BTS –III–11.14–0952 Reg. No. [ ]

B

B. Tech. Degree III Semester Examination November 2014

EE 302 FLUID MECHANICS AND HEAT ENGINES II

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) State Newtons law of viscosity. Obtain the unit for dynamic viscosity.

(b) Differentiate between stream line and path line.

(c) List the minor losses in pipes.

(d) What is kinematic and dynamic similarities?

(e) Differentiate between impulse and reaction turbines.

(f) What is the purpose of draft tube?

(g) What is cavitation? What are its effects?

(h) Why are air vessels used in reciprocating pumps?

PART B

(4 x 15 = 60)

II. Differentiate between:

(i) Eulerian and Lagrangian approach

(ii) steady and unsteady flow

(iii) uniform and non uniform flow

OR

III. Discuss the use of following instruments.

(i) Venturimeter (ii) Pitot tube (iii) Weirs

IV. A pipe with flow rate of $0.25 m^3/s$ has its diameter suddenly enlarged from 200mm to 400mm. Pressure in smaller pipe is $11.772 N/cm^2$.
Determine: (i) loss of head due to sudden enlargement (ii) pressure intensity in larger pipe.

OR

V. Using Buckingbam's theorem, show that velocity through a circular orifice is $V = \sqrt{2gH}\ f\left(D/H, \frac{\mu}{\rho V H}\right)$. H is the head causing flow, 'D' is dia of orifice, μ is coefficient of viscosity, ρ – density and g – acceleration due to gravity.

(P.T.O.)

VI. A pelton wheel is having a mean bucket diameter of 1m and is running at 1000rpm. The net head on the pelton wheel is 700m. If the angle of deflection is 165° and discharge is 0.1 m^3/s, find: (i) power available (ii) hydraulic efficiency.

OR

VII. A Kaplan turbine runner is to be designed to develop 9100kW. The net available head is 5.6m. If the speed ratio = 2.09, flow ratio= 0.68, overall efficiency = 86% and diameter of boss = $\frac{1}{3}$ runner dia. Find runner dia, its speed and specific speed.

VIII. A centrifugal pump delivers water against a net head of 14.5 metre and a design speed of 1000rpm. The vanes are curved back to 30°. The impeller dia is 300mm and outlet width is 50mm. Determine the discharge of the pump if manometric efficiency is 95%.

OR

IX. Discuss the effect of piston acceleration and pipe friction on the indicator diagram of a reciprocating pump. Derive any equation used.

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D

B. Tech. Degree III Semester Examination November 2014

CE/EE 303 STRENGTH OF MATERIALS

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) Draw stress-strain diagram with explanation.

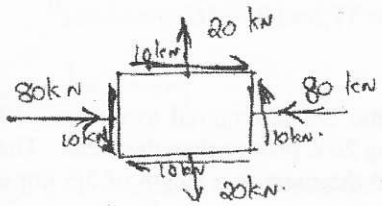
(b) Explain elastic constants. How are they related to each other? Briefly describe the difference between creep and fatigue.

(c) Explain thermal stress and strain energy.

(d) Differentiate moment, couple and torque. Write down basic torsional equation and explain each terms with units.

(e) What are the assumptions in theory of pure bending?

(f) Draw the mohr circle and find the major principal stress, minor principal stress and maximum shear stress according to the system of figure.



(g) What are the different types of loading on simply supported beams and cantilever beams? Elaborate the differences between load intensity, shear stress and bending moment, also indicate their relationships.

(h) If 'ℓ' is the actual length of the column and 'L' is the effective length write down the relationship between the "effective length and actual length" and the crippling load when

(i) both ends hinged
(ii) one end fixed and other end free
(iii) both ends fixed
(iv) one end fixed and one end hinged

(P.T.O)

PART B

(4 x 15 = 60)

II. A compound bar consists of a central steel strip 40mm wide and 5mm thick placed between 2 strips of brass each 40mm wide and 'x' mm thick. The strips are firmly fixed together to form a compound bar of rectangular section 40mm wide and $(2x+5)$ mm thick. Determine:

(i) thickness of the brass strip which will make the apparent modulus of elasticity of the compound bar equal to $160\times10^3\,MN/m^2$.

