

Registration No

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Total Number of Pages : 03

B.Tech
15BE2102

1st Semester Back Examination 2017-18

Basic Electrical Engineering

BRANCH : AEIE, AUTO, CHEM, CIVIL, CSE, ECE, EEE,
ELECTRICAL, ETC, FAT, IT, MANUTECH, MECH, METTAMIN, MINERAL, MINING, MME

Time : 3 Hours

Max Marks : 100

Q.CODE : B997

Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)

- Five lamps are connected in series. Each lamp requires 16V and 0.1 A. The total power consumed is -----Watt.
- A current of 8 A charges an insulator for 3 s. The charge accumulate is-----
---C
- A 500V/100V, single-phase transformer takes a full-load primary current of 4A. The full-load secondary current is ----- A
- A generator gives 20 A current at a voltage of 240V. The power taken by the load is -----
- A washing-machine motor of 420 W draws 4 A from a 110 V ac line. The power factor of the motor is -----
- An electric heater requires 23 A at 110 V and consume the energy for 8 hour. If the company charges at the rate 6 Rs/kW-h, the total amount to be paid is -

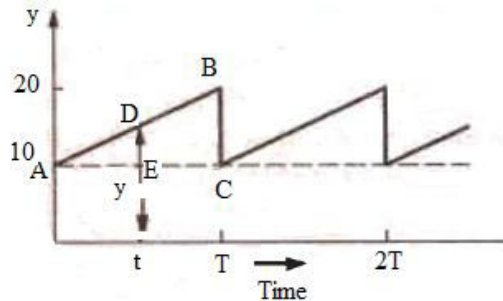
- A coil has an mmf of 500 AT and a reluctance of $2 \times 10^6 \text{ AT / wb}$. The total flux in the magnetic circuit is -----
- The frequency of the audio range extends from 20 Hz to 20 KHz. The range of wavelength over the range of audio frequencies is -----
- A steady current of 20 mA is passed through with an inductance of 100mH. The voltage induced by the coil is -----
- The poles of an alternator with 900 rpm at 60 Hz is -----

Q2 Answer the following questions: *Short answer type* (2 x 10)

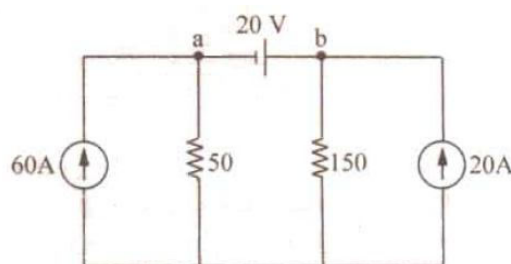
- What is an alternator ? Give the classifications of AC machines ?
- Why high permeability magnetic material is chosen for electrical apparatus ? How the permeability is related the flux density and field intensity ?
- A flux of 400μWb passing through a 150-turn coil is reversed in 40ms. Find the average e.m.f. induced.
- A carbon resistor has a resistance of $1 \text{ k} \Omega$ at 0°C . Determine its resistance at 80°C . Assume that the temperature coefficient of resistance for carbon at 0°C is $-0.0005 / ^\circ \text{C}$.
- What is the difference between the steady state solution and transient solution of a response ?
- Define form factor and peak factor of a sine wave.
- What do you mean by an ideal transformer ?
- The equation of alternating current is $i = 4 + 4 \sin \omega t$. Then find the rms value of the complex current.
- What is the function of brush and commutator in DC machines ?
- Define time constant of a first order system.

- Q3 a)** An alternating voltage given by $v = 100 \sin 240t$ volts is applied across a coil of resistance 32Ω and inductance 100mH . Determine (a) the circuit impedance, (b) the current flowing, (c) the p.d. across the resistance, and (d) the p.d. across the inductance. (e) power factor of the complete circuit (10)
- b)** Write down the principle of operation of a DC generator. An 8-pole, wave-connected armature has 600 conductors and is driven at 625rev/min . If the flux per pole is 20mWb , determine the generated e.m.f. (5)

- Q4 a)** Find the form factor and peak factor of the following wave form. (10)

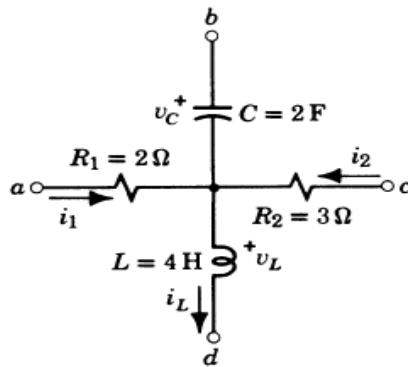


- b)** A silicon iron ring of cross-sectional area 5cm^2 has a radial air gap of 2mm cut into it. If the mean length of the silicon iron path is 40cm , calculate the magnetomotive force to produce a flux of 0.7mWb . (5)
- Q5 a)** What do you mean by transient of a response ? Derive the current growth and current fall equation for the R-L series circuit when DC battery is connected and disconnected respectively. (10)
- b)** The p.d. at the terminals of a battery is 25V when no load is connected and 24V when a load taking 10A is connected. Determine the internal resistance of the battery. (5)
- Q6 a)** Explain the detail construction and principle of operation of an three phase induction motor ? Draw the torque-slip characteristics of the induction motor. (10)
- b)** If the voltage and current supplied to a circuit or load by a source are: $V_s = 230 \angle -30^\circ \text{V}$, $I_s = 5 \angle 30^\circ \text{A}$. Determine: A) The power supplied by the source which is dissipated as heat. B) The power stored in reactive components in the circuit (load). C) The power factor angle and power factor (5)
- Q7 a)** State and explain Superposition theorem. With the help of Superposition theorem, compute the current I_{ab} in the circuit. All resistances are in ohms. (10)



- b)** What do you mean by half power frequencies ? Derive the half power frequencies for a R-L-C ac series circuit. (5)

- Q8 a)** For the current $i_1 = 3 \text{ A}$, $i_2 = 10 \cos t \text{ A}$, and $v_c = 5 \sin t \text{ V}$. Find (a) i_L and v_L (10)
 (b) v_{ab} , v_{bc} and v_{cd} (c) the energy stored in L and C as a function of time.



