Explain the need for modulation. 10 M
If for an amplitude-modulated carrier wave, the maximum and minimum amplitudes are 600mV and 200mV respectively, find the modulation index.

(Level [L2], CO [5], PO [1])

b. Explain the block diagram of digital communication system. 10 M

(Level [L2], CO [5], PO [1])

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16ELN15 / ELN15 / 15ELN15

First Semester B.E. Makeup Examination, January 2018

BASIC ELECTRONICS

Time: 3 Hours Max. Marks: 100

Instructions: 1. *Answer compulsorily Unit II and Unit V questions.*
2. *Answer any one full question each from Unit I, III and IV.*

UNIT – I

1 a. Explain the VI characteristics of a junction diode and define the following w.r.t. diode. 10 M
(i) Depletion region (ii) Knee voltage (iii) Reverse Saturation current
(iv) Dynamic resistance (v) Reverse breakdown voltage
(Level [L2], CO [1], PO [1])

b. Discuss the output and current gain characteristics of a transistor in CE configuration. 10 M
For the circuit shown in Fig.1(b), calculate the
(i) the value of α_{dc} and β_{dc} of the transistor
(ii) value of I_B for a desired I_C of 5mA.

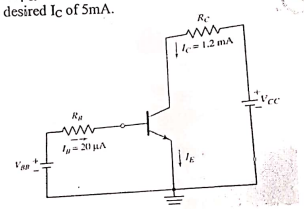

Fig.1(b)

(Level [3], CO [1], PO [1])

OR

2 a. Explain how a Zener diode can be used to maintain a constant voltage across a load. 10 M
For a Zener regulator, if V_Z=10V, R_S=1KΩ, R_L=2KΩ and the input voltage varies from 22 to 40 volts. Find the maximum and minimum values of zener current.
(Level [L3], CO [1], PO [1])

b. With a neat circuit diagram, explain the working of a full wave bridge rectifier with capacitor filter with relevant waveforms. 10 M
A full wave bridge rectifier with capacitor filter supplies a resistive load of 32KΩ. Estimate the value of the capacitor required to keep the ripple factor less than 1%. The supply frequency is 50Hz.
(Level [L3], CO [1], PO [1])

UNIT – II

3 a. Derive an expression for the gain of feedback amplifier with a neat block diagram. 10 M
A voltage amplifier has the following parameters without feedback.
A_V=1000, R_i=20KΩ, R_o=15KΩ, BW=200KHz.
Compute these parameter values if negative feedback with β=0.1 is applied.
(Level [3], CO [2], PO [1])

b. What is an Oscillator? Explain Barkhausen criteria for obtaining sustained oscillations. 10 M
For a transistor RC phase shift oscillator, R=220KΩ and C=500 pF. Find the frequency of oscillation.
(Level [2], CO [2], PO [1])

UNIT – III

4 a. Mention the characteristics of an ideal Op-Amp. 10 M
In a non-inverting amplifier, the input voltage is 1.5V and the output voltage is 9V. If the input resistance R1 is 10KΩ, calculate the value of feedback resistor.
(Level [L2], CO [3], PO [1])

b. Show how an Op-Amp can be used to add three voltages V1, V2, and V3. Derive an expression for the output. 10 M
(Level [L2], CO [3], PO [1])

OR

5 a. Explain, with the necessary circuits, how an Op-Amp can be used as 10 M
(i) Inverting Amplifier
(ii) Voltage Follower
(Level [L2], CO [3], PO [1])

b. (i) Explain the modes of operation of IC555 timer. 10 M
(ii) Find the output voltage for the circuit shown in Fig. 5(b).

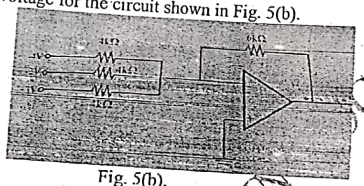

Fig. 5(b).

UNIT – IV

6 a. Realize OR and EX-OR gates using NAND gates only. 10 M
(Level [2], CO [4], PO [1])

b. Explain the block diagram of 8085 microprocessor. 10 M
(Level [2], CO [4], PO [1])

OR

7 a. Design a full adder with the truth table and necessary expressions and implement it with basic gates. 10 M
(Level [3], CO [4], PO [1])

b. (i) Explain different types of semiconductor memories. 10 M
(ii) Simplify the following Boolean expression $(A + B)(\bar{A} + B)$
(Level [2], CO [4], PO [1])

UNIT – V

8 a. Explain AM and FM with neat waveforms and necessary equations. 10 M
(Level [2], CO [5], PO [1])

b. Explain the block diagram of basic communication system. 10 M
Compare analog and digital communication systems.
(Level [2], CO [5], PO [1])

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ELE13/23,15ELE13/23,16ELE14

First Semester B.E. Semester End Examination, Dec/Jan 2017-18

BASIC ELECTRICAL ENGINEERING

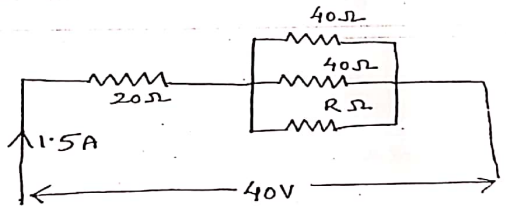
Time: 3 Hours Max. Marks: 100

Instructions: 1. *Answer any FIVE full questions selecting at least One Question from each Unit.*
2. *Unit I and V are compulsory*

UNIT - I

1 a. State and explain Faraday's law of electromagnetic induction. 06 M
(Level [2], CO [1], PO [1])

b. Find the value of R in the DC circuit shown below 06 M



(Level [1], CO [1], PO [1])

c. A coil is wound uniformly on an iron core. The relative permeability of the iron is 1400. The length of the magnetic circuit is 70cm. The cross section area of the core is $5cm^2$. The coil has 1000 turns. Determine i) Reluctance of magnetic circuit ii) Inductance of the coil and iii) EMF induced in the coil if a current of 10A is uniformly reversed in 0.2 sec. 08 M
(Level [3], CO [2], PO [2])

UNIT – II

2 a. For a sinusoidal AC quantity, explain form factor and peak factor. 04 M
(Level [2], CO [2], PO [1])

b. A series circuit is connected across an AC source of $v=100\sqrt{2}\sin(314t+25^\circ)$ volts. The current in the circuit found to be $i=10\sqrt{2}\sin(314t+45^\circ)$ amps. Determine both the parameters of the circuit. 08 M
(Level [4], CO [2], PO [2])

c. Show that the power consumed in a AC series R-L circuit is $P= VI\cos\varphi$. Also draw the phasor diagram and waveforms of voltage, current and power. 08 M
(Level [2], CO [2], PO [2])

OR

3 a. Explain the speed v/s torque characteristics and speed v/s armature current characteristics of i) DC series and ii) DC Shunt motor. 08 M
(Level [3], CO [3], PO [1])

b. A DC shunt motor runs at 900 rpm with 480 volts DC supply while taking armature current of 25A. Calculate the speed at which it will run with 240 volts DC supply when taking a current of 15A. The resistance of the armature circuit is 0.8Ω. Assume the flux per pole at 240 volts to have decreased to 75% of its value at 480 volts. 08 M
(Level [3], CO [3], PO [2])

c. From the fundamentals, derive the torque equation of the DC motor. 04 M
(Level [3], CO [3], PO [2])

UNIT - III

4 a. Explain the advantages of three phase system compared to the single phase system. 04 M
(Level [2], CO [2], PO [1])

b. A balanced star connected load of (8+j6) Ω is connected to a 3 phase 230V, AC supply. Find the line current, power factor, active power, reactive power and apparent power. 08 M
(Level [2], CO [2], PO [2])

c. With a neat circuit diagram and phasor diagram, show that two wattmeters are sufficient to measure power in three phase circuit.. 08 M
(Level [3], CO [2], PO [2])

OR

5 a. Develop the EMF equation of synchronous generator. 06 M
(Level [3], CO [3], PO [2])

b. Explain neat diagrams, the different types of rotors in the 3 phase synchronous generator. 06 M
(Level [4], CO [3], PO [2])

c. A 3 phase 16 poles, star connected alternator has 144 slots on the armature. Each slot contains 10 conductors. It is driven at 375 rpm. The line value of voltage is 2.657 kV. Find the frequency of induced emf and flux per pole. Assume $k_p = 1$, $k_d = 0.96$. 08 M
(Level [2], CO [3], PO [2])

UNIT -V

6 a. Explain the working principle of single phase transformer. Also develop an expression for the EMF induced in both the windings. 06 M
(Level [2], CO [4], PO [2])

b. Explain the various losses occurring in the transformer and write the expression for efficiency. 06 M
(Level [4], CO [4], PO [2])

c. A 500 kVA transformer has an efficiency of 92% at full load and unity pf. and 94% at half full load, 0.9pf. Determine its efficiency at 80% of full load 0.95pf. 08 M
(Level [4], CO [4], PO [2])

