Code No: R05221301 **Set No. 1**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
ELECTRICAL AND ELECTRONIC MEASUREMENTS
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give the general requirements for the construction of multipliers.
   (b) Explain how a potential divider arrangement is used for multipliers used for multi-range voltmeters. Derive the expressions for resistance of different sections for a 4 range voltmeter. [6+10]

2. (a) Explain how an electrodynamometer type of instrument is able to measure the true r.m.s value of a voltage (or) current irrespective of its wave form.
   (b) What are the advantages and dis-advantages of electrodynamometer type of instruments? [8+8]

3. Derive the expression for deflecting torque in single phase induction type energy meter. Show that the deflection is maximum when the phase angle between two fluxes is 90^0 and when the disc is purely non-inductive. [10+6]

4. (a) Explain the importance of thermocouples in the construction of true RMS type of Voltmeter.
   (b) What is the necessity of electronic voltmeter? Explain.
   (c) What is multimeter? What are the parameters that can be measured with multimeter? [6+6+4]

5. (a) Explain how low impedance components can be measured using Q meter.
   (b) Name the measurements for which Vector impedance meter is used. [10+6]

6. (a) With a neat sketch explain the two stage attenuator for a high frequency oscilloscope.
   (b) With a neat sketch explain the operation of 3-bit flash converter in a digital storage oscilloscope. [7+9]

7. (a) With a simple block diagram explain the spectrum analyzer.
   (b) Explain Astable Multivibrator using transistors and compare the performance with other generators. [6+10]

8. (a) Give the importance of time base in a digital frequency counter.
   (b) Why frequency synthesizer is required? Discuss the alternate methods for frequency synthesizing. [6+10]

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Code No: R05221301 **Set No. 2**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
ELECTRICAL AND ELECTRONIC MEASUREMENTS
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the principle of operation of PMMC instrument with a neat sketch.
   (b) A permanent magnet moving coil instrument has a coil dimensions 15 mm × 20 mm. The flux density in the air gap is 2×10^{-3} wb/m^2 and the spring constant is 0.2×10^{-6} Nm/rad. Determine the number of turns required to produce an angular deflection of 90^0 degrees when a current of 5 mA is flowing through the coil. [8+8]

2. Draw the circuit diagram of series type ohmmeter. Explain its working principle? What is significance of half scale value? How are the adjustments done in case the battery runs down? How are the zero adjustments made? [16]

3. (a) Draw the possible methods of connecting the pressure coil of a wattmeter and compare the errors. Explain the meaning of compensating winding in wattmeter?
   (b) An electrodynamometer type wattmeter is employed to measure power in a single phase circuit. The load voltage is 200 volts and the load current is 5 A at a lagging p.f. of 0.1. The wattmeter potential coil has a resistance of 12,000Ω and inductance of 120 mH. Determine the percentage error in wattmeter reading? [10+6]

4. (a) Explain the importance of thermocouples in the construction of true RMS type of Voltmeter.
   (b) What is the necessity of electronic voltmeter? Explain.
   (c) What is multimeter? What are the parameters that can be measured with multimeter? [6+6+4]

5. (a) Name the measurement for which the vector voltmeter is used. Why
   (b) With a neat sketch explain the vector voltmeter in brief. [8+8]

6. (a) Explain the different blocks of Digital storage Oscilloscope in detail.
   (b) How an electron beam is focused to a fine spot on the face of the CRT using Magnetic field? [8+8]

7. (a) Explain the operation of Phase locked loop frequency synthesizer
   (b) Draw and explain the spectra of the following are displayed on spectrum analyzer.
      i. Continuous wave

ii. Amplitude modulated wave. [8+8]

8. (a) Explain the display technique used frequency counter with an example

(b) List the suggestions to be followed to attain maximum accuracy in a frequency counter. [8+8]

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Code No: R05221301 **Set No. 3**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
ELECTRICAL AND ELECTRONIC MEASUREMENTS
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the effect of temperature changes in D.C. Ammeters?
   (b) A moving coil instrument gives a full scale deflection of 10mA when the potential difference across its terminals is 100 mV. Calculate
      i. the shunt resistance for a full scale deflection corresponding to 100A
      ii. the series resistance for full scale reading with 1000 V. Calculate the power dissipation in each case. [6+10]

2. (a) What is a transfer instrument? Why is an electrodynamometer a transfer instrument?
   (b) Derive the equation for deflection of electrodynamometer type a.c. indicating instrument, if the meter is spring controlled. [6+10]

3. Explain the construction and working of a 3-phase rotating field power factor meter. Prove that the deflection of moving system is equal to the phase angle of the system. [10+6]

4. (a) Explain the importance of thermocouples in the construction of true RMS type of Voltmeter.
   (b) What is the necessity of electronic voltmeter? Explain.
   (c) What is multimeter? What are the parameters that can be measured with multimeter? [6+6+4]

5. Draw the basic blocks of vector impedance meter. Explain the functions of each block. Also give the specifications of the above meter. [16]

6. (a) Compare storage oscilloscope with an ordinary oscilloscope .
   (b) Why the operating voltage of CRT arranged so that the deflecting plates are nearly ground potential? [8+8]

7. (a) Discuss in detail about Audio frequency wave generator.
   (b) What are the precautionary measures to be considered in a signal generator? Explain how they can be achieved. [9+7]

8. (a) List the different measurement errors and discuss in brief.
   (b) Draw the block diagram of a frequency counter and explain its operation using appropriate wave forms. [8+8]

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Code No: R05221301 **Set No. 4**

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2007
ELECTRICAL AND ELECTRONIC MEASUREMENTS
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the constructional details of PMMC instruments with a neat sketch.
   (b) Explain different errors of PMMC instruments. [10+6]

2. (a) Explain the following parts of electrodynamometer type indicating instruments.
      i. fixed coils
      ii. moving coil
      iii. control
      iv. damping and
      v. moving system.
   (b) State the advantages of electrodynamometer type indicating instrument.[10+6]

3. (a) Draw the possible methods of connecting the pressure coil of a wattmeter and compare the errors. Explain the meaning of compensating winding in wattmeter?
   (b) An electrodynamometer type wattmeter is employed to measure power in a single phase circuit. The load voltage is 200 volts and the load current is 5 A at a lagging p.f. of 0.1. The wattmeter potential coil has a resistance of 12,000Ω and inductance of 120 mH. Determine the percentage error in wattmeter reading? [10+6]

4. (a) Explain how Successive approximation DVM performance is better than other DVM's.
   (b) Compare the performance characteristics of different types of DVM?s. [8+8]

5. (a) The self capacitance of a coil is to be measure by Q meter. The first measurement result is $f_1 = 1.5$MHz and C1=550 pF. The second measurement result is $f_2 = 3$ MHz and new value of tuning capacitor is 110 pF. Find the distributed capacitance and the inductance.
   (b) What are the alternate methods used to measure R, L & C in measurement? Name them? [10+6]

6. Name the different types of oscilloscopes. Compare their merits and demerits along with their applications. [16]

7. (a) Discuss in detail about Audio frequency wave generator.

(b) What are the precautionary measures to be considered in a signal generator? Explain how they can be achieved. [9+7]

8. (a) Draw and explain the temperature compensated crystal oscillator circuit.

(b) What are the different measurement errors? Explain in detail. [6+10]

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