- b)** Draw and explain the torque-speed characteristics of a three phase induction motor. (5)

- Q9 a)** Write the advantages of three phase supply ? A delta connected balanced three phase load is supplied from a three phase, 400V supply. The line current is 20 A and the power taken by the load is 10,000W. Find (i) Impedance in each branch (ii) the line current, power factor and power consumed if the same load is connected in star. (10)

- b)** A coil has resistance of 300ohm and is switched on to a 110V d.c. supply. If the current reaches 62.3% of its final steady value in 0.002 second, determine (i) the time constant of the circuit (ii) the inductance of the circuit (iii) the maximum circuit current (iv) the initial rate of rise of current. (5)

Registration No :

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Total Number of Pages : 02

B.Tech
15BE2102

1st Semester Back Examination 2019-20

BASIC ELECTRICAL ENGINEERING

BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE

Max Marks : 100

Time : 3 Hours

Q.CODE : HB929

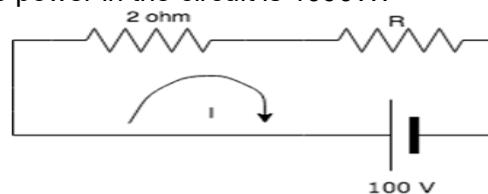
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- Explain how voltage source with a source resistance can be converted into an equivalent current source.
- Find the value of R if the power in the circuit is 1000W.

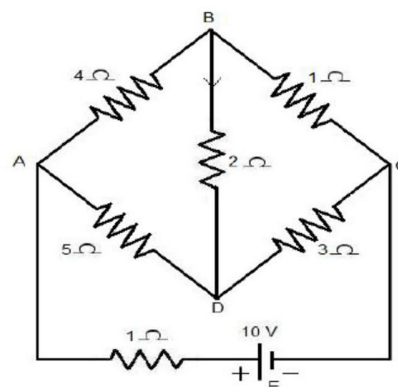


- State Ohm's law and give its limitations.
- Give the expression with diagram of current flow in terms of charge
- Give at least four sources of electricity.
- List any two advantages of 3-phase system over 1-phase system.
- How can ammeter and voltmeter are connected in a circuit? Why?
- What will happen to the resistance of the conductor if area of cross section increased by twice.
- Why high permeability magnetic material is required for electrical apparatus?
- Mention the form factor and peak factor of a sine wave?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- What do you mean by signal conditioning? How can an analog signal be read by a computer?
- What do you mean by potential divider connection and why it is required? Explain with neat sketch.
- In the circuit shown, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchhoff's laws.

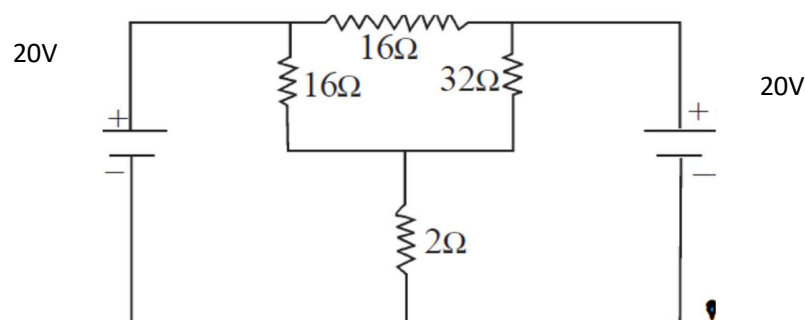


- d) A series circuit has $R=10\Omega$, $L=50\text{mH}$, and $C=100\mu\text{F}$ and is supplied with $200\text{V}, 50\text{Hz}$. Find (i) Impedance (ii) current (iii) power (iv) power factor (v) voltage drop across the each element.
- e) Define and give expression for the following
(i) Hysteresis (ii) mmf (iii) mutual inductance
- f) Explain the construction and principle of DC Motor.
- g) An iron ring wound with 550 turn's solenoid produces a flux density of 0.94 tesla in the ring carrying a current of 2.4 Amp. The mean length of iron path is 80 cm and that of air gap is 1 mm.
Determine:
(i) The relative permeability of iron
(ii) Self-inductance
(iii) Energy stored in the above arrangement, if the cross-sectional area of ring is 25 cm^2 .
- h) At instant $t = 0$, the instantaneous value of 50Hz sinusoidal current is +5 Amp and increases in magnitude further. Its r.m.s. value is 10 Amp :
(i) Write expression for its instantaneous value.
(ii) Find the current at $t = 0.01$ and $t = 0.015$ second.
Sketch the waveform indicating these values
- i) State and explain Superposition Theorem.
- j) Explain the working principle of PMMC instruments.
- k) Derive the equation for equivalent resistance of number of resistors connected in parallel.
- l) Explain in details with sketch of AC electric power generation and distribution.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Two circuits the impedances of which are given by $Z_1 = (12 + j16)\text{ Ohm}$ and $Z_2 = (8 - j4)\text{ Ohm}$ are connected in parallel across the potential difference of $(23 + j0)\text{ volts}$.
Calculate :
a) The Total Current Drawn
b) Total Power and Branch Power consumed and
c) Overall Power Factor of the circuit. (16)
- Q4** Describe the construction details of transformer and also explain the principle of operation. (16)
- Q5** A 4 pole, wave wound generator having 40 slots and 10 conductors placed per slot. The flux per pole is 0.02 wb. Calculate the generated emf when the generator is drive at 1200rpm. (16)
- Q6** State the Kirchoff's Voltage and Current Law. Find the current flowing through 2Ω resistance using KVL for the circuit given in Fig given below. (16)



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Total Number of Pages: 02

**B.Tech
BE2102**

1st Semester Back Examination 2017-18

Basic Electrical Engineering

**BRANCH: BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE,
ELECTRICAL, ETC, FASHION, IEE, IT, MANUTECH, MECH, METTA, MME, PE, TEXTILE**

Time: 3 Hours

Max Marks: 70

Q.CODE: B1141

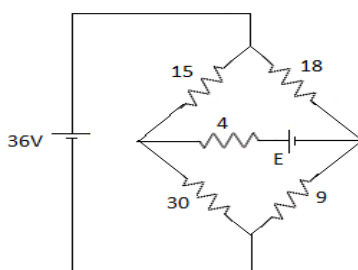
Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