OR

7 a. With the help of 3 phase waveform and phasor diagrams, analyze the concept of rotating magnetic field in 3 phase induction motor. 08 M
(Level [4], CO [3], PO [2])

b. Define slip in induction motor and hence develop the equation for the rotor frequency in terms of slip and supply frequency. 08 M
(Level [3], CO [3], PO [2])

c. A 3 phase induction motor having 4 poles, 50Hz, star connected Induction motor has a full load slip of 4%. Find the full load speed of the motor. 04 M
(Level [2], CO [3], PO [2])

UNIT –V

8 a. Illustrate the necessity of earthing for the electrical appliances. Also explain with a neat diagram, plate earthing. 08 M
(Level [2], CO [5], PO [1])

b. With a neat diagram, explain the construction and working of single phase induction type energy meter 08 M
(Level [2], CO [5], PO [2])

c. Compare the advantages and disadvantages of fluorescent and LED lamps. 04 M
(Level [4], CO [5], PO [2])

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16ELE14 / ELE13 / 23 / 15ELE13 / 23

First Semester B.E. Makeup Examination, January 2018

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours Max. Marks: 100

Instructions: 1. *Unit- I and Unit-V are Compulsory*
2. *Answer any one Full Question from remaining Units*
3. *Assume the missing data suitably.*

UNIT - I

1 a. Explain the basic analogy between the electrical and magnetic circuits. 06 M
(Level[2],CO[1],PO[1])

b. Find the total resistance between A & B terminals of electrical network shown in Fig.Q.1(b). 07 M

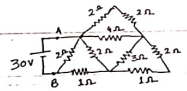

Fig 1.b
(Level[1],CO[2],PO[1])

c. For the network shown in Fig. Q.1(c), apply the concept of mesh analysis to find the branch currents.Also estimate the power dissipated in 100 Ω resistor. 07 M

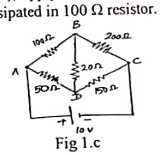

Fig 1.c
(Level[3],CO[2],PO[2])

UNIT – II

2 a. Explain the function of following parts of DC machine. 08 M
(i) yoke (ii) pole shoe (iii) Commutator (iv) Brush
(Level[2],CO[3],PO[1])

b. A 4 pole, 500 V, DC shunt motor has 720 wave connected conductors in the armature. Full load armature current is 60 A, flux per pole is 0.03 Wb, armature resistance is 0.2 Ω. Determine full load speed of the motor. 06 M
(Level[3],CO[3],PO[2])

c. Mention the types of DC motor and derive torque equation of DC motor. 06 M
(Level[3],CO[3].PO[2])

OR

3 a With help of circuit diagram and phasor diagram analyze the behavior of series R-L circuit and mention the current and voltage relationship. 07 M
(Level [4],CO[2],PO[1])

b A current of i=4sin(314t-100) produces voltage drop of v=220 sin(314t+200) in series AC circuit. Determine circuit parameters. 06 M
(Level [3],CO[2],PO[1])

c For the circuit shown in Fig. Q.3(c), determine (i) current (ii) active power (iii) reactive power (iv) power factor. 07 M

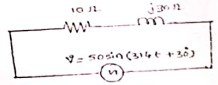

Fig. Q. 3c

UNIT– III

4 a. Develop the relationship between line and phase values of current and voltage in a three phase balanced star connected system (Level[3],CO[2],PO[2]) 07 M

b. Three similar choking coils each having resistance 10ohm and reactance 10 ohm are connected in star across a 440 V, 3 phase supply. Calculate line current and reading of each of two wattmeters connected to measure power. (Level[3],CO[2],PO[2]) 07 M

c. A balanced star connected load of 150 kW takes a leading current of 100 A with a line voltage of 1100 V at 50 Hz. Determine the circuit parameters of load per phase. (Level[3],CO[2],PO[2]) 06 M

OR

5 a. Mention the different types of rotors used in alternators. Explain the characteristics of salient type of rotor with neat diagram. (Level[2],CO[3],PO[1]) 07 M

b. Develop the emf equation of an alternator. Explain the significance of winding factors. (Level[3],CO[3],PO[1]) 07 M

c. A 2 pole, 3 phase alternator running at 3000 rpm has 42 armature slots with 2 conductors in each slot. Calculate the flux/pole required to generate a line voltage of 2300 V. Distribution factor is 0.952 and the pitch factor is 0.956. (Level[3],CO[3],PO[2]) 06 M

UNIT– IV

6 a. The maximum efficiency at full load and unity power factor of a single phase 25 kVA, 500/1000 V, 50 Hz, transformer is 98%. Determine its efficiency at 1) 75% load, 0.9 p.f and 2) 50 % load, 0.8 p.f. (Level[3],CO[4],PO[2]) 05 M

b. Mention the types of losses that occur in transformer & Compare shell type and core type transformer. (Level[2],CO[4],PO[1]) 08 M

c. Develop the emf expression of a transformer and hence define transformation ratio. (Level[4],CO[4],PO[1]) 07 M

OR

7 a. Show that a rotating magnetic field of constant magnitude is produced when the stator windings of a polyphase induction motor are energized by a balanced 3 phase supply. (Level[2],CO[3],PO[2]) 08 M

b. Explain the necessity of starter for three phase induction motor and also explain the working of star delta starter with neat diagram (Level[2],CO[3],PO[1]) 07 M

c. A three phase 440V, 50 Hz induction motor is wound for 8 poles. If the full load slip is 2.5 %, calculate (i) synchronous speed (ii) rotor speed (iii) rotor frequency. (Level[3],CO[3],PO[2]) 05 M

UNIT -V

8 a. Explain with neat diagram, the working of electrodynamometer type wattmeter. (Level[2],CO[5],PO[1]) 10 M

b. What is earthing? Explain the necessity of earthing. (Level[2],CO[5],PO[1]) 05 M

c. Classify the types of lamp. Explain in brief fluorescent lamp. (Level[2],CO[5],PO[1]) 05 M

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15ELE13/23, ELE13/23

B.E. Fast Track Examination, JULY / AUG. 2016-17

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *Unit- II and Unit-IV are Compulsory*
2. *Answer any one Full Question from remaining Units*
3. *Assume the missing data suitably.*

UNIT - I

1 a. State and explain Kirchhoff's voltage and Current laws. **05 M**

(Level[2],CO[1],PO[1])

b. Apply the knowledge of star delta transformation in electric circuits to find the total resistance between the terminals of electrical network shown in Fig.Q.1(b). **08 M**

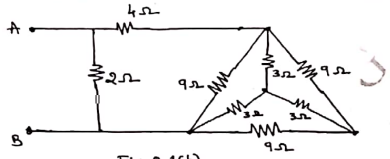

Fig. Q.1(b).

(Level[3],CO[2],PO[1])

c. For the network shown in Fig. Q.1(c), estimate the power dissipated in 4 Ω resistor. **07 M**

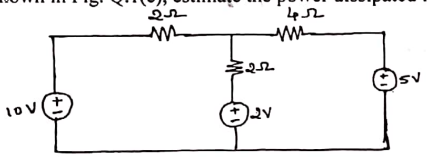

Fig. Q.1(c)

(Level[3],CO[2],PO[2])

OR

2 a. Explain the basic analogy between the electrical and magnetic circuits. **06 M**

(Level[2],CO[2],PO[2])

b. An electromagnet is made up of mild steel ring of mean circumference of 500 mm and uniform cross section area of 300 mm^2. Relative permeability of mild steel is 1200. Number of turns in excitation coil is10000. Find the excitation current required to produce a flux of 500 mWb in the airgap of length 1 mm. Neglect leakage and fringing flux. **07 M**

(Level[3],CO[2],PO[2])

c. In the magnetic circuit shown in Fig. Q.2(c), excitation coil is put on central limb with 500 turns. Estimate the mmf required and excitation current to produce a flux of 1 mWb in the central limb. Relative permeability of core is 600 and neglect fringing and leakage flux. **07 M**

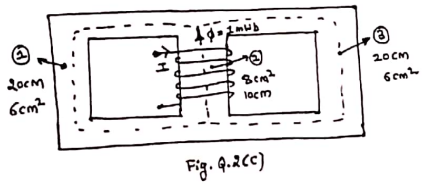

Fig. Q.2(c)

(Level[3],CO[2],PO[2])

UNIT – II

3 a. Explain the function of following parts of DC machine. **08 M**
(i) yoke (ii) pole shoe (iii) Commutator (iv) Brush
(Level[2],CO[3],PO[1])

b. A 4 pole, 500 V, DC shunt motor has 720 wave connected conductors in the armature. Full load armature current is 60 A, flux per pole is 0.03 Wb, armature resistance is 0.2 Ω. Find full load speed of the motor. **06 M**
(Level[3],CO[3],PO[2])

c. Explain with neat diagram, the working of electrodynamometer type wattmeter. **06 M**
(Level[2],CO[3],PO[1])