(ii) maximum axial pull of the bar can then carry if the stress is not to exceed $160MN/m^2$, in either the brass or steel.

Take $E_s = 207GN/m^2$ & $E_b = 114GN/m^2$.

OR

III. A steel rod of 10mm diameter passes centrally through a copper tube of external diameter 40mm and internal diameter 30mm and of length 2m. The tube is closed at each end by 20mm thick steel plates which are screwed by the nuts. The nuts are tightened until the copper tube is reduced to the length 1.9996 m. Find the stress in the rod and the tube.

If the whole assembly is heated through 60°C, what are the stresses in the rod and the tube, assuming that thickness of the plates remains unchanged?

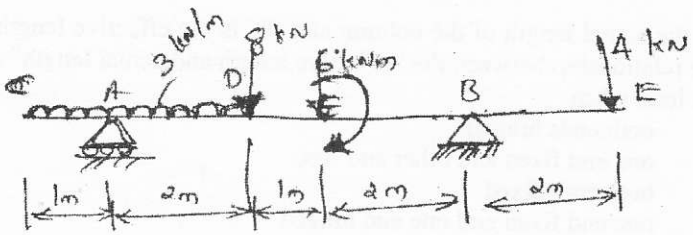
Take $E_s = 210GN/m^2$ $E_c = 100GN/m^2$

$\alpha_s = 12\times10^{-6}/°C$ $\alpha_c = 17.5\times10^{-6}/°C$

IV. A hollow shaft of diameter ratio 3/8 is required to transmit 600kW at 110 rpm, the maximum torque being 20% greater than the mean. The shear stress is not to exceed 63 MN/m^2 and the twist in a length of 3m not to exceed 1.4 degrees. Calculate the maximum external diameter satisfying these conditions. Take G = 84 GN/m^2 (modulus of rigidity).

OR

V. Sketch the shear force and bending moment diagrams showing salient values for the beam loaded as shown in figure. Indicate the point of contra flexture and find the values.



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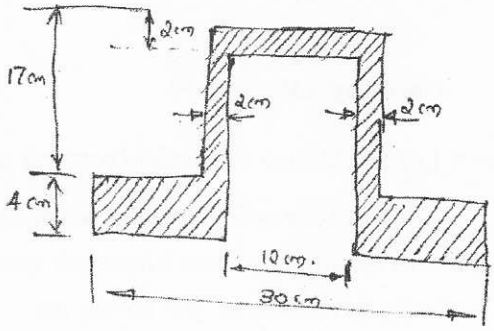
VI. Figure shows the cross section of a cast iron beam. When this beam subjected to a bending moment the tensile stress at the bottom edge is $30 MN/m^2$. Calculate:

(i) value of the bending moment
(ii) stress induced in the top edge

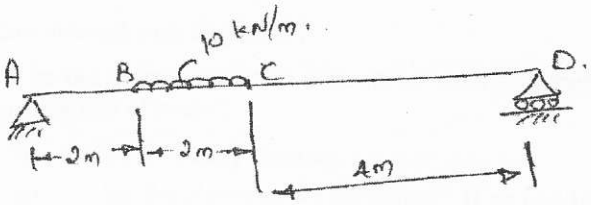


OR

VII. A point in a bracket the stresses on the two mutually perpendicular planes are $400 MN/m^2$ tensile and $300 MN/m^2$ tensile. The shear stress across these planes is $200 MN/m^2$. Determine the magnitude and directions of principal stresses and maximum shear stress by:

(i) analytical method
(ii) graphical method

VIII.



From the figure the moment of inertia of the cross section of the beam $I = 120 \times 10^{-6} m^4$.

Youngs modulus of the beam $= 200 \times 10^6 kN/m^2$.