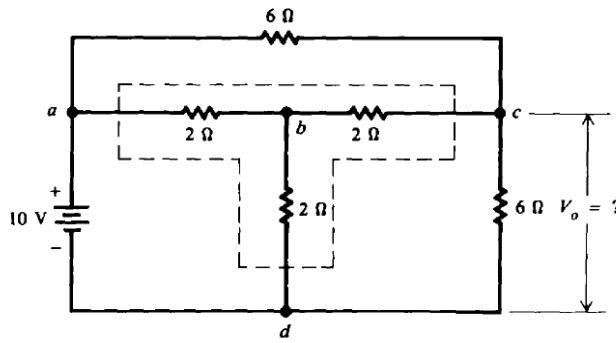
- Differentiate between the A.C. and D.C. system.
- The name plate of a meter reads '1 kwh = 15000 revolutions'. In a check up, the meter completes 150 revolutions during 50 seconds. How much power is consumed during this period ?
- A resistor of 50 ohms in series with a 0.2 H inductor is connected across a supply at 230V, 50hz. Calculate the magnitude of the steady current.
- Give the relation between phase and line for both voltage and current in a 3-phase delta connected power system.
- State and explain the Norton's theorem.
- The equation of alternating current is $i = 5 + 10\sin \omega t$. Find the rms current.
- A milliammeter of 2.5 ohms resistance reads upto 100 milliamperes. How much shunt resistance is to be added for measuring the voltage upto 10V. ?
- Write down the conditions for getting an ideal transformer.
- Write down the principle of operation synchronous motor.
- A 4 pole induction motor is connected to 400V, 50 Hz AC supply and is running at 1450 rpm. Find the slip of the induction motor.

Q2 a) Find the current flowing through the 4Ω resistor for the given network when E = 2V using Thevenin's theorem. (5)



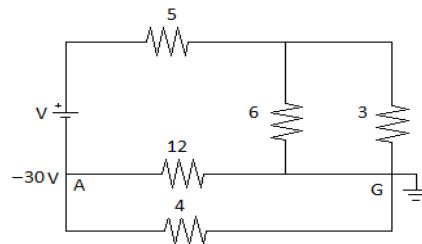
b) Derive the E.M.F. equation for D.C. generator. (5)

- Q3 a)** Find the total resistance R_T and voltage V_0 of the following circuit with a bridged T form. (5)



- b)** Derive the condition for maximum mechanical power developed in DC motor. (5)

- Q4 a)** The potential at 'A' in the given circuit is -30V. Using Kirchoff's Voltage Law, find (i) the value of 'V' and (ii) Power dissipated by 5Ω resistance. All resistances are in ohms. (5)



- b)** Derive the E.M.F equation of a three phase alternator. (5)

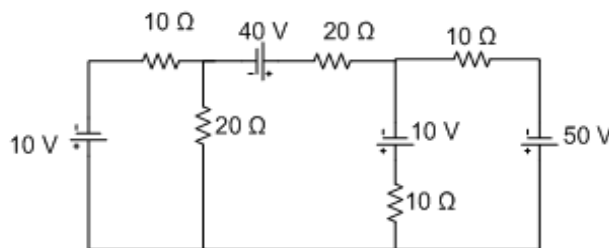
- Q5 a)** Sketch the layout of the steam power plant for power generation indicating its important accessories. (5)

- b)** The voltage per turn of a single phase transformer is 1.1 V. When the primary winding is connected to a 220V, 50 Hz A.C. supply, the secondary voltage is found to be 550 V. Find: (i) Primary and secondary turns. (ii) Core area if the maximum flux density is 1.1 Tesla. (5)

- Q6 a)** An iron ring of mean circumference of 900mm and cross-sectional area of 250mm² has flux of 500μWb. Calculate the mmf acting on the ring. An air gap of 2mm is now cut in the ring. Find the flux in the ring if the mmf remains same. A relative permeability of 1200 may be assumed. (5)

- b)** Derive the current growth equation for a R-L series circuit containing a DC source. (5)

- Q7** Differentiate between loop and mesh in a network. Find the branch currents in the network using loop current method. (10)



- Q8** Write short answer on any TWO: (5 x 2)

- AD to DA conversion Circuit
- PMMC type instrument
- Torque-slip characteristic of three phase Induction Motor
- B-H curve of a magnetic material

Registration No :

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Total Number of Pages : 02

B.Tech
BE2102

1st Semester Back Examination 2017-18

BASIC ELECTRICAL ENGINEERING

BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH,
CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC,
FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH,
METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE

Time : 3 Hours

Max Marks : 70

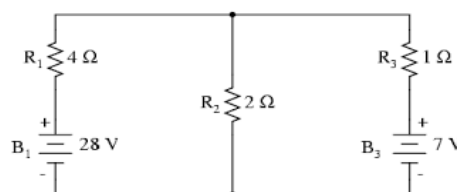
Q.CODE : HB975

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions : (2 x 10)

- Mention the mode of ammeter and voltmeter connection in a circuit?
- Distinguish between a Branch and a node of a circuit.
- Give the power equation for a star connected system?
- Which type of instrument is called as universal instrument?
- What is the use of commutator and brush in a d.c machine?
- Mention the two types of rotors of an induction motor?
- What is the purpose of laminating the core in a transformer?
- An alternating voltage is given by $V=230\sin 314t$. Calculate i) frequency, ii) maximum value, iii) average value, iv) RMS value.
- Mention the expression for reluctance of a magnetic circuit and what is its unit?
- How the direction of rotation of dc motor can be changed?

Q2 a) Using Thevenin's Theorem find the current flowing through 2 ohm resistance, as shown in the Fig below (5)

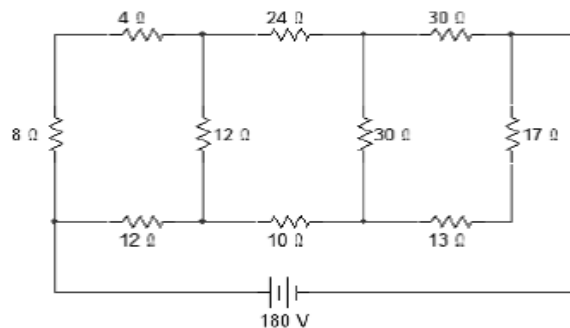


- b) An iron ring wound with 550 turn's solenoid produces a fluxdensity of 0.94 tesla in the ring carrying a current of 2.4 Amp. The mean length of iron path is 80 cm and that of air gap is 1 mm. Determine: (5)
- The relative permeability of iron
 - Self-inductance
 - Energy stored in the above arrangement, if the cross sectional area of ring is 25 cms².

