BTS.III.11.14. 0953 Reg. No. [ ][ ][ ][ ][ ][ ][ ][ ]

B

B.Tech. Degree III Semester Examination November 2014

EE 1302 MATERIAL SCIENCE

(2012 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer *ALL* questions)

$(8 \times 5 = 40)$

I. (a) Explain how conductivity of conducting materials vary with temperature and composition.

(b) Write note on magnetostriction.

(c) Explain dipolar relaxation.

(d) List any five characteristics of SF_6.

(e) What are the materials used for solar cells? Discuss.

(f) List out some alloys for switch contacts.

(g) What is photoelectron spectroscopy? Explain

(h) Explain briefly ferromagnetic resource.

PART B

$(4 \times 15 = 60)$

II. (a) Explain Fermi-dirac distribution. (8)

(b) Explain the zone-refining technique for the preparation of semiconductor materials. (7)

OR

III. (a) Write notes on (i) soft magnetic materials (ii) hard magnetic materials. (8)

(b) With neat diagram, discuss about hysterics loop (7)

IV. Explain electronic, ionic and dipolar polarization. How do they depend on frequency? (15)

OR

V. Explain the breakdown in gases, liquids and solids. (15)

VI. Define: (15)

(i) cold mirror coating

(ii) heat mirror coating

(iii) anti-reflection coating.

OR

VII. What are the different types of solar selective coatings? Explain in detail. (15)

VIII. With neat sketch explain the operation of optical microscope. (15)

OR

IX. Write notes on (15)

(i) nuclear magnetic resonance

(ii) electron spin resonance

***

BTS – III – 11.14 – 0964 Reg. No. | | | | | | | | |

D

B.Tech. Degree III Semester Examination November 2014

EE 1303 FLUID MECHANICS AND HEAT ENGINES

(2012 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

$(8 \times 5 = 40)$

I. (a) Explain Newton's law of viscosity.

(b) Distinguish between
  (i) uniform and non-uniform flow
  (ii) laminar and turbulent flow. Give one practical example for each.

(c) What are the minor losses occurring in pipes? Discuss how they are determined.

(d) Define
  (i) Reynolds number
  (ii) Froude's number. What are their significances for fluid flow problem?

(e) What is a draft tube? Why is it used in a reaction turbine? State its uses.

(f) What is cavitation? How can it be avoided in reaction turbine?

(g) What is meant by priming in centrifugal pumps? Explain its significance.

(h) Differentiate between reciprocating pumps and centrifugal pumps.

PART B

$(4 \times 15 = 60)$

II. (a) With the help of a diagram explain a U-tube differential manometer. (5)

(b) An inverted differential manometer containing an oil of specific gravity 0.9 is connected to two pipes. Find the difference of pressures at two points of a pipe containing water. If the manometer reading is 40cm. Find the difference of pressures. (10)

OR

III. (a) Explain Bernoulli's equation and its assumptions. (10)

(b) A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to inlet and throat is 10cm of mercury. Determine the rate of flow. Take $Cd = 0.98$. (5)

IV. (a) Derive the Hagen-Poiseuille equation. (10)

(b) Find the head loss due to friction in a pipe of diameter 250mm and length 60m through which water is flowing at a velocity of 3m/s using (5)
  (i) Darcy formula
  (ii) Ehezys" formula for which C = 55. Take ϑ for water = 0.1 stoke

OR

V. Using Buckingham's π-theorem show that the velocity through a circular orifice is given by $V = \sqrt{2gH}\ \phi\left[\frac{D}{H}\frac{\mu}{\rho VH}\right]$ where H is the head causing flow, D is the diameter of the orifice, μ is co-efficient of viscosity, ρ is the mass density and g is the acceleration due to gravity. (15)

(P.T.O)

VI. A pelton wheel is working under a gross head of 400m. The water is supplied through penstock of diameter 1m and length 4km from reservoir to the pelton wheel. The coefficient of friction for the penstock is given as .008. The jet of water of diameter 150mm strikes the buckets of the wheel and gets deflected through an angle of 165°. The relative velocity of water at outlet is reduced by 15% due to friction between inside surface of the bucket and water. If the velocity of the buckets is 0.45 times the jet velocity at inlet and mechanical efficiency as 85% determine: (15)

(i) power given to the runner
(ii) shaft power
(iii) hydraulic efficiency and overall efficiency