Determine:

(i) deflection at the mid span
(ii) maximum deflection
(iii) slope at the end A

OR

IX. A bar of length 4m used as a simply supported beam and subjected to a uniformly distributed load of 30 kN/m over the whole span; deflects 15mm at the centre. Determine the crippling load when:

(i) both ends are pinned
(ii) both ends are fixed
(iii) one end fixed and other end hinged
(iv) one end fixed and other end free
(v) both ends are free

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D

B.Tech. Degree III Semester Examination November 2014

EE 304 ELECTRIC CIRCUIT THEORY

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

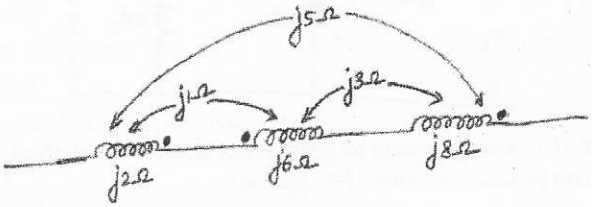
(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) State and explain Thevenin's theorem.

(b) Define a tree and list three requirements of a tree.

(c) Obtain the equivalent inductive reactance of the coupled circuit.



(d) Obtain h-parameters in terms of z-parameters.

(e) Explain displacement neutral method.

(f) Derive the expression for i(f) in a series RL circuit if the applied voltage is DC.

(g) Write down the properties of Fourier transforms.

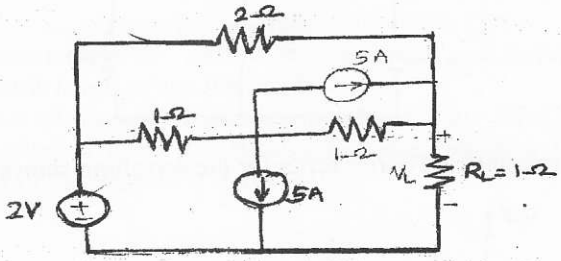
(h) Derive the expression for cut-off frequency of a constant K low pass filter.

PART B

(4 x 15 = 60)

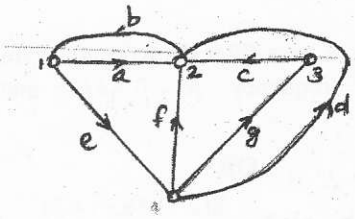
II. (a) State and explain reciprocity theorem. (5)

(b) Find V_L in the circuit shown below using superposition theorem. (10)



OR

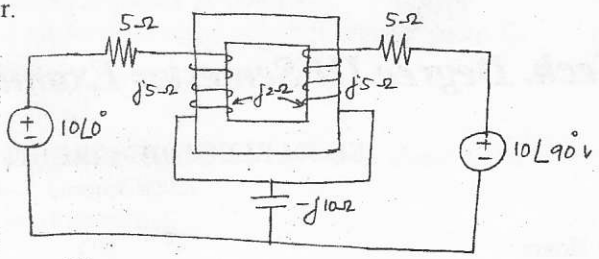
III. Obtain the complete incidence matrix, tie-set matrix and cut-set matrix for the oriented graph taking {a, c, f} as tree of the graph. (15)



(P.T.O.)

IV. (a) Distinguish between a linear transformer and ideal transformer. (5)

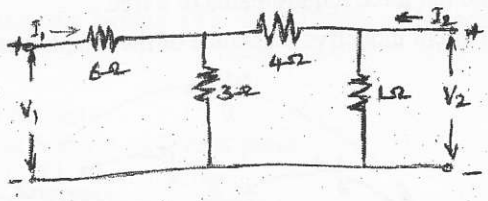
(b) Obtain the dotted equivalent circuit for the following circuit and find the voltage across the capacitor. (10)



OR

V. (a) Explain the cascade connection of two port network. (5)

(b) Find the z-parameters of the network shown below and hence prove that the given network is reciprocal. (10)



