3E1642

Roll No. _____ [Total No. of Pages : 3

3E1642

B.Tech. III Sem.(Main/Back) Examination, Dec. - 2016
Electrical Engineering
3EE2A Circuit Analysis - I

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

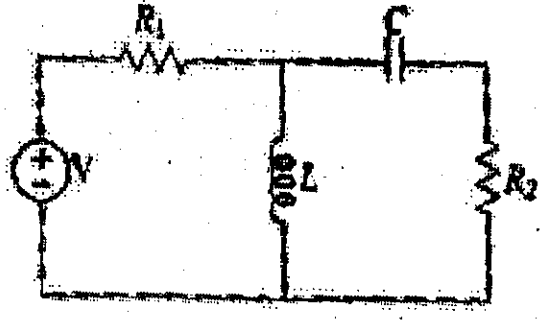
Instructions to Candidates:

*Attempt any **five questions,** selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

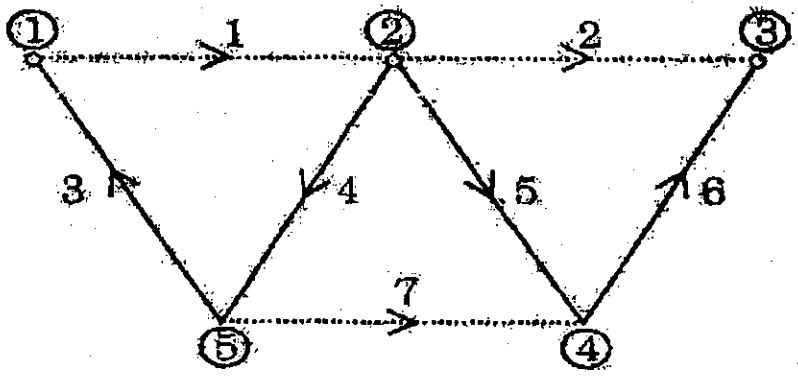
1. a) Define Q factor in an AC circuit. Deduce the relation between band width, resonant frequency and Q factor. **(8)**

   b) Draw the dual of the network shown in figure. **(8)**



OR

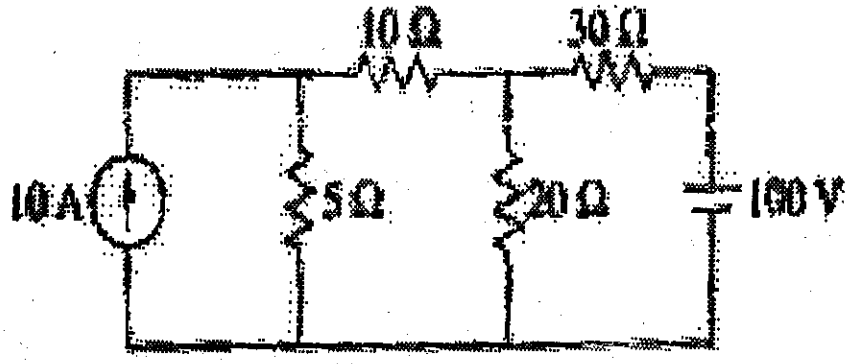
1. a) A graph is shown in figure below. Find the tie - set and cut set matrices and obtain the KCL and KVL equations. **(8)**



b) A 240-V, 100-Hz ac source is connected to a series RLC circuit consisting of a coil and variable capacitor. The coil has a resistance of $55m\Omega$ and an inductance of 7mH. The capacitor is varied so as to achieve resonance. Determine (i) the value of the capacitance, (ii) the circuit quality factor, and (iii) the half - power frequencies. **(8)**

Unit - II

2. a) Using Thevenin Theorem, find the current through the $10-\Omega$ resistor. **(8)**



b) State and explain for Tellegen's theorem that the sum of power delivered to a closed network is zero. **(8)**

OR

2. a) State and explain for maximum power transfer theorem that power transfer from a d.c. source network to a resistive network is maximum when the internal resistance of the d.c. source network is equal to the load resistance. **(8)**

b) Explain the compensation theorem with its limitations. **(8)**

Unit - III

3. a) A balanced, three - phase load connected in delta draws a power of 10.4 kW at 200 V at a power factor of 0.5 lead. Find the values of the circuit elements and the reactive voltamperes drawn. **(8)**

b) What do you mean by power triangle? Explain active, reactive and apparent power with example. **(8)**

