

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
ELECTRICAL MEASUREMENTS
 (ELECTRICAL & ELECTRONIC ENGINEERING)

APRIL/MAY 2005

TIME – 3 HOUR
 MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) How does errors due to magnetic field and frequency are compensated in moving iron instruments.
 (b) The coil of a 300 Volt of a moving iron voltmeter has a resistance of 500 ohm and an inductance of 0.8 H. The instrument reads correctly at 50 Hz AC supply and takes 100 milli amps at full-scale deflection. What is the percentage error in the instrument reading when it is connected to 200 Volt DC supply.
2. Explain the working of a 3 phase dynamometer wattmeter. Describe how mutual effects between the two elements of the wattmeter are eliminated.
3. (a) Describe with a diagram the construction and working of a ROTATING COIL TYPE SINGLE PHASE power factor meter ?
 (b) What is the need for the use of a Synchroscope in power station.? Explain with a diagram the construction and working of a Moving iron type synchroscope ?
4. (a) Explain the construction and working of a single phase energymeter.
 (b) What are the adjustments to be done in Single phase induction energymeter so that the meter reads correctly?
5. Explain in detail, the construction and working principle of a vibration galvanometer.
6. A Kelvin Double bridge has each of the ratio arms $P = Q = p = q = 1000$. The emf of the battery is 100V and a resistance of 5 is included in the battery circuit. The galvanometer has a resistance of 500 and the resistance of the link connecting the unknown resistance to the standard resistance may be neglected. The bridge is balanced when the standard resistance $S = 0.001$.
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 (a) Determine the value of unknown resistance.
 (b) Determine the current (approximate value) through the unknown resistance R at balance.
 (c) Determine the deflection of the galvanometer when the unknown resistance, R, is changed by 0.1 percent from its value at balance. The galvanometer has a sensitivity of 200mm/ μ A.
7. (a) Obtain the balanced condition of Andersons bridge in measurement of inductance.
 (b) The four impedances of an a.c. bridge are $Z_1 = 4006 \ 50$, $Z_2 = 2006 \ 40$, $Z_3 = 8006 - 50$ and $Z_4 = 4006 \ 20$ one end of Z_1 is connected to one end of Z_2 . Other end of Z_2 is connected to one end of Z_3 , other end of Z_3 is connected one end of Z_4 . Find under what conditions this bridge is balanced.
8. (a) Explain the Double bar method of measuring the flux density of iron specimen.
 (b) A solenoid is 60cm long and 2.5cm in diameter, it is uniformly wound with 600 turns of wire. Find the magnetic field strength at the centre of the solenoid when carrying a current of 2amp. If the secondary coil is wound round the central part of solenoid, calculate the flux passing through it .