UNIT– III

4 a. For the circuit shown in Fig. Q.4(a), find (i) current (ii) active power (iii) reactive power (iv) power factor. **05 M**

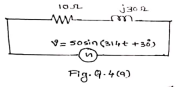

Fig. Q. 4 (a)

(Level[1],CO[2],PO[1])

b. A 100 V, 50 Hz AC supply is connected to inductive coil. It takes 15 A of current from supply. Current lags supply voltage by an angle 30°. Estimate the values of internal resistance and inductance of coil. **07 M**
(Level[5],CO[2],PO[2])

c. Prove that average power consumption in pure inductor is zero. **08 M**
(Level[5],CO[2],PO[2])

OR

5 a. For the circuit shown in Fig. 5(a), Calculate the total current I and power factor. **06 M**

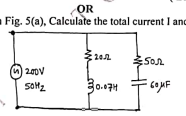

Fig. Q. 5(a)

(Level[3],CO[2],PO[1])

b. Explain Two way control and Three way control of lamps with neat diagram and switching table. **10 M**
(Level[2],CO[5],PO[1])

c. Explain the necessity of earthing. **04 M**
(Level[2],CO[5],PO[1])

UNIT– IV

6 a. A balanced star connected load of (8+j6) Ω per phase is connected to a three phase AC supply of 230 V, 50 Hz frequency. Find the values of (i) line current (ii) power factor (iii) active power (iv) reactive power. **05 M**
(Level[1],CO[2],PO[2])

b. Prove that two wattmeters are sufficient to measure three phase power. **08 M**
(Level[5],CO[2],PO[2])

c. Develop the emf expression of a transformer and hence define transformation ratio. **07 M**
(Level[3],CO[4],PO[1])

UNIT -V

7 a. Explain the production of rotating magnetic field of constant magnitude in the airgap of three phase induction motor with phasor diagrams. **08 M**
(Level[2],CO[3],PO[1])

b. Explain the necessity of starter for three phase induction motor and also explain the working of star delta starter with neat diagram **07 M**
(Level[2],CO[3],PO[1])

c. A three phase 440V, 50 Hz induction motor is wound for 8 poles. If the full load slip is 2.5 %, calculate the values of (i) synchronous speed (ii) rotor speed (iii) rotor voltage frequency. **05 M**
(Level[3],CO[3],PO[2])

OR

8 a. Explain the construction of three phase synchronous generator with neat diagram. **10 M**
(Level[2],CO[3],PO[1])

b. Develop the expression for emf induced in three phase alternator. **05 M**
(Level[2],CO[3],PO[1])

c. A 12 pole star connected alternator has 48 slots with 15 conductors per slot. The flux per pole is 0.02 Wb and is distributed sinusoidally. Winding factor is 0.97. Calculatethe emf induced per phase when alternator is driven at a speed of 500 rpm. **05 M**
(Level[3],CO[3],PO[2])

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15ELN15/25, ELN15/25

B.E. Fast Track Examination, JULY / AUG. 2016-17

BASIC ELECTRONICS

Time: 3 Hours **Max. Marks: 100**

Instructions: *1. Units II and III are compulsory.*
2. Answer any one full question from remaining units.

UNIT – I

1 a. Explain the working of a full-wave bridge rectifier with a neat circuit diagram and relevant input and output waveforms. Also write the expressions for its (i) D.C. output voltage (ii) R.M.S. voltage (iii) Efficiency (iv) Ripple factor (v) PIV of each diode **10 M**

(Level[L2], CO[1], PO[1])

b. The input voltage of a full-wave bridge rectifier is given as Vs=100sin(314t). The load resistance is 1kΩ. Assuming the diodes to be ideal, calculate (i) D.C. output voltage (ii) D. C. output current (iii) PIV of each diode (iv) Ripple factor (v) Efficiency of rectification. **10 M**

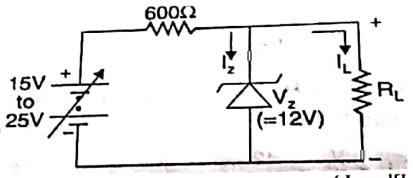
(Level[L3], CO[1], PO[1])

OR

2 a. Why is a filter used in rectifier? Analyze with waveforms, how the d.c. voltage of a half wave rectifier is improved when a capacitor filter is used. Write the expression for the ripple factor for the same. **10 M**

(Level[L4], CO[1], PO[1])

b. The breakdown voltage of the zener diode shown in the fig is 12V. Find the maximum and minimum input currents. **10 M**



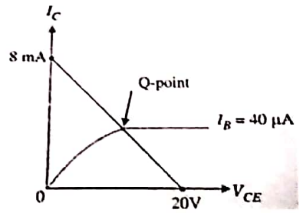
(Level[L3], CO[1], PO[2])

UNIT – II

3 a. What is an FET? What are the different types of FETs? Explain the construction and operation of JFET **10 M**

(Level[L2], CO[2], PO[1])

b. Design a base bias circuit given the load line and the Q-point as shown below. **10 M**



UNIT – III

4. a. Construct a differentiator using an op-amp. Design an adder circuit using an op-amp to obtain an output voltage given by $V_0 = -(0.2V1 - 0.5V2 + 10V3)$ where V1, V2 and V3 are the inputs. **10 M**

(Level[L6], CO[4], PO[2])

b. Explain the typical frequency response of a RC coupled amplifier. Define and indicate the cut-off frequencies and bandwidth. **10 M**

(Level[L2,L6], CO[3,4], PO[2])

UNIT – IV

5. a. Why NAND and NOR gates are called as universal logic gates? Justify your answer by realizing NOT, AND and OR functions using the universal gates. **10 M**

(Level[L4], CO[5], PO[2])

b. What is Full Adder? Design and implement full adder using gates. **10 M**

(Level[L6], CO[5], PO[1])

OR

6. a. (i) Convert decimal 7894.125 to its octal equivalent.
(ii) Convert octal 5413.237 to its hexadecimal equivalent.
(iii) Obtain the decimal equivalent of hexadecimal BC64.
(iv) Convert hexadecimal A26.AC to its decimal equivalent.
(v) Obtain the decimal equivalent of binary 10110.11. **10 M**

(Level[L3],CO[5],PO[1])

b. Show that **10 M**

(i) $A\overline{BC} + \overline{ABC} + \bar{A}B\bar{C} + \overline{AB}C = \bar{A} + \bar{B} + \bar{C}$

(ii) Implement the NOR function using NAND gates only.

(Level[L5], CO[5], PO[1])

UNIT –V

7. a. Explain the block diagram of a Digital communication system. **10 M**

(Level[L1], CO[6], PO[1])

b. Explain the working principle of LED and LCD. **10 M**

(Level[L1], CO[6], PO[1])

OR

8. a. With a neat block diagram explain the functions of each block used in a super-heterodyne radio receiver. **10 M**

(Level[L2], CO[6], PO[1])

b. What is modulation? Explain Amplitude modulation and Frequency modulation with neat waveforms. **10 M**

(Level[L1], CO[6], PO[1])

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ELE23

Second Semester B.E. Semester End Examination, April/May 2016-17

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *Answer any FIVE full questions selecting at least One Question from each Unit.*
2. *Unit - IV and V are compulsory*

UNIT - I

1 a. Find the equivalent resistance and the current delivered by the source in the circuit shown in fig 1a. **05 M**

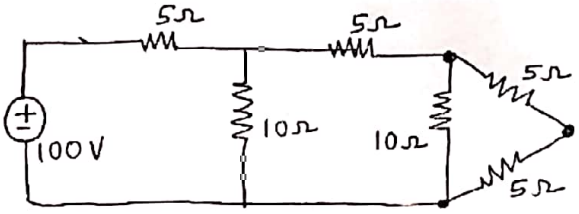

Fig 1a

(Level[1], CO[2], PO[3])

b. Applying the concept of star delta transformation determine the equivalent resistance of the circuit in fig 1b. **05 M**

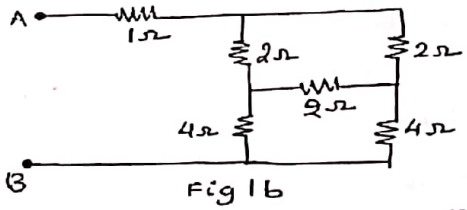

Fig 1b

(Level[3], CO[2], PO[3,11])

c. Applying the concept of Mesh analysis find the current in 5 Ω resistance in the circuit in fig 1c. **10 M**