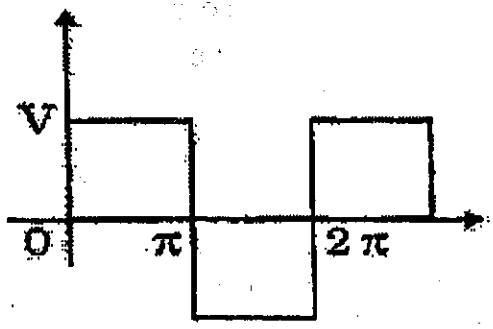
OR

3. a) Explain the neat circuit and phasor diagram, how the power and power factor of $3-\phi$ system can be measured by means of two wattmeter method. **(8)**

b) Write down the relationship between line voltage and line current with phase voltage and phase current in star connected and delta connected circuits. **(8)**

Unit - IV

4. a) A square waveform is shown below. Obtain the Fourier series. **(8)**



b) Derive the expression of power with Non - sinusoidal voltage and current. **(8)**

OR

4. a) Find the first few terms of Fourier series of the function given by

$f(a) = 1 \; for \; 0 < \alpha < \pi$
$f(a) = -1 \; for \; \pi < \alpha < 2\pi$ **(8)**

b) Explain the different kinds of symmetry in non - sinusoidal waves. **(8)**

Unit - V

5. a) A 50 Hz, 400 V (peak value) sinusoidal voltage is applied at t = 0 to a series R-L circuit having resistance 5Ω and inductance 0.2 H. Obtain an expression of current at any instant t. Calculate the value of the transient current 0.1 sec. after switching on. **(8)**

b) State and deduce initial - value and final value theorems. **(8)**

OR

5. a) Explain the impulse response of series RC network. **(8)**

b) An impulse function is given by $s(t-t_1)$. Obtain its Laplace transform. **(8)**

3E1645

Roll No. _____ [Total No. of Pages : 2

3E1645

B.Tech. III Sem.(Main/Back) Examination, Dec. - 2016
Electrical Engg.
3EE5A Electrical Machines - I
EE,EX

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. Explain following in reference to magnetic circuits in detail.
   a. Magneto motive force
   b. Magnetic field strength
   c. Permeability
   d. Reluctance (4×4)

OR

1. a) Give basic principle of electromechanical energy conversions. (8)
   b) Explain the concept of energy balance and energy stored in magnetic field. (8)

Unit - II

2. a) Explain Demagnetizing and cross magnetizing ampere turns in detail. (12)
   b) Give various characteristics of shunt generators. (4)

OR

2. a) Explain Communication and armature reaction in DC generators. (12)
   b) Give various characteristics of series generators. (4)

Unit - III

3. Give principals of D.C. motors also explain the concept of back emf end torque of motor in detail. (16)

OR

3. Give various methods for speed control in D.C. motors in detail. **(16)**

Unit - IV

4. a) Explain the concept of no load and short circuit test in transformer in detail.**(8)**

   b) Explain the process of finding efficiency of transformer by Semphis test.**(8)**

OR

4. Explain following in relevant to transformer

   a. Efficiency

   b. Condition for maximum efficiency

   c. All day efficiency

   d. Welding transformer **(4×4)**

Unit - V

5. a) Explain in detail the double star connection for obtaining 6 - phas supply from 3 - phase supply. **(10)**

   b) Explain open delta connections for polyphase transformer. **(6)**

OR

5. Write short notes on :

   a. Three winding transformers **(8)**

   b. Switching currents in transformers **(8)**

3E1646

Roll No. _____ [Total No. of Pages : 3

3E1646

B.Tech. III Sem.(Main/Back) Examination, Dec. - 2016
Electrical & Electronics Engg.
3EX6A Advanced Engg. Mathematics - I
EE,EX

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Show that the function $2te^{t^2}\cos(e^{t^2})$ is not of exponential order. however its Laplace transform exists. **(6)**

   b) Find the Laplace transform of $\sin\left(\sqrt{t}\right)$. **(4)**

   c) The integro - differential equation governing the flow current i(t) in an RC - circuit is given by $Ri(t)\frac{1}{C}\int_0^t i(u)du = E(t)$.

   If initially at t = 0 there is no current and $E(t) = \upsilon[u_1(t) - u_2(t)]$. υ constant, find the current i(t), using Laplace transform. **(6)**

OR

1. a) Using convolution theorem evaluate if $f(t) = e^{-t} - \int_0^t \cos(t-\tau) f(\tau)\, d\tau$. **(8)**

   b) Using Laplace transform, find the solution of the initial value problem. **(8)**

$$x\frac{\partial u}{\partial x} + \frac{\partial u}{\partial x} = xt.u(x,0) = 0, u(0,t) = 1$$

Unit - II

2. a) Find the Fourier series of $f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x^2, & 0 \le x < \pi \end{cases}$ Hence show that

$$\frac{\pi^2}{6} = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \ldots\ldots\ldots$$ **(8)**

b) Obtain the expansion for y from the following table upto the first harmonic :

x :	0	1	2	3	4	5
y :	9	18	24	28	26	20

(8)