Q3 a) Derive the expression for the energy stored in the magnetic field in terms of energy stored per unit volume (5)

b) What are the factors governing the Value of Resistance? Explain the term Resistivity. (5)

- Q4** a) Derive the expression for instantaneous voltage, charge and charging current for a R-C circuit. (5)
 b) State and explain Maximum Power Transfer theorem and give one example of application of the theorem. (5)
- Q5** a) Prove that rms value of the sinusoidal alternating current is 0.707 times its maximum value. (5)
 b) Compare merits and demerits of moving iron type instruments and dynamometer type instruments. Which one is superior why? (5)
- Q6** a) With a neat circuit diagram Explain the principle of operation of DC Motor. (5)
 b) Derive the EMF equation of a transformer. (5)
- Q7** Determine the current in 10Ω resistor in the net work shown, use star-delta conversion. (10)



- Q8** Write short answer on any TWO : (5 x 2)
 a) Residential wiring
 b) A/D conversion
 c) Grounding and safety
 d) PMMC instruments

Registration No :

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Total Number of Pages : 03

B.Tech
RBE1B001

1st Semester Regular/Back Examination 2019-20

BASIC ELECTRICAL ENGINEERING

BRANCH : AEIE, AERO, AG, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, CST, ECE, EEE, EIE, ELECTRICAL, ELECTRICAL & C.E, ELECTRONICS & AMP; C.E, ENV, ETC, FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, PT, TEXTILE

Max Marks : 100

Time : 3 Hours

Q.CODE : HRB712

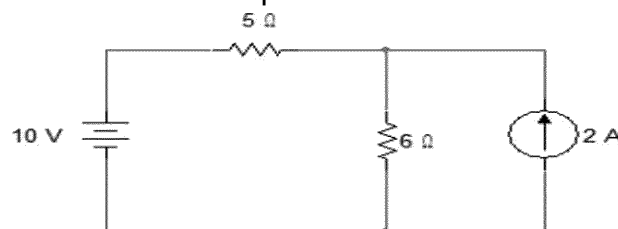
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

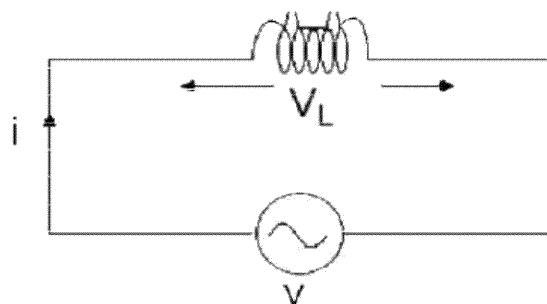
Part-I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- State Ohm's Law and mention the limitations of Ohm's Law.
- How transformers are classified according to their construction?
- Determine the number of branches and nodes in the circuit shown. Identify which elements are in series and which are in parallel.



- Represent the wave form with proper labels in a single plot.
 $Y_1 = 200\sin(\omega t)$, $Y_2 = 150\sin(\omega t + \phi)$.
- Explain the phasor relation of voltage and current with proper diagram for the circuit given below.

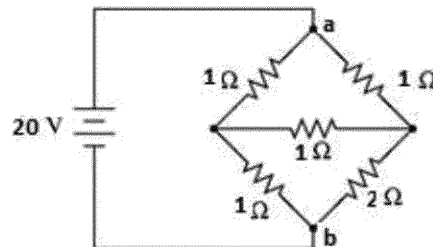


- f) Mention different types of 3 phase induction motors available and mention the criteria of classifications.
- g) Can we connect two battery sources of different voltage ratings in parallel? Justify your answer.
- h) Explain, what is magnetizing force. Give the relation between flux, mmf and reluctance.
- i) Write the relation between the line and phase value of voltage and current in a balanced starconnected load?
- j) Explain, what do you mean by hysteresis loss?

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) A series circuit has $R=10\Omega$, $L=50\text{mH}$, and $C=80\mu\text{F}$ and is supplied with $220\text{V}, 50\text{Hz}$. Find (i) impedance (ii) current (iii) power (iv) power factor (v) voltage drop across the each element.
- b) Three impedances $Z_1 = (5 + j5)\Omega$, $Z_2 = -j8\Omega$ and $Z_3 = 4\Omega$ are connected in series to an unknown voltage source V . Find I and V , if the voltage drop across Z_3 is $63.2 \angle 18.45^\circ \text{V}$.
- c) For the bridge network shown, determine the total resistance seen from the terminals AB using star-delta transformation.



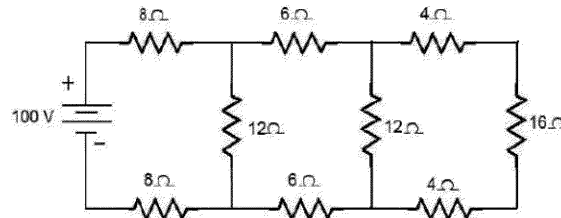
- d) Derive the EMF equation of a transformer and draw the no load phasor diagram for single phase transformer.
- e) An iron ring has cross sectional area $A=500 \text{ sqmm}$, and a mean length of $L=1000\text{mm}$. Find the ampere-turns required to produce a flux density $B=2\text{T}$, Given $H=1000\text{Am}^{-1}$.
- f) A star connected load consists of identical resistance of 30 ohms and inductance of 125mH. If the line current is 5A, calculate the line voltage.
- g) Define Average value, RMS value and Form Factor and Explain how to find the values for sinusoidal wave.
- h) A 230v, 50 Hz, is applied a series connected resistor 30 ohms and inductor 0.5mH, then find the impedance X_L , current through the circuit, voltage across each component, and also draw phasor diagram between current and voltage.
- i) With proper sketch, Explain the principle of operation of DC Motor.
- j) Define Thevenin's theorem and explain in steps with proper diagram.
- k) Explain in brief with neat circuit diagram for open circuit and short circuit test on single phase transformer.
- l) Two wattmeters are used to measure the power in a 3-phase balanced load. The wattmeter readings are 8.2kW and 7.5kW, Calculate the (i) Total power (ii) Power factor and (iii) Reactive power

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 A 4 pole, wave wound generator having 40 slots and 10 conductors placed per slot. The flux per pole is 0.03 wb. Calculate the generated emf when the generator is driven at 1500rpm. **(16)**

Q4 For the given circuit Calculate a) the equivalent resistances across the terminals of the supply, b) total current supplied by the source and c) power delivered to 16 ohm resistor. **(16)**



Q5 Deduce an expression for the frequency of the rotor current in induction motor. A 4-pole, 3 phase induction motor operates from supply of frequency 50Hz. Calculate the followings: **(16)**
(i) Synchronous speed (ii) The speed of the rotor, when the slip is 0.04 (iii) The frequency of the rotor current when slip is 0.03. (iv) the Frequency of rotor current at rotor standstill.

Q6 A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V. Find the number of turns in the low voltage winding. **(16)**

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Total Number of Pages : 03

B.Tech.
15BE2102

2nd Semester Back Examination 2017-18

BASIC ELECTRICAL ENGINEERING

BRANCH : AEIE, AERO, AUTO,

**BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC,
FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA,
METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE**

Time : 3 Hours

Max Marks : 100

Q.CODE : C921

Answer Part-A which is compulsory and any four from Part-B.