OR

VII. Draw neat sketches of Kaplan turbine. Explain its working. (15)

VIII. (a) Explain with neat sketches the working of a single stage centrifugal pump. (8)

(b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 300mm and 600mm respectively. The velocity of flow at outlet is 2.5m/s and vanes are set back at an angle of 45°at outlet. Determine the minimum starting speed of the pump if the manometric efficiency is 75%. (7)

OR

IX. With neat sketch explain the principle and working of a reciprocating pump. What is the function of the air vessel for reciprocating pumps? (15)

***

BTS.III. 11.14. 0985 Reg. No. [ ]

D

B.Tech. Degree III Semester Examination November 2014

EE 1304 CIRCUITS, SIGNALS AND SYSTEMS I

(2012 Scheme)

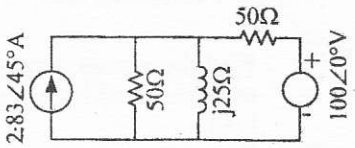
Time : 3 Hours Maximum Marks : 100

PART A

(Answer *ALL* questions)

$(8 \times 5 = 40)$

I. (a) For the circuit shown below, calculate the current supplied by the voltage source and voltage across the current source.



(b) Derive the condition for maximum power transfer from a source to a load in an a.c. circuit.

(c) Define tree and list properties of a tree in a graph.

(d) Find the expression for the mutual inductance in the series connection of two coupled coils, when the flux of the two coils assists each other, the net equivalent inductance being 12H and when the flux of the two coils opposes each other, the equivalent inductance being 4H.

(e) Find the current in a series R-L circuit having $R = 2\Omega$ and $L = 10H$ while a d.c. voltage of 100V is applied. What is the value of this current after 5 seconds of switching on?

(f) A-3-phase, 3-wire system, with an effective line voltage of 120V, has three impedances of $5\angle 45^o\,\Omega$ in a $\Delta-$ connection. Determine the line currents.

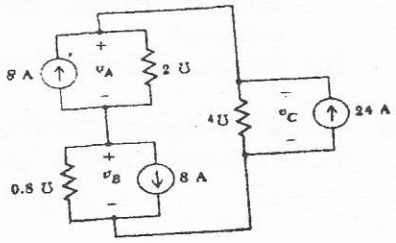
(g) Explain the properties of Fourier transforms.

(h) Find the Fourier transform of impulse function.

PART B

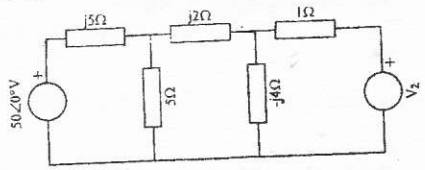
$(4 \times 15 = 60)$

II. In the circuit, use nodal analysis to find v_A, v_B, and v_C. (15)

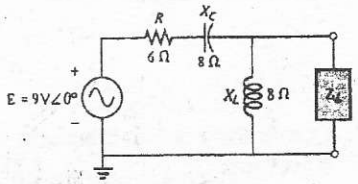


OR

III. (a) Using mesh analysis, find V_2 such that the source current of V_2 is zero. (10)

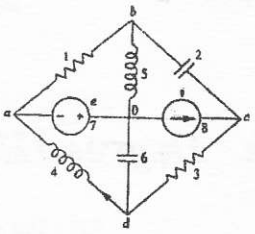


(b) Find the load impedance in the following figure for maximum power to be transferred to the load. (5)



(P.T.O.)

IV. For a network shown in figure determine the number of all possible trees. For a tree consisting of (1, 2, 3) write (i) incidence matrix (ii) tieset matrix (iii) cutset matrix. (15)



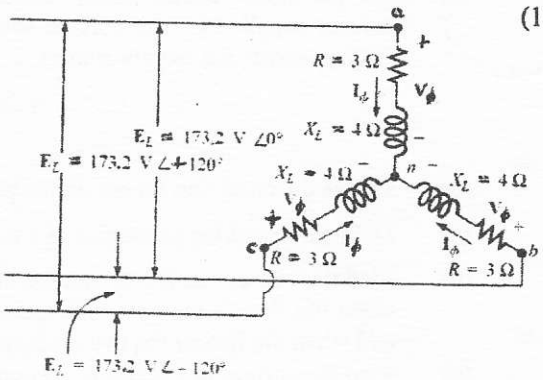
OR

V. (a) For an ideal transformer, show that $\frac{V_1}{V_2} = \sqrt{\frac{L_1}{L_2}}$ where L_1 and L_2 are the self-inductance of the primary and secondary winding. (10)

(b) Write short note on ideal transformer. (5)

VI. For the Y connected load; (15)

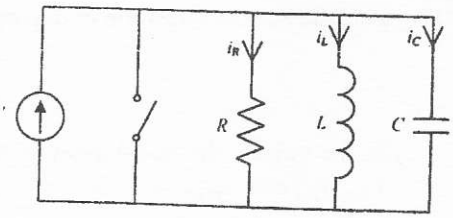
(i) Find the average power delivered to each phase and the total connected load.
(ii) Determine the reactive power delivered to each phase and the total reactive power.
(iii) Find the apparent power delivered to each phase and the total apparent power.
(iv) Find the power factor of the load.