OR

2. a) If $Z(u_n)=\frac{2z^2+3z+4}{(z-3)^3}$, $|z|>3$, show that $u_1=2, u_2=21, u_3=139$ **(6)**

b) Solve the difference equation using Z-transform. **(6)**

$y_{n+2}+5y_{n+1}+4y_n=2^n$. given that $y_0 = 1$, $y_1 = -4$.

c) Find $Z^{-1}\{(z-5)^{-3}\}$. Determine the region of convergence. **(4)**

Unit - III

3. a) Find the Fourier transform of $f(x)=e^{-ax^2}, a>0$ **(4)**

b) Find inverse Fourier cosine transform of $F_c(\omega)=\begin{cases}1-\omega, & \omega\le 1\\ 0, & \omega>1\end{cases}$ **(4)**

c) Solve the heat equation : $k\frac{\partial^2 u}{\partial x^2}=\frac{\partial u}{\partial t}, -\infty<x<\infty, t>0$ when

$u(x,t)=0$ at $x=\pm\infty; \frac{\partial u}{\partial x}=0$ at $x=\pm\infty$ and $u(x,0)=1, -\infty<x<\infty$ **(8)**

OR

3. a) Find inverse Fourier sine transform of $F_s(\omega)=\frac{1}{\sqrt{\omega}}, \omega>0$ **(4)**

b) Find the Fourier transform of the function

$$f(t)=\begin{cases}-(1+t), & -1\le t<0,\\ t-1, & 0<t\le 1,\\ 0, & |t|>1,\end{cases}$$ **(4)**

c) Use Fourier transform to solve : $\frac{\partial^2 u}{\partial x^2}=2\frac{\partial u}{\partial t}, x>0, i>0$. subject to $u_x(0,t)=0$, $u(x,0)=e^{-x}$ and u(x,t) is bounded. **(8)**

Unit - IV

4. a) If $f(z)=u+iv$ is analytic and $u-v=e^x(\cos y-\sin y)$, find the function f(z) in terms of z. **(6)**

b) Find the bilinear transformation which maps the points $z=1,i,-1$ into the points $w=i,0,-i$. **(6)**

c) If C is the curve given by $y=x^3-3x^2+4x-1$ joining the points (1,1) and (2,3), evaluate $\int_C (12z^2-4iz)dz$ **(4)**

OR

4. a) Find an analytic function f(z) such that $\mathrm{Re}[f'(z)]=3x^2-4y-3y^2$ *and* $f(1+i)=0$ **(6)**

b) Find the values of the constants a,b,c,d such that the function $f(z)=x^2+axy+by^2+i(cx^2+dxy+y^2)$ **(6)**

c) Let C be the rectangle with vertices at the points z = 0, z = 3, z = 3+2i and z = 2i with positive orientation. Evaluate the integral $\int_C \frac{dz}{(z-2-i)^n}$ for integer values of n. **(4)**

Unit - V

5. a) Find the residues of the following function at their poles :

$$\frac{z^2+4}{(z^3+2z^2+2z)}$$ **(6)**

b) Expand $f(z)=\frac{1}{z^2-3z+2}$ in at Laurent series for $1<|z|<2$. **(5)**

c) Show that $\int_0^\infty \frac{1}{x^4+1}dx$. **(5)**

OR

5. a) Evaluate $\oint_C z^3 e^{\frac{1}{z}}dz$ taken counter - clockwise around the circle C : $|z-1|=4$. **(5)**

b) Find the value of $\int_0^x \sin^4\theta d\theta$ **(6)**

c) Expand $f(z)=\frac{1}{(z+1)(z+3)}$ in a Laurent series for $1<|z|<3$. **(5)**

55

3E1471

Roll No. _____ [Total No. of Pages : 2

3E1471

B.Tech. III Sem.(Back) Examination,Dec. - 2016

Electronic Ins. & Control Engineering

3EI4(O) Electrical Measurements

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain in detail about single phase induction type energymeters. **(8)**

   b) Explain principal of operation electrostatic instruments for the measurement of voltage and current. **(8)**

OR

1. a) Explain different errors in wattmeters and their compensation. **(8)**

   b) Compare errors in moving coil and moving iron type instruments. **(4)**

   c) Compare electrodynamic and induction instruments. **(4)**

Unit - II

2. a) Draw the block diagram of a storage oscillocopes and explain different parts. **(10)**

   b) Explain the measurement of phase Angle and time delay. **(6)**

OR

2. a) Explain the use of CRO and Basic CRO circuit. **(8)**

   b) Explain use of CRO probes. Explain different type of CRO probes. **(8)**

Unit - III

3. a) Explain Ammeter - voltmeter method for measurement of low resistance. (8)

   b) Explain ohmmeter method for measurement of medium resistance. (8)

OR

3. a) Explain loss of charge method for measurement of High resistance. (8)

   b) Explain the different method for measurement of Soil resistivity. (8)