The figures in the right hand margin indicate marks.

Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)

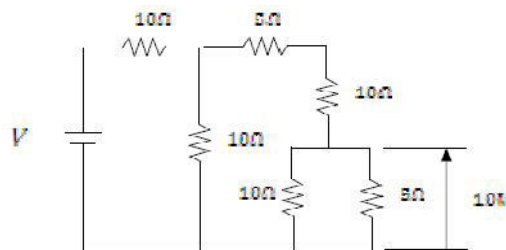
- a) What is the relation between time period T and frequency?
i) $T = 1 / \text{frequency}$. ii) $T = 0.5 / \text{frequency}$.
iii) $T = 0.85 / \text{frequency}$. iv) $T = \text{frequency}$.
- b) Resistivity of a conductor depends on _____ and _____.
- c) An electrolytic capacitor can be used for
i) DC only. ii) AC only.
iii) both A and B. iv) none Of the above.
- d) While comparing magnetic field and electric circuits, the point of dissimilarity exists while considering
i) mmf and emf. ii) reluctance and resistance.
iii) flux and current flow. iv) permeance and conductance.
- e) A motor having a power factor of 0.8 absorbs in active power of 1200 W the reactive power drawn from the supply is _____ VA.
i) 130 ii) 900
iii) 250 iv) 400
- f) If field current is decreased in shunt dc motor, the speed of the motor
i) remains same. ii) increases.
iii) decreases. iv) none of the above.
- g) In DC generators brushes are used for
i) collecting of current without any sparkings
ii) collecting of voltage
iii) reduce eddy current loss
iv) convert ac armature current in to dc
- h) Transformer core is made with laminated steel sheets in order to
i) Increase eddy current loss ii) decrease hysteresis loss
iii) Decrease eddy current loss iv) decrease copper loss.
- i) Series generators are used in which of the following applications?
i) air crafts
ii) arc welding
iii) used as boosters in dc distribution or transmission
iv) all of the above
- j) How many coulombs of charge flow through a circuit carrying a current of 10 A in 1 minute?
i) 10 ii) 60
iii) 600 iv) 1200

Q2 Answer the following questions: Short answer type: (2 x 10)

- What are the fundamental difference between e.m.f and potential difference?
- What will be the problem, if a capacitor directly connected to DC source?
- Why does the kinetic energy of a charged particle moving in a magnetic field remain constant?
- In a series RLC circuit, is it possible to achieve series resonance without changing the supply frequency. Justify your answer.
- What do you mean by phase sequence? How can the phase sequence be reversed?
- Why should an ammeter have low resistance?
- Which DC motor have more field resistance and why?
- What is the objective of Thevenin's theorem? How thevenin's voltage is calculated.
- Why iron core transformers are not used for high frequency applications?
- What do you mean by A/D and signal conditioning?

Part – B (Answer any four questions)

- Q3** a) A 20V battery with an internal resistance of 5Ω is connected to a resistor of x ohms. If an additional 6Ω resistor is connected across the battery, find the value of x so that the external power supplied by the battery remains the same. (10)
- b) Explain the principle of operation of dc motor. (5)
- Q4** a) A coil of resistance 10Ω and inductance 0.1 H is connected in series with a $150\ \mu\text{F}$ capacitor across a 200 V, 50 Hz supply. Calculate the voltage across the coil and the capacitor respectively. (10)
- b) State and explain Kirchoff's current law and Kirchoff's voltage law. (5)
- Q5** a) Three similar coils each having resistance of 10 Ohms and reactance of 8 Ohm are connected in star, across 400 V, 3 phase supply. Determine (i) line current, (ii) total power, (iii) reading of each of two wattmeter connected to measure power. (10)
- b) Explain the working principle of a 3 phase induction motor. (5)
- Q6** a) Calculate the supply voltage V in the circuit shown. (10)



- b) If a 6 pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor. (5)

- Q7** a) The maximum efficiency at full load and Upf of a single phase, 25 kV A, 500/1000 V, 50 Hz transformer is 98%. Determine the efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% load 0.6 pf **(10)**
- b) A coil consists of 600 turns and a current of 10 A in the coil gives rise to a magnetic flux of 1 mWb. Calculate: (i) self inductance, (ii) The emf induced, (iii) The energy stored when a current is reversed in 0.01 sec. **(5)**
- Q8** a) Two impedances $Z_1 = (10 + j15)\Omega$ and $Z_2 = (6 - j8)\Omega$ are connected in parallel. If the total current supplied is 15A, what is power taken by each branch? **(10)**
- b) Define slip. Derive an expression for frequency of rotor current. **(5)**
- Q9** a) An induction furnace load requires 400 KW and 800 KV AR at 11KV (single phase), 50 Hz, Find:
i) Power factor or pf angle ii) Current iii) Value of apparent power. **(6)**
- b) Explain pipe earthing with neat diagram. **(4)**
- c) Explain the physical phenomena of saturation in magnetic material. **(5)**

Registration No :

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Total Number of Pages : 02

B.Tech.
BE2102

2nd Semester Back Examination 2017-18

BASIC ELECTRICAL ENGINEERING

BRANCH : AEIE, AERO, AUTO, BIOMED,

BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FASHION, FAT,

IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL,

MINING, MME, PE, PLASTIC, TEXTILE

Time : 3 Hours

Max Marks : 70

Q.CODE : C1173

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Answer all parts of a question at a place.

Q1 Answer the following questions:

(2 x 10)

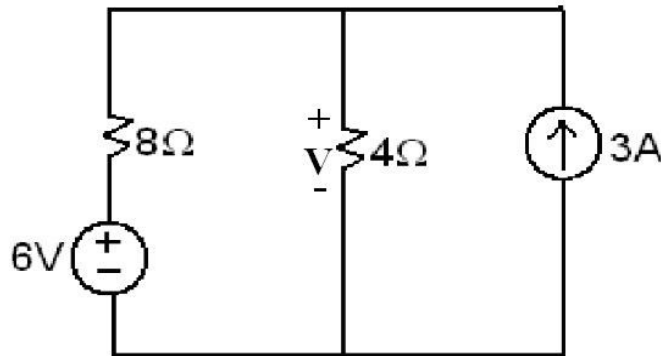
- a) A resistor of $5\ \Omega$ is connected across a potential difference of 50V. Calculate the power dissipated and energy transferred to heat in 2 minutes ?
- b) Explain the term 'Permeability' & 'coercivity' ?
- c) Define R.M.S value of an alternating quantity?
- d) Two impedances of $0.5\angle -90^\circ$ & $3+j4\ \Omega$ are connected in series .Find out the resultant impedances in polar form?
- e) What is back emf in a DC motor, explain?
- f) Find the frequency of the induced emf of an alternator having six pole rotating at 1500 rpm?
- g) Differentiate between active and reactive power ?
- h) What is the value of starting torque in case of a single phase induction motor?
- i) What is the relation between phase and line current in three phase star connected circuit ?
- j) Why the transformer core is laminated ?