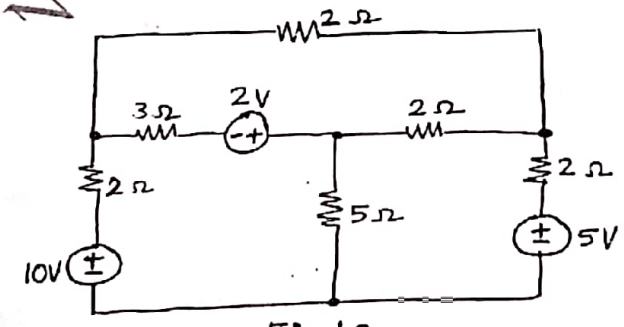

Fig 1c

(Level[3], CO[2], PO[3,11])

OR

2 a. Explain the terms MMF, magnetic flux and reluctance in a magnetic circuit **05 M**
(Level[2], CO[1], PO[3])

b. Derive an expression for the Energy stored in a magnetic field **05 M**
(Level[3], CO[1], PO[3])

c. Determine the excitation current required to produce a magnetic flux of 1 mWb in the air gap in a Electromagnet in fig 2c. Relative permeability of iron is 600. Considering leakage and fringing take the leakage factor as 1.2. **10 M**

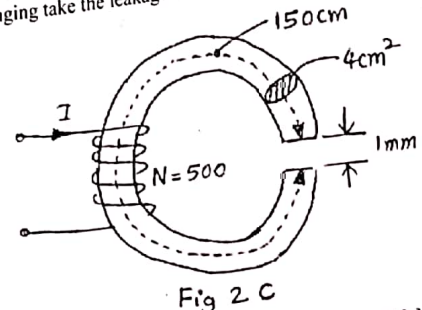

Fig 2 c

(Level[3], CO[1], PO[3,11])

UNIT – II

3 a. Explain the principle of working of a DC generator with a neat diagram **05 M**
(Level[2], CO[3], PO[3])

b. Develop an expression for EMF generated in DC generator. **05 M**
(Level[3], CO[3], PO[3,10,11])

c. Determine the EMF generated in a 5 kW, 4 pole, 1500 rpm DC Shunt generator having 24 armature slots with 10 conductors per slot. Lap winding is employed. . Flux per pole is 50 mWb. Also find the emf if the armature has wave winding. **10 M**
(Level[3], CO[3], PO[3,11])

OR

4 a. Explain the principle of working of a DC motor with a neat diagram **05 M**
(Level[2], CO[3], PO[3])

b. A DC shunt motor draws a current of 4 A at no load at a DC supply voltage of 220 V. Shunt field resistance is 110 Ω and armature resistance is 0.2 Ω. If the line current on full load is 40 A at a speed of 1500 rpm, determine the speed at No load. **10 M**
(Level[3], CO[3], PO[3,11])

c. Explain with a neat diagram a Dynamometer type wattmeter. **05 M**
(Level[2], CO[3],PO [3])

UNIT – III

5 a. Determine an expression for Average value of Sinusoidal voltage. **05 M**
(Level[3], CO[2], PO[3])

b. Explain the voltage and current relations in pure inductive circuit. Draw corresponding phasor diagram. **05 M**
(Level[2], CO[2], PO[3,11])

c. Determine the current, power consumed and power factor in a single phase AC circuit with a resistance of 5 Ω in series with a pure inductor of 5 mH when a voltage v= 200sin314t volts is applied. Draw the phasor diagram for the circuit. **10 M**
(Level[3], CO[1,2], PO[3,11])

OR

6 a. In an AC circuit if the applied voltage is v=100sin (314t) V and the current drawn is i=10sin (314t- 45) A, determine the circuit parameters. **05 M**
(Level[3], CO[1, 2], PO[3,11])

b. A choke coil of inductance 0.08 H and resistance 12 Ω is connected in parallel with a 120 μF capacitor to a 1 phase 230 V, 50 Hz AC supply. Determine the current drawn from the supply and its phase angle. **08 M**
(Level[3], CO[1,2], PO[3,11])

c. Explain with a neat sketch 2 way control of a lamp. **07 M**
(Level[2], CO[5], PO[3])

UNIT – IV

7 a. Determine the relation between Line voltage and phase voltages, line current and phase currents for star connected 3 phase systems. **05 M**
(Level[3], CO[1,2], PO[3])

b. A 3 phase 440 V, 50 Hz system has star connected load with an impedance of (3+j4) Ω per phase. Determine the line current, phase current, power consumed and power factor. **05 M**
(Level[5], CO[1,2], PO[3,11])

c. A 25 kVA transformer has 500 primary winding turns and 50 secondary winding turns. The primary side is connected to 3300 V, 50 Hz supply. Determine the secondary voltage, maximum flux in core, full load primary and secondary currents. **10 M**
(Level[3], CO[5], PO[3,11])

UNIT -V

8 a. Explain with neat sketch working principle of 3 phase Induction motor. **07 M**
(Level[2],CO[3],PO[3])

b. A 10 hp, 415 volt, 50 Hz, 4 pole, 3 phase squirrel cage Induction motor is running at 1410 rpm at full load. Determine the percentage slip at full load. **05 M**
(Level[3], CO[3], PO[3,11])

c. Explain with a neat sketch the construction of a 3 phase salient pole Synchronous generator. **08 M**
(Level[2], CO[3], PO[3])

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ELN25

Second Semester B.E. Semester End Examination, April/May 2016-17

BASIC ELECTRONICS

Time: 3 Hours

Max. Marks: 100

Instructions: 1. *Units II and III are compulsory.*
2. *Answer any one full question from remaining units.*

UNIT - I

1 a. Discuss how barrier potential is developed at the PN junction. Using this concept discuss the behavior of PN junction when it is (i) forward biased (ii) reverse biased. **07 M**

(Level[L2], CO[1], PO[1])

b. The input voltage of a full-wave bridge rectifier is given as Vs=50 sin ωt. The load resistance is 750Ω. Assuming the diodes to be ideal, calculate (i) D.C. output voltage (ii) D. C. output current (iii) PIV of each diode (iv) Ripple factor (v) Efficiency of rectification **07 M**

(Level[L3], CO[1], PO[1])

c. Compare half wave rectifier and full-wave bridge rectifier. **06 M**

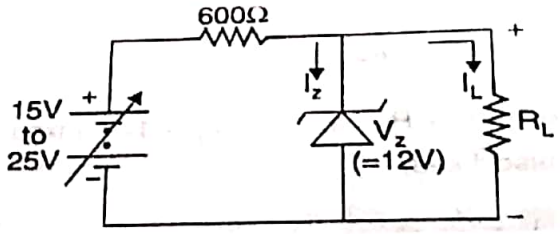
(Level[L5], CO[1], PO[1])

OR

2 a. Why is a filter used in rectifier? Analyze with waveforms, how the d.c. voltage of a half wave rectifier is improved when a capacitor filter is used. Write the expression for the ripple factor for the same. **10 M**

(Level[L4], CO[1], PO[1])

b. The breakdown voltage of the zener diode shown in the fig is 12V. Find the maximum and minimum input currents. **10 M**



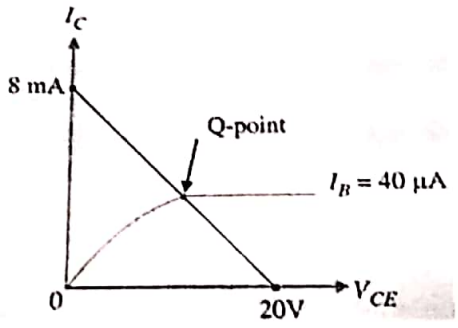
(Level[L3], CO[1], PO[2])

UNIT – II

3 a. What is a D.C. load line for a transistor circuit? Explain the procedure to draw the D.C. load line and locate the Q-point for an NPN transistor connected in CE configuration. **10 M**

(Level[L2], CO[2], PO[1])

b. Design a base bias circuit given the load line and the Q-point as shown below. **10 M**



UNIT – III

4. a. Derive an expression for the gain of a multistage amplifier in decibels. The overall gain of a multistage amplifier is 140. When negative feedback is applied, the gain is reduced to 17.5.Find the fraction of the output that is fed back to the input. 10 M
(Level[L3], CO[3], PO[1])

b. Construct an integrator using an op-amp. 10 M
Design an adder circuit using an op-amp to obtain an output voltage given by $V_0 = -(0.1V1+0.5V2+20V3)$ where V1, V2 and V3 are the inputs.
(Level[L6], CO[4], PO[2])

UNIT – IV

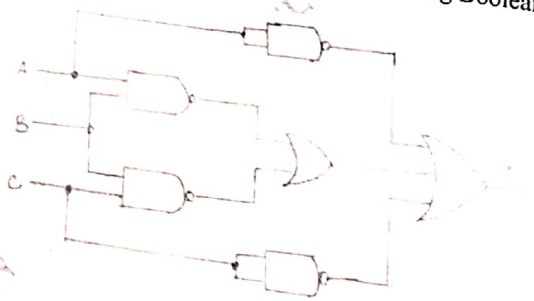
5. a. What is Full Adder? Design and implement full adder using gates. 10 M
(Level[L6], CO[5], PO[1])

b. Prove that (i) (A+B)(B+C)(C+A)= AB+BC+CA
(ii) $(X+Y)(\bar{X}\bar{Z}+Z)(\bar{Y}+XZ) = XZ$ 10 M
(Level[L5], CO[5], PO[1])