Unit - IV

4. Explain the working principal of following bridge

   a. Schering bridge (8)

   b. Heaviside bridge (8)

OR

4. a) Explain the measurement of frequency using wein's bridge (8)

   b) Explain the measurement of mutual inductance using carey foster bridge (8)

Unit - V

5. a) Explain standardization and applications of DC potentiometers (8)

   b) Explain construction and working principal of DC potentiometer. (8)

OR

5. Explain the following :

   a. Polar type A.C. potentiometer

   b. Coordinate type potentiometer. (8+8)

3E1472

Roll No. _____ [Total No. of Pages : 2

3E1472

B.Tech. III Sem.(Back) Examination,Dec. - 2016

Electronic Ins. & Control Engg.

3E15(O) Electrical Technology

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from ***each unit****. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain a DC machines? also explain simillarities and difference between DC generators & motors? **(8)**

   b) Explain the phenomena of production of torque & back emf in DC motor? **(8)**

OR

1. a) In an DC Generator explain the concept of Generated voltage & its parallel operation? **(8)**

   b) Explain starting & speed control of DC motor also explain its lones? **(8)**

Unit - II

2. a) Explain starting methodology of single phase induction motor? **(8)**

   b) The frequency and induced voltage in the rotor of a certain sixpole wound rotor induction motor, whose shaft is blocked are 60 Hz & 100 Hz, respl. Det the corresponding values when the rotor is running at 1100 rev/min. **(8)**

OR

2. a) Explain Basic principles & torque slip curve of an Induction motor? **(8)**

   b) Explain the concept of speed control & breaking of induction motor? **(8)**

Unit - III

3. a) Describe briefly the phenomine of single phase synchronous motor? **(8)**

   b) Explain the zero power factor characteristics of synchronous motor? **(8)**

OR

3. a) Explain OC & SC test in synchronous machine? **(8)**

   b) Explain Basic principles of starting of synchronous motor? **(8)**

Unit - IV

4. a) Give a general Idea of transmission & distribution system of electrical power? **(8)**

   b. Explain conductors & Insulators for Transmission lines? **(8)**

OR

4. a) Explain electrical equipment of a sub station? **(8)**

   b) Describe in detail the phenomena of interface of power lines with telecomm. circuits. **(8)**

Unit - V

5. a) Explain a static relay? also explain its advantage & limits? **(8)**

   b) Explain over current relay & its uses in power system? **(8)**

OR

5. a) Describe basic types of fault & its causes in an electrical power system? **(8)**

   b) Explain protection system in electrical power system and also explain consequences of fault in this system. **(8)**

59

3E1485

Roll No. _____ [Total No. of Pages : 2

3E1485

B.Tech. III Semester (Back) Examination Dec. - 2016

Electrical Engg.

3EE5(O) Electrical Measurements

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the construction and working principle of moving iron instruments in detail. **(8)**

   b) Explain the working principle of $1-\phi$ energy meter. **(8)**

OR

1. a) Explain the construction and working principle of moving coll instruments. **(8)**

   b) Explain errors in wattmeter and energy meter and how they are corrected? **(8)**

Unit - II

2. a) State and derive the Blondel's Theorem. **(8)**

   b) Draw the equivalent circuit and phasor diagram of a potential transformer. Derive the expressions for its ratio and phase angle errors. **(8)**

OR

2. a) Describe the two wattmeter method of measurement of power in 3-phase circuit. **(8)**

   b) Explain with neat diagram, how PT and CT are useful for measurement of power. **(8)**

Unit - III

3. a) What is volt - ratio box? Explain how volt ratio box works? **(8)**

   b) What is calibrated using a D.C. potentiometer? Explain with suitable circuit diagram. **(8)**

OR

3. a) Explain in detail the construction and working principle of A.C. potentiometer. **(8)**

   b) Explain crompton potentiometer in detail. **(8)**

Unit - IV

4. a) Explain the principle of working of a kelvin's double bridge for low resistance measurement. **(8)**

   b) Explain Price's Guard - wire method for measurement at high resistance. **(8)**

OR

4. Describe the following methods for measurement of medium resistance :

   i. Ammeter and voltmeter method.

   ii. Wheatstone bridge method. **(8+8=16)**

Unit - V

5. a) Explain with the connection and phasor diagram of Hay's bridge for measurement of inductance. **(8)**

   b) Draw Wien's bridge and its phasor diagram for measurement of capacitance and frequency. Also obtain expression for frequency in terms of bridge parameters. **(8)**

OR

5. a) Discuss with phasor diagram the Heaviside's bridge for measurement of mutual inductance. **(8)**

   b) What are the sources of errors in bridge circuits? What are the precautions and methods used to minimize the errors? **(8)**