Q2 a) A 50 Hz sinusoidal voltage; $V=141 \sin \omega t$ is supplied to a series R-L circuit comprising of $R=5\ \text{ohm}$, and $L=0.015\ \text{Henry}$. Calculate:

(5)

- i. The effective value of the steady state current as well as the relative phase angle?
- ii. The instantaneous current (time equation) ?

- b) Using Super position theorem Find V in the circuit shown in Fig (1)? (5)



- Q3 a) State & explain Thevenin's theorem by giving a suitable example? (5)
 b) The voltage applied to a circuit is $V = 230 \sin(\omega t + 30^\circ)$ and the current through the circuit is $i = 10 \sin(\omega t - 30^\circ)$. Determine the parameter of the circuit, power consumed in the circuit and also the power factor of the circuit? (5)

- Q4 a) Draw the analogy between electric circuits & magnetic circuits? (5)
 b) An iron ring has a mean diameter of 25cm and a cross sectional area of 4cm^2 . It is wound with a coil of 1200 turns. An air gap 1.5 mm width is cut in the ring. Determine the current required in the coil to produce a flux of 0.48 m Wb in the air gap. If the relative permeability of iron is 800? (neglect magnetic leakage and fringing) (5)

Given $\mu_0 = 4\pi \times 10^{-7} \text{ H/m}$

- Q5 a) An inductance of 0.5 H in series with a capacitance of $100\mu\text{F}$. Find the impedance of the circuit for the condition given below : (5)
 i. At a frequency 60Hz
 ii. At a frequency 1kHz
 b) A balanced star connected load has resistance of 10Ω & inductance of 50mH per phase is connected to a three phase supply of 440V & 50Hz. Find the (5)
 i. Line Current.
 ii. Phase current
 iii. Power Factor.

- Q6 a) Explain in brief various losses occurred in a DC machine? (5)
 b) A 220/20V transformer has 50 turns on its low voltage side. Calculate (5)
 i. The number of turns on the high voltage side?
 ii. The turn ratio when it is used as step down transformer?
 iii. The turn ratio when it is used as step up transformer?

- Q7 a) Name the series and shunt methods of excitation provided in DC machines? (5)
 b) Describe the Principle of alternator? Also write names of various parts Of a rotating electrical machine ? (5)

- Q8 **ANSWER ANY TWO :** (5 x 2)
 a) Voltage sources & Current Sources
 b) Laws of magnetic circuits.
 c) AC power distribution.
 d) Measurement Systems

Registration No :

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Total Number of Pages : 02

B.Tech
BE2102

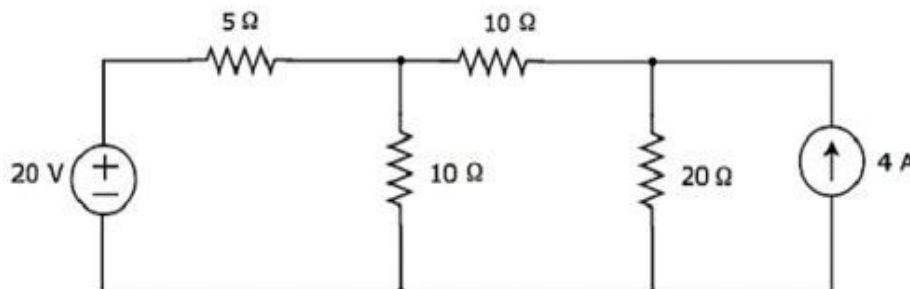
2nd Semester Back Examination 2018-19
BASIC ELECTRICAL ENGINEERING
BRANCH : CHEM, CIVIL, CSE, ECE, EEE,
ELECTRICAL, IT, MECH, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : F115

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions : (2 x 10)

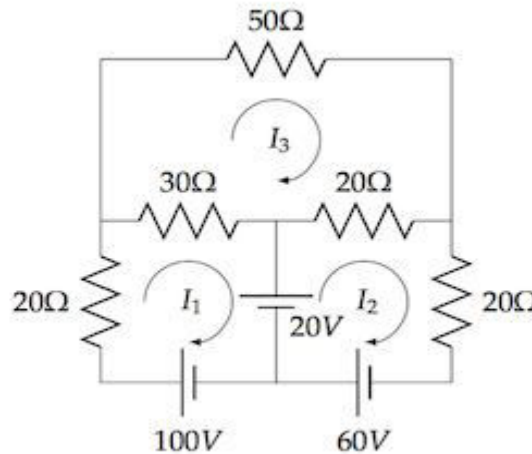
- If a conductor of resistance R connected to a voltage source will compress to half of its length what will be the variation of current flowing through the conductor?
- Specify different active and passive elements with symbolic representation.
- State KCL and KVL.
- What is permeability?
- Define RMS value. How it is related to Peak factor?
- Which instruments are used for measurement of Power and Energy?
- Write the advantage of dynamometer type instruments over MI instruments.
- Why the efficiency of transformer is high among all electrical Machine and device.
- Convert $\frac{5+j20}{3-j15}$ to polar form.
- What are the different non-conventional sources of energy?