OR

6. a. (i) Convert decimal 7894.125 to its octal equivalent.
(ii) Convert octal 5413.237 to its hexadecimal equivalent.
(iii) Obtain the decimal equivalent of hexadecimal BC64.
(iv) Convert hexadecimal A26.ACCC to its decimal equivalent.
(v) Obtain the decimal equivalent of binary 11011.101. 10 M

b. Write the logic expressions at the output of each gate and obtain the expression for Y for the following logic circuit and reduce the expression using Boolean algebra. 10 M
(Level[L3],CO[5],PO[1])



UNIT –V

7. a. What is modulation? Explain Amplitude modulation and Frequency modulation with neat waveforms. 10 M
(Level[L3], CO[5], PO[1])

b. Explain the working principle of LED and LCD. 10 M
(Level[L1], CO[6], PO[1])

8. a. Explain the block diagram of digital communication with a neat diagram. 10 M
(Level[L1], CO[6], PO[1])

OR

b. Compare Analog and Digital communication systems. 10 M
(Level[L2], CO[6], PO[1])

(Level[L2], CO[6], PO[1])

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ELE23

Second Semester B.E. Makeup Examination, April/May 2016-17

BASIC ELECTRICAL ENGINEERING

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *Answer any FIVE full questions selecting at least One Question from each Unit.*
2. *Unit – IV and Unit - V are compulsory*

UNIT - I

1 a. Find the equivalent resistance and the current delivered by the source in the circuit shown in fig 1a. **05 M**

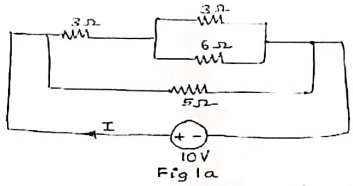

Fig 1a

(Level[3], CO[2], PO[3])

b. Applying the concept of star delta transformation determine the equivalent resistance of the circuit in fig 1b. **05 M**

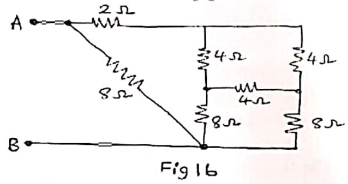

Fig 1b

(Level[3], CO[2], PO[3,11])

c. Applying the concept of Mesh analysis find the current in 5Ω resistance in the circuit in fig 1c. **10 M**

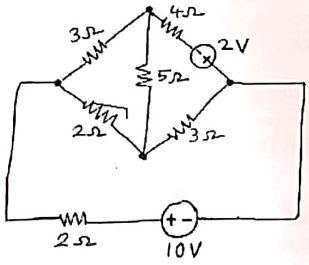

Fig 1c

(Level[3], CO[2], PO[3,11])

OR

2 a. Explain the terms MMF, magnetic flux and reluctance in a magnetic circuit **05 M**
(Level[2], CO[1], PO[3])

b. Compare Magnetic and Electric circuits **05 M**
(Level[2], CO[1], PO[3])

c. Determine the mmf and excitation current required to produce a magnetic flux of 1 mWb in the air gap in a Electromagnet in fig 2c. Relative permeability of iron is 600. Considering leakage and fringing take the leakage factor as 1.2. **10 M**

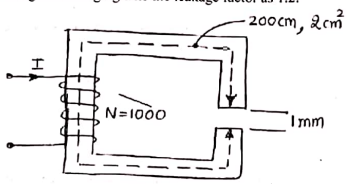

Fig 2c

(Level[3], CO[1], PO[3,11])

UNIT – II

3 a. Explain the construction of a DC generator with a neat diagram **05 M**
(Level[2], CO[3], PO[3])

b. Develop an expression for EMF generated in DC generator. **05 M**
(Level[3], CO[3], PO[3,10,11])

c. Find the EMF generated in a 5 kW, 8 pole, 750 rpm DC Shunt generator having 24 armature slots with 10 conductors per slot with lap winding. Flux per pole is 50 mWb. Also find the emf if the armature has wave winding. **10 M**
(Level[3], CO[3], PO[3,11])

OR

4 a. Explain the principle of working of a DC motor with a neat diagram **05 M**
(Level[2], CO[3], PO[3])

b. A 220 V DC shunt motor draws a line current of 4A at no load. Shunt field resistance is 110 Ω and armature resistance is 0.2 Ω. If the line current on full load is 40 A at a speed of 1500 rpm, determine the speed at No load. **10 M**
(Level[5], CO[3], PO[3,11])

c. Explain with a neat diagram working of a Single phase Induction type Energy meter. **05 M**
(Level[2], CO[3],PO [3])

UNIT – III

5 a. Derive an expression for RMS value of Sinusoidal voltage. **05 M**
(Level[5], CO[2], PO[3])

b. Explain the voltage and current relations in pure capacitive circuit and draw the corresponding phasor diagram. **05 M**
(Level[2], CO[2], PO[3,11])

c. Determine the current, power consumed and power factor in a single phase AC circuit with a resistance of 5 Ω in series with a pure capacitor 100 μF when a voltage v= 200sin314t volts is applied. Draw the phasor diagram for the circuit. **10 M**
(Level[3], CO[1,2], PO[3,11])

OR

6 a. In an AC circuit if the applied voltage is v=100sin (314t) V and the current drawn is i=10sin (314t + 45^0) A, determine the circuit parameters. **05 M**
(Level[3], CO[1, 2], PO[3,11])

b. A choke coil of inductance 0.04 H and internal resistance 6 Ω is connected in parallel with a 60 μF capacitor to a single phase 230 V, 50 Hz AC supply. Find the current drawn from the supply and its phase angle. **08 M**
(Level[3], CO[1,2], PO[3,11])

c. Explain with a neat sketch a typical Earthing system and its functions. **07 M**
(Level[2], CO[5], PO[3])

UNIT – IV

7 a. Determine the relation between Line voltage and phase voltages, line current and phase currents for delta connected 3 phase systems. **05 M**
(Level[5], CO[1,2], PO[3])

b. A 3 phase 440 V, 50 Hz system has delta connected load with an impedance (3+j4) Ω per phase. Calculate the line current, phase current, power consumed and power factor. **05 M**
(Level[3], CO[1,2], PO[3,11])

c. A 50 kVA transformer has 500 primary winding turns and 50 secondary winding turns. The primary side is connected to 3300 V, 50 Hz supply. Determine the secondary voltage, maximum flux in core, full load primary and secondary currents. **10 M**
(Level[3], CO[5], PO[3,11])

UNIT -V

8 a. Explain with neat sketch working principle of 3 phase Induction motor. **07 M**
(Level[2],CO[3],PO[3])

b. A 10 hp, 415 volt, 50 Hz, 4 pole, 3 phase squirrel cage Induction motor is running at 5% slip at full load. Determine the speed at full load. **05 M**
(Level[3], CO[3], PO[3,11])

c. Explain with a neat sketch the construction of a 3 phase salient pole Synchronous generator. **08 M**
(Level[2], CO[3], PO[3])

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ELN25

Second Semester B.E. Makeup Examination, April/May 2016-17

BASIC ELECTRONICS

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *Units II and III are compulsory.*
2. *Answer any one full question from remaining units.*

UNIT - I

1 a. Explain the working of a full-wave bridge rectifier with a neat circuit diagram and relevant input and output waveforms. Also write the expressions for its (i) D.C. output voltage (ii) R.M.S. voltage (iii) Efficiency (iv) Ripple factor (v) PIV of each diode **10 M**

(Level[L2], CO[1], PO[1])

b. Identify a two terminal device which can be used as voltage regulator. Explain the working of a voltage regulator circuit using this device to feed a load R_L with necessary equations. **10 M**

(Level[L3], CO[1], PO[2])

OR

2 a. Explain the significance of load line analysis w.r.t.diode. Explain the procedure to draw the D.C. load line and locate the Q-point for a diode connected in series with a supply voltage E and a load resistance R_L **10 M**

(Level[L2], CO[1], PO[1])

b. A half wave rectifier with capacitor filter is supplying a resistive load of 500Ω. If the load ripple content should not exceed 10%, find the value of capacitance required. The supply frequency is 50Hz. **10 M**

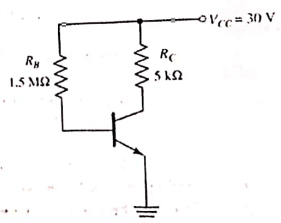
(Level[L3], CO[1], PO[2])

UNIT – II

3 a. What is an FET? What are the different types of FETs? Explain the construction and operation of JFET **10 M**

(Level[L2], CO[2], PO[1])

b. For the circuit shown below, draw the D.C. load line and mark the D.C. operating point on it. Assume a Si transistor with β=100 **10 M**



(Level[L3], CO[2], PO[1])

UNIT - III

4. a. Derive an expression for the gain of an amplifier with negative feedback with a neat block diagram. **10 M**

A certain amplifier has a voltage gain of 15dB. If the input signal is 0.8V, what is the output voltage?

b. Explain the typical frequency response of a RC coupled amplifier. Define and indicate the cut-off frequencies and bandwidth. **10 M**
Design a non- inverting amplifier using op-amp with a closed loop gain of 10.