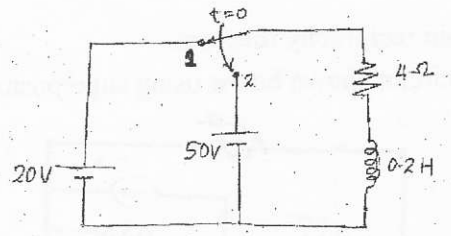
VI. (a) Prove that the power measured using two wattmeter method gives the total three phased power consumed by the load. (8)

(b) A three phase balanced delta connected load of $(15+j20)\Omega$ each is fed from 220 v three phase system. Find (i) total active power (ii) reactive power and (iii) power factor. (7)

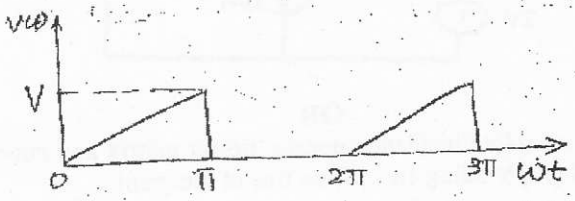
OR

VII. (a) Sketch the different types of circuit transients in a RLC circuit when it is subjected to a DC voltage of V volts. (7)

(b) For the circuit shown below, determine the current when the switch is moved from position 1 to position 2 at t = 0. The switch has been in position 1 for a long time to get steady state values. (8)



VIII. (a) Find the trigonometric Fourier series for the waveform shown below: (8)



(b) Design an m-derived low pass filter (T section) having a design resistance Ro = 900 Ω, cut-off frequency $fc = 0.8\,kHz$ and infinite attenuation frequency $f_\infty = 1\,kHz$. (7)

OR

IX. An impedance is given by $z(s) = \dfrac{8(s^2+1)(s^2+3)}{S(s^2+2)(s^2+4)}$. Realise the network in foster I, II and cauer I, II forms. (15)

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BTS.III-11.14-1000 Reg.No. | | | | | | | | |

B

B.Tech. Degree III Semester Examination November 2014

EE 305 ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) Explain the terms accuracy, sensitivity and resolution as used for indicating instruments.

(b) Explain shunts and multipliers used in d.c. instruments.

(c) Why are dynamometer type instruments suitable both for dc and ac measurement?

(d) What is creeping in motor type energy meter and how is it avoided?

(e) What do you mean by low, medium and high resistances? State various methods of measurement of low resistance.

(f) Describe Murray Loop test for localization of ground fault in cables.

(g) Define and explain laws of illumination.

(h) Describe polar curves of illuminations.

PART B

(4 x 15 = 60)

II. (a) Describe various types of errors during measurement and suggest their remedies. (10)

(b) A moving coil meter has a resistance of 5Ω and gives a full scale deflection with 10mA. Show how it can be used to measure current upto 10A. (5)

OR

III. (a) Describe the constructional features and principle of operation of D' Arsonval galvanometer. (10)

(b) Derive the torque equation of a permanent magnet moving coil instrument. (5)

IV. (a) Describe the various errors in electro dynamometer type Wattmeters. How are they compensated? (10)

(b) What do you mean by creeping in energy meters? How can this be eliminated? (5)

OR

(P.T.O.)

V. (a) Describe the working of a single phase energy meter, with neat diagram. (10)

(b) How does a current transformer differ from an ordinary power transformer? (5)

VI. (a) Explain the principle of operation of Kelvin double bridge. (10)

(b) Explain Hay bridge for the measurement of unknown inductance. (5)

OR

VII. (a) Explain the Lloyd-Fisher square method for the determination of coreloss. (10)

(b) Describe the construction and working of a dc potentiometer. (5)

VIII. (a) Explain the measurement of voltage, current and frequency, with the help of CRO. (10)

(b) Explain dual beam oscilloscope, with the help of block diagram. (5)

OR

IX. (a) Describe how Lummer-Brodhum photometer head is used to measure MSCP of a source of light. (10)

(b) Explain the following terms. (5)

(i) Solid angle
(ii) Illumination.

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