P P SAVANI UNIVERSITY

First & Second Semester of B. Tech. Examination

May 2019

SECV1060 Basics of Engineering Sciences

21.05.2019, Tuesday **Time: 12:30 p.m. to 3:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 (a) Define Civil Engineering. Explain Branch of Civil Engineering. **[05]**

Q - 1 (b) Enlist various material used in construction. Explain any one in detail. **[05]**

OR

Q - 1 (a) What is the impact of infrastructure development for the economy of country? **[05]**

Q - 1 (b) Give a classification of properties of materials. Explain mechanical properties. **[05]**

Q - 2 (a) What are Thermodynamics? Explain 1st law of thermodynamics. **[05]**

Q - 2 (b) Describe and list out different mountings and accessories of boiler. **[05]**

OR

Q - 2 (a) Give the brief classification of boiler. **[05]**

Q - 2 (b) Define System, Surrounding, Boundary, Prime Mover, Calorific Value. **[05]**

Q - 3 (a) Two mutually coupled coils, A and B, are connected in series to a 360 V d.c. supply as shown in Figure (i). Coil A has a resistance of 6 Ω and inductance 4 H. Coil B has resistance of 11 Ω and inductance 9 H. At a certain instant after the circuit is energized, the current is 10 A and is increasing at the rate of 10 A/s. Calculate (i) the mutual inductance between the coils and (ii) the coefficient of coupling. The coils are in series aiding. **[05]**

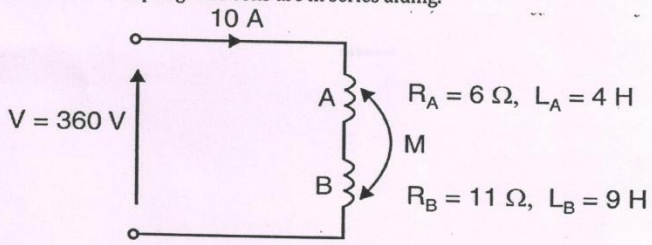

Figure (i)

Q - 3 (b) Find the equivalent inductance L_{AB} in Figure (ii). Make necessary assumptions if required. **[05]**

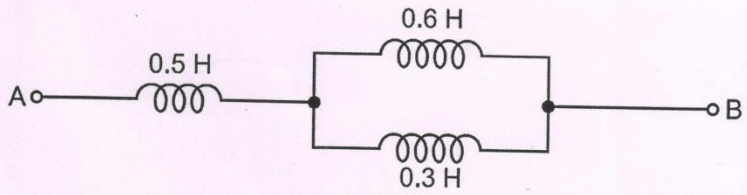

Figure (ii)

OR

Q - 3 (a) The self-inductances of three coils are $L_A = 20$ H, $L_B = 30$ H and $L_C = 40$ H. The coils are **(05)**

connected in series in such a way that fluxes of L_A and L_B add, fluxes of L_A and L_C are in opposition and fluxes of L_B and L_C are in opposition. If M_{AB} = 8 H, M_{BC} = 12 H and M_{AC} = 10 H, find the total inductance of the circuit. Draw the complete circuit diagram as well.

Q - 3 (b) A straight conductor 0.4m long carries a current of 12 A and lies at right angles to a uniform field of 2.5 Wb/m². Find the mechanical force on the conductor when (i) it lies in the given position (ii) it lies in a position such that it is inclined at an angle of 30° to the direction of field. **(05)**

SECTION – II

Q – 1 (a) Explain the fundamental principles of surveying. **[05]**

Q – 1 (b) Enlist various instruments used in chaining and describe with sketch any two of them. **(05)**

OR

Q - 1 (a) Enumerate various methods of levelling and describe any one. **[05]**

Q - 1 (b) What is meant by local attraction? How is it detected? How is the observed bearing corrected for local attraction? **[05]**

Q - 2 (a) Classify clutch and explain cone clutch in detail **[05]**

Q - 2 (b) Write down the difference between 2- stroke and 4-stroke petrol engine. **[05]**

OR

Q - 2 (a) Write down the short note on brake. **[05]**

Q - 2 (b) Explain diesel engine with neat sketch. **[05]**

Q - 3 (a) With the help of a neat labeled diagram explain the construction of an MCB. **[05]**

Q - 3 (b) Describe with the help of pictorial representations the two methods of earthing. **[05]**

OR

Q - 3 (a) Enumerate the advantages of polyphase over single phase system. **[05]**

Q - 3 (b) Explain the Two Wattmeter method of power measurement in 3-phase circuit for a Star connection with the help of a neat and labeled diagram. Give suitable equations also. **[05]**

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