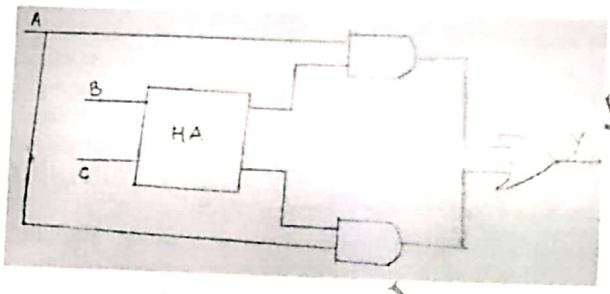
(Level[L2,L6], CO[3,4], PO[2])

UNIT - IV

5. a. (i) Convert the decimal number 749.25 to binary, octal and hexadecimal numbers. **10 M**
(ii) Convert decimal number2598.675 to hexadecimal.
(iii) Convert the octal number 4057.06 to decimal.

(Level[L3], CO[5], PO[1])

b. Write the logic expression for the output of each gate for the following circuit. Write the expression for Y and reduce it using Boolean algebra. **10 M**



(Level[L4], CO[5], PO[2])

OR

6. a. What is half-adder? Design half adder by writing its truth table and realize it using basic gates. **07 M**

(Level[L6],CO[5],PO[2])

b. Show that **07 M**
(i) $A\overline{BC} + \overline{ABC} + \bar{A}B\bar{C} + \overline{AB}C = \bar{A} + \bar{B} + \bar{C}$

(Level[L5], CO[5], PO[1])

c. Implement the NOR function using NAND gates only. **06 M**

(Level[L4], CO[5], PO[1])

UNIT –V

7. a. Explain the block diagram of a communication system. **07 M**

(Level[L1], CO[6], PO[1])

b. Explain the need for modulation. **07 M**

(Level[L2], CO[6], PO[1])

c. Write a short note on 7 segment display. **06 M**

(Level[L1], CO[6], PO[1])

OR

8. a. What do you understand by channel encoder and decoder? **07 M**

(Level[L2], CO[6], PO[1])

b. Compare Amplitude modulation and Frequency modulation. **07 M**

(Level[L4], CO[6], PO[1])

c. Explain the working principle of LED and LCD. **06 M**

(Level[L1], CO[6], PO[1])

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15ELE 23

Second Semester B.E. MAKE-UP Examination, APRIL / MAY 2015-16

Basic Electrical Engineering

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *Answer ANY FIVE full questions choosing at least ONE from each Unit.*
2 *Unit 4 and 5 are Compulsory*
3 *Marks will be scaled down to max.50 marks for SGPA and CGPA calculations*

UNIT - I

1 a. Find I in the circuit shown in Fig 1a. **10 M**

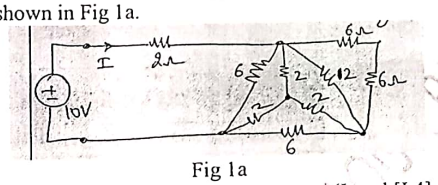

Fig 1a

(Level [L4], CO [2], PO [a,k])

b. Find the excitation current in a magnetic circuit consisting of an iron ring of mean circumference 20cm and area of cross section 4 cm^2 with an air gap of 1 mm length with an excitation coil having 500 turns. The relative permeability of iron is 800. Flux required in the in the air gap is $4x10^{-4}$Wb. Also find Self inductance of the coil. **10 M**

(Level[L4],CO [1],PO [a,k])

OR

2 a. Explain the types of induced emfs. **10 M**

(Level [L2],CO [1], PO [a,b,h])

b. Find currents in all the branches with directions in Fig 2b **10 M**

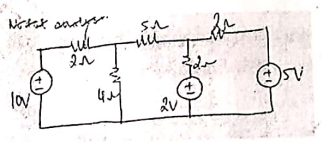

Fig 2b

(Level [L4],CO [2],PO [a, k])

UNIT - II

3 a. Explain the classification of DC motors with relevant sketches and mention the applications of each type. **10 M**

(Level [L2],CO [3],PO [a,h,k])

b. Explain with neat sketch the construction and working of Induction type Energy meter. **10 M**

(Level [L2], CO [1], PO [a,h.k])

OR

4 a. Explain with neat sketch the construction and working of Dynamometer type Wattmeter. **10 M**

(Level [L2],CO [1],PO [a,h,k])

b. A DC Shunt motor connected across 440 V DC supply takes an armature current of 20 A and runs at 500 rpm. The armature circuit resistance is 0.6 Ω. If the magnetic flux is reduced by 30% and torque developed is increased by 40 % find the values of armature current and speed. **10 M**

(Level[L4],CO [3],PO [a,k])

UNIT - III

5 a. Obtain the expression of impedance of a series RC circuit connected to single phase supply. 8 M
(Level [2],CO [1,2], PO [a,b,h])

b. A single phase voltage (200 + j0) V at 50 Hz is applied to a circuit comprising of a resistance of 20 Ω, inductance of 20 mH and a capacitance of 150 μF connected in series. Find 8 M
(i) Impedance of the circuit,
(ii) Current drawn from the supply,
(iii) Power factor and (iv) Power drawn.
(Level [5],CO [1,2],PO [a,b,k])

c. Explain two way control of lamp. 4 M
(Level [2],CO [1,2,6],PO [a,e,h])

OR

6 a. Obtain the expression for the RMS value of an alternating quantity. What is form factor? 8 M
(Level [3], CO [1,2], PO [a,b,h])

b. Two impedances Z_1= (150 + j157) Ω and Z_2= (100 - j110) Ω are connected in parallel across a 220 V, 50 Hz supply. Find the total current and power factor. 8 M
(Level [5],CO [2], PO [b])

c. Explain three way control of lamp. 4 M
(Level [2],CO [1,2,6], PO [a,e,h])

UNIT - IV

7 a. List the advantages of a three phase system. 4 M
(Level [1],CO [1,2,6],PO [a,e])

b. Three similar resistors are connected in star across 400 V, three phase lines. The line current is 10 A. Calculate (i) Value of each resistor and (ii) Line current when the resistors are connected in delta consuming the same power. 8 M
(Level [5],CO [1,2], PO [b,k])

c. A 100 kVA , single phase transformer has iron loss of 600 W and full load copper loss of 1500 W. Find the efficiency of the transformer at (i) Full load, 0.8 p.f. lag and (ii) Half full load, unity p.f. 8 M
(Level [5],CO [4], PO [b,k])

UNIT - V

8 a. Explain the production of rotating magnetic flux in 3 phase Induction motor and the working of Induction motor. 10 M
(Level [L2],CO [3], PO [a,b,h])

b. A 3 phase, 50 Hz, 1000 kVA, 16 pole Alternator with star connected stator has 144 slots with 10 conductors per slot. The flux per pole is 24.8 mWb. The stator has full pitched coils with distributed windings with a distribution factor of 0.96.Determine the line emf and synchronous speed. Find Full load current. 10 M
(Level [L4],CO [3], PO [a,k])

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15ELN25

Second Semester B.E. Degree Semester End Examination, APRIL / MAY 2015-16

Basic Electronics

Time: 3 Hours

Max. Marks: 100

Instructions: 1. *UNIT-III and UNIT- IV are compulsory*
2. *Answer any one full question from each of the other UNITS*

UNIT - I

1 a. With a suitable circuit obtain the DC load line for a semiconductor diode and explain the importance of the operating point. Determine the required load resistance using the device characteristics as shown in Figure 1. 10 M

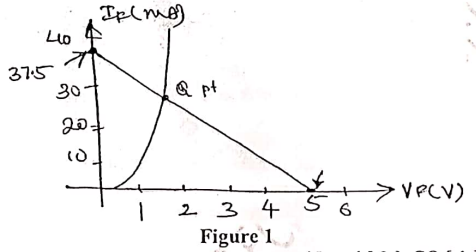

Figure 1

(Level [3], CO [1], PO [a, b])

b. With a neat circuit diagram explain the working of a Full wave Bridge rectifier with necessary waveforms. A Bridge rectifier produces a direct current of 124.49mA across a 2KΩ resistive load. If the RMS value of primary input supply is 220V, calculate the peak secondary current and voltage. 10 M

(Level [2], CO [1], PO [a, b])

OR

2 a. Explain with a neat circuit and waveforms the working of a circuit with the output ripple factor given by $\gamma = \frac{1}{2\sqrt{3} f R_L C}$. 10 M

(Level [2], CO [1], PO [a, b])

b. Draw the characteristics of a Zener diode and discuss the important parameters on the reverse characteristics. 10 M
A Zener diode and a resistor connected in series are to be used as a 10V reference source for a load current of 15mA. The available supply voltage is 25V. Select suitable components. Assume low power Zener diode with V_Z = 10V, I_{ZT} = 20mA, P_D = 400mW, I_{Zmin}= 5mA.