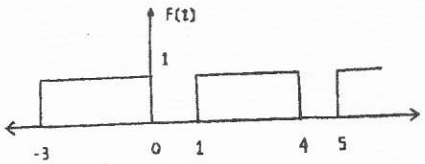
OR

VII. The figure shows a parallel RLC circuit fed from a d.c. current source. The circuit elements are $R = 400\Omega$, $L = 25mH$ and $C = 25nF$. The source current is 24mA. The switch which has been in closed position for a long time is opened at t = 0. (15)

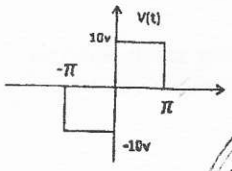
(i) What is the initial value of current i_L, at t = 0?
(ii) What is the initial value of voltage across L at t = 0?
(iii) What is the expression for current through inductance, capacitance and resistance?
(iv) What is the final value of i_L?



VIII. (a) Obtain the trigonometric Fourier series for the waveform shown in figure. (7)

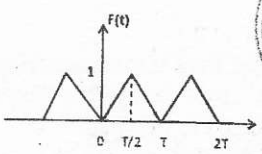


(b) Find the exponential Fourier series for the waveform shown in figure. (8)

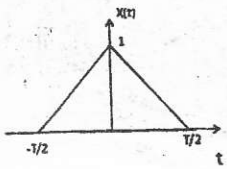


OR

IX. (a) Find the Fourier coefficients of the waveform shown in figure. (7)



(b) Obtain the Fourier transform of the given waveform. (8)



***

BTS.III-11.14-1001 Reg.No. | | | | | | | | |

B

B.Tech. Degree III Semester Examination November 2014

EE 1305 ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

(2012 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) Explain the different standards of measurement.

(b) Define the following terms.

(i) Static error (ii) Static correction
(iii) Relative error (iv) Percentage relative error.

(c) Explain Murray loop test for localization of ground and short circuit faults in cables.

(d) Describe the various errors and compensation in wattmeter.

(e) How is a current transformer different from an ordinary power transformer.

(f) Explain the application of Hibbert magnetic standard.

(g) Define the terms:

(i) lumen (ii) luminous intensity
(ii) illuminance (iv) mean spherical luminous intensity
(v) luminance.

(h) List out the benefits of delayed sweep in a CRO.

PART B

(4 x 15 = 60)

II. (a) Explain the types of errors occurring during measurements and their remedies. (10)

(b) The current passing through a resistor of $60 \pm 0.3\Omega$ is $8.00 \pm 0.04A$. Determine the limiting error in the computed value of power dissipation. (5)

OR

III. (a) Prove that moving iron instruments can be used for both a.c and d.c. measurement. (8)

(b) Describe the constructional features and principle of operation of d' Arsonval galvanometer. (7)

IV. (a) With the help of a neat diagram, explain the working of a single phase energy meter. (10)

(b) What is creeping? Explain the remedy to eliminate the creeping. (5)

OR

(P.T.O.)

V. (a) Explain the working of Weston frequency meter. (8)

(b) With a neat diagram, explain the working of earth tester for measuring earth resistance. (7)

VI. Explain how Lloyd Fischer square can be used for Coreloss measurement, with suitable diagrams. (15)

OR

VII. (a) Explain the principle of working of Kelvin's double bridge. (10)

(b) Explain how a d.c. potentiometer can be used for measurement of power. (5)

VIII. (a) Explain laws of illumination. (5)

(b) A circular area of radius 6m is to be illuminated by a single lamp vertically above the circumference of the circle. The minimum illuminance is to be 6 lux and the maximum to be 20 lux. Find the mounting height and the mean spherical luminous intensity of the lamp. Assume M.S.L.I. of the lamp to be uniform in all directions. (10)

OR

IX. (a) Describe the different parts of CRT. (10)

(b) Describe the polar curves of illumination. (5)

***