- Q2** a) State and explain superposition theorem? (5)
b) Find the current flowing through 20 Ω resistor of the following circuit using superposition theorem. (5)

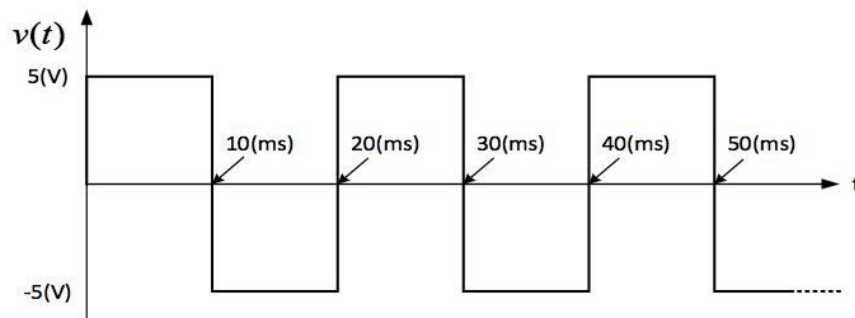


- Q3** a) Explain the conversion process of star network to a delta network. (5)
b) A magnetic material produces a flux density of $10\text{wb}/\text{m}^2$ due to certain mmf. For the same mmf value, another magnetic material produces a flux density of $12\text{wb}/\text{m}^2$. What is the ratio of their relative permeability? (5)

- Q4** a) Derive the expression for EMF equation of transformer. (5)
 b) Find the value of I_1 , I_2 and I_3 by using mesh analysis. (5)



- Q5** a) Find the RMS value of the voltage wave form. (5)



- b) Compare between three phase and single phase AC system. (5)
- Q6** Contrast brief idea about various generating plants. (10)
- Q7** Describe B-H curve for magnetic materials and discuss the various losses occur in the core of electrical equipment due to periodic reversal of magnetization. (10)
- Q8** Write short answer on any TWO : (5 x 2)
 a) Induction Motor
 b) Principle of operation of D.C Generator
 c) Transients in R-L and R-C circuit

Registration No :

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Total Number of Pages : 02

B.Tech
RBE2B001

2nd Semester Regular Examination 2018-19
BASIC ELECTRICAL ENGINEERING
BRANCH : AEIE, AG, AUTO, BIOMED,
BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL,
ETC, IT, MECH, METTA, MINING, MME, PE, PT

Max Marks : 100

Time : 3 Hours

Q.CODE : F357

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

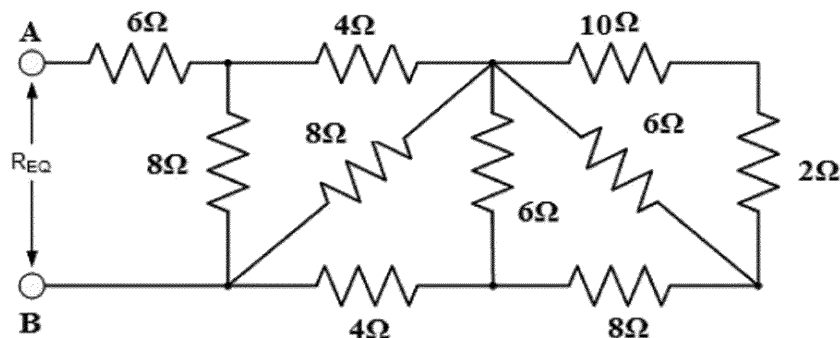
Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- What is the approximate resistance of a rheostat if the voltage source is 12 V and the current is 220 mA?
- A certain circuit is composed of two parallel resistors. The total resistance is $1,403\Omega$. One of the resistor is $2\text{ k}\Omega$. The other resistor value is?
- State the venin's theorem.
- Define RMS voltage.
- Represent the vector $5+j10$
- State Biotsavart slaw.
- If the cross-sectional area of a magnetic field increases, but the flux remains the same, the flux density _____.
- The voltage across a coil when $di/dt = 20\text{ mA}/\mu\text{ s}$ and $L = 8\text{ }\mu\text{ H}$ is _____.
- Why the efficiency of the transformer is maximum among all electrical machines/Devices.
- Write the EMF equation of D.C generator.

Part- II

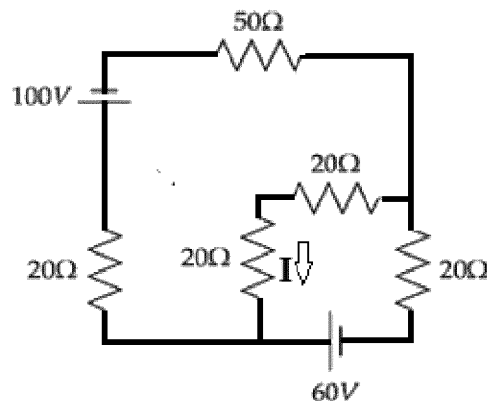
Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) Find the R_{AB} in the circuit.

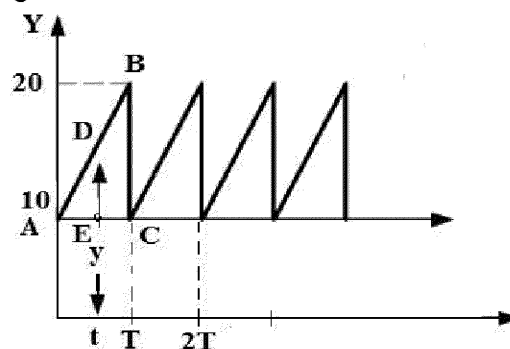


- b) Explain B-H curve for magnetic and formulate hysteresis.

- c) Find the value of I using superposition theorem.



- d) Determine R.M.S and average value of the wave form shown?



- e) A square wave has frequency of 50Hz and peak value of 12 Amp. Calculate the Average value, Peak factor and form factor.
- f) State and explain Norton's theorem with suitable example.
- g) An iron ring wound with 550 turn's solenoid produces a flux density of 0.94 tesla in the ring carrying a current of 2.4 Amp. The mean length of iron path is 80 cm and that of air gap is 1 mm. Determine the relative permeability of iron and self-inductance.
- h) An alternating current is given by $i = 14.14 \sin 377 t$. Find R.M.S Value, frequency and sketch the waveform.
- i) Write the principle of DC Generator and derive the EMF equation.
- j) Give the comparison between Electric and magnetic Circuit.
- k) Explain the construction and principle of three phase induction motor.
- l) The armature of a 6-pole, 600 RPM lap-wound generator has 90 slots. If each coil has 4 turns, calculate the flux per pole required to generate an EMF of 288 Volts.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Explain the conversion process of star network to a delta network and vice versa and write the voltage and current relations in star and delta network. (16)
- Q4** Discuss the principle of operation and testing of single phase transformer. Draw the Phasor diagram. (16)
- Q5** With a neat circuit and Phasor diagram explain the three phase power measurement by two wattmeter method and also derive the expression for Power Factor. (16)
- Q6** A series RLC circuit has $R=20 \text{ ohm}$, $L=0.005\text{H}$ and $C = 0.2 \times 10^{-6}\text{F}$. It is fed from a 100V variable frequency source. Find (16)
- frequency at which current is maximum
 - Impedance at this frequency and
 - Voltage across inductance at this frequency.