(Level [2], CO [1], PO [a, b])

UNIT – II

3 a. For the circuit shown in Figure 2 obtain the operating point. Given: R_B = 965 KΩ, R_C = 2.2 KΩ, VCC = 20V, β = 100. 10 M

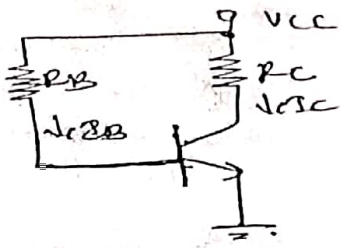

Figure 2

(Level [2], CO [2], PO [b]) **10 M**

b. What are the various currents and voltages in a transistor device? Explain the working of a npn transistor with a neat diagram.

(Level [2], CO [2], PO [a])

OR

4 a. With a neat diagram explain the input and output characteristics of a common emitter transistor configuration. **10 M**

(Level [2], CO [2], PO [a])

b. Derive the relation between the current gains α and β of the transistor. Calculate the values of I_C, I_E and β for a transistor with α = 0.98 and I_B = 120μA. **10 M**

(Level [2], CO [2], PO [a, b])

UNIT – III

5 a. Draw the following using op-amp. In each case, write the output voltage equation. **10 M**

i) Voltage follower ii) Summer iii) Subtractor
iv) Integrator v) Differentiator

(Level [L3], CO [CO4], PO [a])

b. Discuss the effects of negative feedback. **5 M**

(Level [L6], CO [CO3], PO [a])

c. Explain Barkhausen criterion for oscillations. **5 M**

(Level [L2], CO [CO3], PO [a])

UNIT – IV

6 a. Perform the following conversions: **5 M**

(i) $(16.2)_8 = (?)_{16}$ (ii) $(25.375)_{10} = (?)_2$

(Level [2], CO [5], PO [b])

b. Construct AND and NOR gate using NAND gates only. **5 M**

(Level [3], CO [5], PO [a])

c. Explain the working of a circuit to add three binary bits with the help of truth table, Boolean expressions, logic diagram and gate level realization. **10 M**

(Level [2], CO [5], PO [a, b])

UNIT – V

7 a. Explain FM with the help of waveforms. Also, discuss its advantages and disadvantages. **10 M**

(Level [L2, L6], CO [6], PO [a])

b. Explain communication system with a neat block diagram. Give the classification of communication system. **10 M**

(Level [L2], CO [6], PO [a])

OR

8 a. Draw the block diagram of superheterodyne receiver. Explain function of each block. **10 M**

(Level [L2], CO [6], PO [a])

b. Discuss salient features of: i) 7-segment display, and ii) LCD. **10 M**

(Level [L2], CO [6], PO [a])

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15ELE13

First Semester B.E. Degree MAKE-UP Examination, Dec. / Jan. 2015

Basic Electrical Engineering

Time: 3 Hours Max. Marks: 100

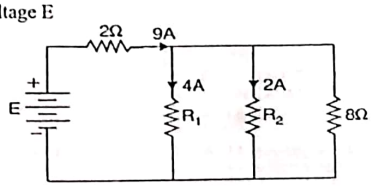
Instructions:
1. **Questions from Unit IV and Unit V are COMPULSORY**
2. **Answer any one FULL question from each of the other units**
3. **Maximum Marks will be scaled to 50 marks for SGPA and CGPA calculation**

UNIT - I

1 a. Obtain the expression for equivalent resistance for two resistors when connected in a) series and b) parallel. 5 Marks

(Level[2],CO[1],PO[a,b])

b. For the circuit shown below find the current in the 8Ω resistor and also find the value of R_1 and R_2 and supply voltage E 10 Marks



(Level[3],CO[3],PO[a,b])

c. Mention the similarities and differences between electrical and magnetic circuit. 5 Marks

(Level[1],CO[1],PO[a])

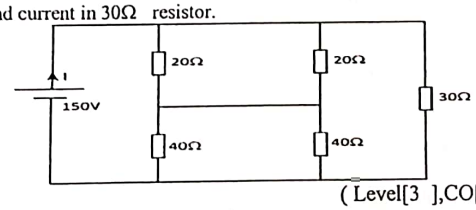
OR

2 a. For a ring type magnetic circuit obtain the expression $\Phi = \frac{NI}{l/\mu a}$, 5 Marks

Where $\mu = \mu_0 x \mu_r$

(Level[2],CO[1],PO[a,b])

b. For the circuit shown below find the equivalent resistance and current supplied by the 150V battery and current in 30Ω resistor. 10 Marks



(Level[3],CO[1],PO[a,b])

c. State Fleming's right hand rule and define ohm's law. 5 Marks

(Level[1],CO[1],PO[a])

UNIT – II

3 a. A 4 pole DC generator runs at 1200rpm. The flux per pole is 50mWb, there are 160 conductors placed in the slots. Find the emf generated if the machine is a) lap connected b) wave connected. 5 Marks

(Level[3],CO[2],PO[a,b])

b. Draw a neat sketch of single phase induction type energy meter and explain its operation. 10 Marks

(Level[3],CO[2],PO[a])

c. Draw the circuit diagram for a) DC shunt machine b) DC series machine and c) DC compound machine. 5 Marks

(Level[3],CO[2],PO[a])

OR

4 a. Derive the emf equation of a DC generator. 5 Marks

(Level[3],CO[2],PO[a,b])

b. Draw a neat sketch of electrodynamometer type wattmeter and explain its operation. 10 Marks

(Level[3],CO[2],PO[a])

c. A 250 V shunt motor takes a current of 20A. Resistance of shunt field is 200Ω and of armature is 0.3Ω. Calculate the current in the armature and back EMF. 5 Marks

(Level[4],CO[2],PO[a,b])

UNIT - III

5 a. Define the following terms a) RMS value of alternating current b) Average value of alternating current.. 5 Marks

(Level[4],CO[3],PO[a])

b. For pure Inductance the equation of an AC voltage applied is $v = V_m \sin\omega t$. Obtain the expression for current through pure inductance and power consumed. Represent the relation between current and voltage in the form of phasor diagram. 10 Marks

(Level[4],CO[3],PO[a,b])

c. With neat circuit diagram explain the operation of circuit to control the lamp from two different places. 5 Marks

(Level[3],CO[3],PO[a,b])

OR

6 a. Why earthing is necessary for domestic appliances? 5 Marks

(Level[2],CO[3],PO[a])

b. From the first principles obtain the expression for a current in a series RC circuit given that the applied voltage $v = V_m \sin\omega t$. Prove that power consumed in the RC series circuit is given by the expression $P = VI \cos\Phi$.. 10 Marks

(Level[2],CO[3],PO[a,b])

c. Two resistors 5Ω and 10Ω and one inductance L Henry are connected in series with supply voltage of $50\sin\omega t$. Power loss across 5Ω resistor is 10watts, Find the power factor of the circuit. 5 Marks

(Level[3],CO[3],PO[a.b])

UNIT - IV

7 a. Two wattmeters connected to measure the power in three phase balance circuit indicate 4.5KW and 0.5KW. What is the total power and power factor of the circuit? 5 Marks

(Level[3],CO[4],PO[a,b])

b. Draw the sketch of core type and shell type transformer and label the parts. Mention the materials used for different parts. 10 Marks

(Level[3],CO[4],PO[a,b])

c. Find the efficiency of a 150KVA single phase transformer at full load unity power factor, if the full load copper loss is 1600W and iron loss is 1400W. 5 Marks

(Level[3],CO[4],PO[a,b])

UNIT - V

8 a. A 4 poles, 3-phase, 50Hz induction motor runs at a speed of 1470 rpm. Calculate the synchronous speed of rotating magnetic field and slip of the induction motor. 5 Marks

(Level[4],CO[5],PO[a.b])

b. With neat sketch explain the construction of any one type of induction motor. 10 Marks

(Level[4],CO[5],PO[a])

c. Derive the emf equation of three phase alternator. 5 Marks

(Level[2],CO[5],PO[a])

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15ELE13

First Semester B.E. Degree Semester End Examination, Nov. / Dec. 2015

Basic Electrical Engineering

Time: 3 Hours

Max. Marks: 100

Instructions:
1. **Questions from unit IV and V are compulsory.**
2. **Answer any one full question from each of the other units.**
3. **Marks will be scaled down to max 50 marks for SGPA and CGPA calculations.**

UNIT - I

a. State the similarities and differences in electric and magnetic circuits. 4 Marks

(Level [L1 CO [1 PO [a,k]

b. Calculate the equivalent resistance of the network shown in Fig.Q1(b) as measured across the terminals A and B. 8 Marks

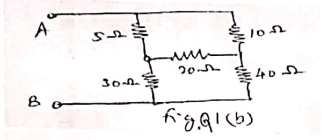

Fig.Q1(b)

(Level [4], CO [2 PO [a,k]

c. An iron ring having a mean length of 50 cm and uniform cross section of 5 cm^2 is wound with 240 turns. A current of 2 A in the winding produces a flux of 0.4 mwb. Calculate the relative permeability of the iron and the reluctance of the magnetic circuit. Neglect magnetic leakage and fringing. 8 Marks

(Level [1], CO [1], PO [a,k])

OR

a. State Fleming's right hand and left hand rule. 4 Marks

(Level [1], CO [1], PO [a,k])

b. For the circuit shown in Fig.Q2 (b), find the current supplied by each battery and power dissipated in 1 ohm resistor. 8 Marks

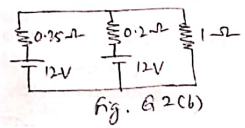

Fig. Q2(b)

(Level [4], CO [2 PO [a,k]

c. An iron ring 100 cm mean circumference and of circular cross section 5 cm^2 has a saw cut2 mm in length. It is wound with 500 turns of wire. If 0.5 mwb flux exists across the air gap, what is the exciting current ? Take leakage factor as 1.2 and μ_r for iron as 500. 8 Marks

(Level [4], CO [1], PO [a,k]

UNIT - II

a. Illustrate the necessity of starter for a D.C. motor. 4 Marks

(Level [3], CO [3 PO [a,b]

b. A 120 V D.C. shunt motor has an armature resistance of 0.2 Ω and shunt field resistance of 60 Ω. It runs at 1800 rpm when it takes full load current of 40 A. Find the speed of the motor while it is operating at a total current of 20 A with load terminal voltage remaining the same. Take brush drop as 2 V. 6 Marks

(Level [4], CO [3 PO [a,k])

c. With the help of a schematic describe working of induction type energy meter. 10 Marks

(Level [2], CO [1 PO [a,b])

OR

4 a. Derive torque equation of DC motor. 4 Marks

(Level [2], CO [3 PO [a,b])

b. A 4 pole , 100 V shunt generator with lap connected armature winding having field and armature resistances of 50 Ω and 0.1 Ω respectively, supplies 60 numbers of 100 V, 40 W lamps. Calculate the total armature current, the current per path and generated emf. Neglect brush drop. 8 Marks

(Level [4], CO [3 PO [a,k])

c. With the help of a neat sketch explain electrodynamometer type wattmeter used to measure power in electric circuit. 8 Marks

(Level [2], CO [1 PO [a,b])

UNIT - III

5 a. A circuit having a resistance of 12 Ω and inductance 0.15 H and a capacitance of 100 μF in series is connected across a 100 V, 50 Hz supply. Calculate the impedance, current and the phase difference between the current and supply voltage. 8 Marks

(Level [4], CO [1 PO [a,k])

b. With neat circuit diagram explain how operation of lamp can be controlled from two different locations. 4 Marks

(Level [2], CO [1 PO [a,b,h])

c. Prove that the power consumed by pure capacitor in AC circuit is zero. 8 Marks

(Level [2], CO [1 PO [a,b ,h)

OR

6 a. Two circuits A and B are connected in parallel across a 200 V, 50 Hz mains. Circuit A consists of a resistance of 10 Ω and an inductance of 0.12 H connected in series. Circuit B consists of a resistance of 20 Ω in series with a capacitor of 40 μF. Calculate i) Current in each branch and ii) power factor of the circuit. 8 Marks

(Level [4], CO [1 PO [a,k,h])

b. Obtain the expression for impedance of a series RL circuit with phasor diagram. What is the power factor of such a circuit? 8 Marks

(Level [2], CO [1 PO [a,b,k])

c. Explain three way control of lamp. 4 Marks

(Level [2], CO [1 PO [a,k,h])

UNIT - IV

7 a. Mention the advantages of 3 phase electrical systems. 5 Marks

(Level [L1], CO [2], PO [a,b])

b. Derive the relationship between the line and phase values of voltages and currents in a Star connected balanced 3 phase system. 5 Marks

(Level [L2], CO [2], PO [a,b])

c. A 100 kVA, 50 Hz, single phase transformer has 1000 turns on its primary and 400 turns on the secondary side.The voltage applied on primary side is 1250 V. Find the i)Secondary voltage ii) Full load primary current iii) Full load secondary current iv) flux in the core v) Flux density in the core if area of cross section is 60 cm^2 10 Mark

(Level [L4], CO [3], PO [a,b])

UNIT - V

8 a. What is the necessity of starter for a three phase induction motor? Explain the operation of a star delta starter with a neat schematic. 8 Marks

(Level [1], CO [3], PO [a,b,k])

b. What are the applications of squirrel cage and slip ring induction motors? 4 Marks

(Level [1], CO [3], PO [a,b,h])

c. A 6 pole, three phase, star connected alternator has an armature with 90 slots and 12 conductors per slot. It revolves at 1000 rpm. The flux per pole is 0.5 wb. Calculate the line value of the emf generated if the distribution factor is 0.96 and pitch factor is 0.97. 8 Marks

(Level [4], CO [3], PO [a,b,k])

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15ELN15

First Semester B.E. Degree Semester End Examination, Nov. / Dec. 2015
Basic Electronics

Time: 3 Hours | Max. Marks: 100

Instructions: 1. Unit III and Unit IV are COMPULSORY.
2. Answer any one question from other units.

UNIT - I

a. What is a PN junction? Draw and explain the V-I characteristics of a PN junction diode. 10M

(Level [L1,L2], CO [1], PO [a])

b. Draw a centre-tapped FWR circuit. Write the expressions for V_{dc}, V_{rms}, ripple factor, PIV and efficiency. What are its advantages over HWR? 10M

(Level [L1,L4], CO [1], PO [a])

OR

a. Draw circuit and waveforms of a bridge rectifier. Explain its working. What is the use of the filter? 10M

(Level [L2], CO [1], PO [a])

b. A zener diode has a breakdown voltage of 10V. It is supplied from a voltage source varying between 20-40V, in series with a resistance of 1kΩ. Find the maximum and minimum zener current, if the load resistance is 4kΩ. 10M

(Level [L3], CO [1], PO [b])

UNIT – II

a. Draw the input and output characteristics of an NPN transistor in CE configuration. Explain with necessary circuit diagram and equations. 10M

(Level L2], CO [2], PO [a])

b. What is a DC load line? Discuss its significance as applied to transistor biasing. 10M

(Level [L1,L6], CO [2], PO [a])

OR

a. Draw a sketch to show the various currents in a PNP transistor. Deduce the relationships between various components. 10M

(Level [L2,L3], CO [2], PO [a])

b. Explain the concept of base bias technique using a transistor. Also, list out advantages and disadvantages. 10M

(Level [L1,L2], CO [2], PO [a])

UNIT – III

a. Design an amplifier using op-amp to provide a closed loop gain of 10. 5M

(Level [3], CO [3], PO [b])

b. Explain the working of an op-amp circuit that has the following output:- 5M

$V_o = -[V_1 + V_2 + V_3]$, where V_1, V_2 and V_3 are the inputs.

(Level 2], CO [4], PO [a])

c. Explain the concept of feedback with a neat block diagram. Derive the relation between the open loop and closed loop gain of the feedback system. 10M

(Level [2], CO [3], PO [a])

UNIT – IV

a. Simplify and realize the following Boolean expressions using basic gates only. 10M

i) $ABCD + A\bar{B}CD$

ii) $AB + ABC + AB\bar{C} + \bar{A}BC$

iii) $ABCD + \bar{A}BCD + ABD$

b. Perform the following: (Level [L4,L6], CO [CO5], PO [b]) 05M
i) $(1011101)_2 = (?)_8$
ii) $(7271)_8 = (?)_2$
iii) $(AB2C)_{16} = (?)_8$
iv) $(879)_{10} = (?)_2$
v) $(24DC)_{16} = (?)_{10}$

c. Realize a full adder circuit using gates. Verify the truth table. (Level [L3], CO [5], PO [b]) 05M

7 a. Draw the block diagram of a superheterodyne receiver. Explain function of each block. (Level [L3], CO [5], PO [a]) 10M

UNIT – V

b. Explain in detail, the need for modulation. (Level [L2,L3], CO [6], PO [a]) 10M

8 a. With neat waveforms and equations, explain amplitude modulation. Also, discuss its advantages and disadvantages. (Level [L2], CO [6], PO [a]) 10M

OR

b. Discuss salient features of: i) LED, and ii) LCD. (Level [L2], CO [6], PO [a]) 10M