Registration No :

2	2	0	1	2	1	4	0	6	5
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Total Number of Pages : 03

Integrated Dual Degree (B.Tech. and M.Tech)
RBE1B001

1st Semester Regular/Back Examination: 2022-23

Basic Electrical Engineering

AEIE, AUTO, BIOMED, CHEM, CIVIL, CSE, CSEAI, CSEAIM, CSEDS, CST, ECE, EEE, ELECTRICAL, ELECTRICAL & C.E, ETC, IT, MECH, METTA, MINING, MME, PT/CE, CSE, EE

Time : 3 Hour

Max Marks : 100

Q.Code : L604

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

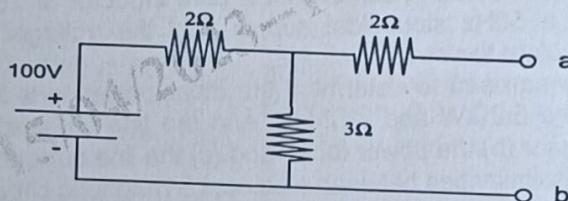
Q1

Answer the following questions :

Part-I

(2 x 10)

- a) Two impedances of $(3+j4) \Omega$ and $(2-j3) \Omega$ are connected in parallel, what is the equivalent impedance?
- b) Determine the open circuit voltage across the terminals 'a' and 'b' as shown in the Fig. below.



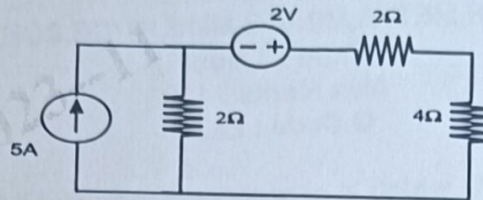
- c) What is the difference between mesh and loop in circuit analysis?
- d) Three resistances of 6Ω each are connected in delta. The value of the resistances in equivalent star is _____.
- e) In an ac circuit, if supply voltage is $V = 20 \angle -30^\circ$ and circuit current is $I = 10 \angle 30^\circ$, Calculate the real power.
- f) Write the relation between phase and line voltages, and phase and line currents for a balanced three-phase delta connected load.
- g) What do you mean by magnetic hysteresis? Write down the expression of hysteresis loss.
- h) In a 110/220 V, 1 kVA, single -phase transformer if supply frequency to HV side is 50 Hz, what is the frequency of emf induced in LV side?
- i) A 3 phase, 50Hz, 4 pole induction motor is running on full load & runs at 1460 rpm. Find the slip.
- j) What is emf generated in a 4 pole, wave wound dc shunt generator having 294

conductors rotating at 1500 rpm & flux per pole is 0.0156 wb?

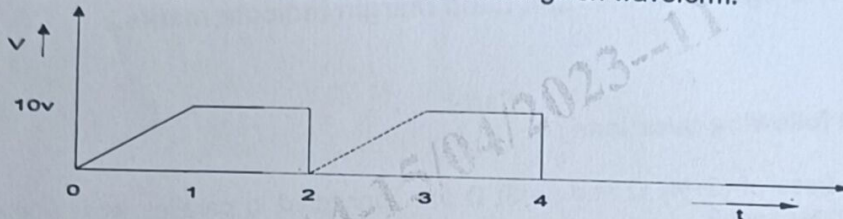
Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 × 8)

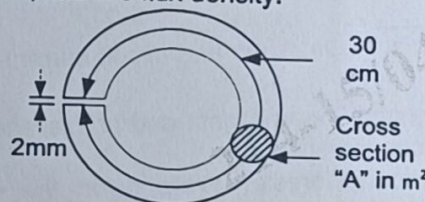
- Distinguish between independent and dependent energy sources. Enumerate the various types of dependent sources.
- Determine the current in the 4Ω resistor of the circuit shown in fig. below using Thevenin's theorem.



- Determine the average and rms value of the below given waveform.



- A circuit consists of a resistance R in series with a capacitive reactance of 60Ω . Determine the value of R for which the power factor of the circuit is 0.8.
- A resistance of 50Ω is connected in series with a pure inductor of 250 mH . The circuit is connected to a 50 Hz sinusoidal supply and the voltage across the resistance is 150 V . Calculate the supply voltage.
- Two-wattmeter method was used to determine the input power to a three-phase motor. The readings were 5.2 kW and -1.7 kW , and the line voltage was 415 V . Calculate (a) the total power (b) the power factor and (c) the line current.
- Write the similarities & dissimilarities between electrical & magnetic circuit.
- An iron ring (as shown below) of mean length 30 cm has an air gap of 2 mm and a winding of 200 turns. If the permeability of the iron core is 300 when a current of 1 A flows through the coil, find the flux density.



- A $6600/440\text{ V}$, 50 Hz single phase transformer is built on a core having an effective cross sectional area of 150 cm^2 & has 80 turns in the low voltage winding. Calculate (i) The value of the maximum flux density in the core, (ii) The no. of turns in the high voltage winding.
- A 3-phase, 4 pole induction motor is supplied from 3-phase, 50 Hz AC supply.

Calculate (i) synchronous speed (ii) rotor speed when slip is 4% and (iii) rotor frequency when rotor runs at 600 rpm.

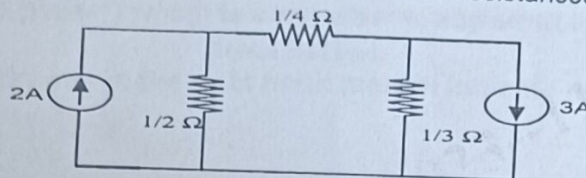
- k) What are the different types of DC generators according to the ways in which fields are excited? Show the connection diagram of each type.
- l) A 6-pole, dc motor takes an armature current of 110 A at 480 V. The resistance of the armature circuit is 0.2Ω , and flux per pole is 50 mWb. The armature has 864 lap-connected conductors. Calculate (a) the speed, and (b) the gross torque developed by the armature.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3

Using the node voltage analysis for the circuit shown in Fig. below, find all the node voltages and currents in $1/2 \Omega$, $1/4 \Omega$ and $1/3 \Omega$ resistances. (16)



Q4

A balanced star connected load of $(6 + j8) \Omega$ per phase is connected to a 3-phase, 50Hz, 415 V supply system. Calculate (i) Line current (ii) Power factor (iii) Real power (iv) Apparent power. (16)

Q5

State the working principle of a transformer. Draw the phasor diagram of an ideal transformer under no load condition. (16)

Q6

An 8-pole, dc shunt generator has 778 wave-connected conductors on its armature. While running at 500 rpm, it supplies power to a load of 12.5Ω at 250 V. The armature and the shunt -field resistances are 0.24Ω and 250Ω , respectively. Determine the armature current, the emf induced, and the flux per pole. (16)