**SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR**
**(AUTONOMOUS)**
Siddharth Nagar, Narayanavanam Road – 517583
**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code :** Electrical and Electronic Measurements (16EE224) **Course**: B.Tech & EEE

**Year &Sem:** III-B.Tech & II-Sem **Regulation:** R16

## UNIT –I

## MEASURING INSTRUMENTS

| | | | |
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| 1 | a | Define the terms "Indicating instruments", "Recording instruments" and "Integrating instruments". | 6M |
| | b | A 2mA meter with an internal resistance of 100ohm is to be converted to 0-150mA ammeter. Calculate the value of the shunt resistance required. | 6M |
| 2 | a | Explain the working of universal shunt used for multi range ammeters and derive expressions for resistances of different sections of a universal shunt for 3 range ammeter | 10M |
| | b | List the errors in PMMC instrument. | 2M |
| 3 | a | Design an Aryton shunt to provide an ammeter with the current ranges 1 A, 5A and 10A. A basic meter resistance is 50 ohm and full scale deflection current is 1 mA. | 10M |
| | b | What are the disadvantages of gravity control | 2M |
| 4 | | Explain the construction and working principle of PMMC instrument along with its torque equation | 12M |
| 5 | a | Derive an expression for the Deflecting torque in MI type instruments | 6M |
| | b | List the advantages & disadvantages of MI type instruments | 6M |
| 6 | | Describe the construction and working of attraction type MI instrument? | 12M |
| 7 | | How do you extend the range of an Ammeter? Explain Aryton Shunt with diagram. | 12M |
| 8 | a | A moving coil instrument has a resistance of 10 ohm and gives a full scale deflection when carrying 50mA . Show how it can be adopted to measure voltage upto 750 V and current 100 A. | 8M |
| | b | What are the precautions to be taken while using a voltmeter | 4M |
| 9 | a | Compare various controlling system in indicating instrument | 5M |
| | b | The deflecting torque of an ammeter varies as the square of the current passing through it. If a current of 5A produces a deflection of 90degree, what will be the deflection for a current of 10A when the instrument is i) spring control ii) gravity control | 7M |

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| 10 | | Explain the construction and working of attracted disc electrostatic voltmeter in detail. | 12M |

## UNIT-II

## DC AND AC BRIDGES

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| 1 | a | Draw the circuit diagram of a Wheatstone bridge and derive the conditions for balance. | 6M |
| | b | The wheatstone bridge has R1=10Kohm, R2=2Kohm and R3=5Kohm. Calculate the value of unknown resistance, assuming the bridge to be in balanced condition. | 6M |
| 2 | | Explain how insulation resistance of a cable can be measured with a help of Loss of charge method? | 12M |
| 3 | a | Draw the circuit of a Kelvin's double bridge used for measurement of low resistance. Derive condition for balance | 10M |
| | b | Explain the classification of resistances. | 2M |
| 4 | a | An inductance comparison bridge is used to measure the inductive impedance at a frequency of 1.5KHz. The bridge constants at bridge balance are, L3=8mH, R1=1Kohm, R2=25ohm, R3=50kohm | 6M |
| | b | Derive the balance equation for AC bridges | 6M |
| 5 | | Explain how Wien's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters. | 12M |
| 6 | a | Explain about De sauty's Bridge with a neat sketch. | 6M |
| | b | List the advantages and disadvantages of Maxwell's Bridge. | 6M |
| 7 | | Explain the construction and working of Anderson bridge with suitable diagram | 12M |
| 8 | a | Derive the general balance equation of a DC Bridge. | 6M |
| | b | List some advantages and disadvantages of Anderson bridge. | 6M |
| 9 | | Explain voltmeter and ammeter method for measuring resistances value in detail | 12M |
| 10 | a | Draw and derive the circuit of Maxwell's inductance capacitance bridge to measure the value of inductance. | 8M |
| | b | Define power factor and loss angle. | 4M |

## UNIT –III
## MEASUREMENT OF POWER AND ENERGY

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|---|---|---|---|
| 1 | | Give the constructional details of electro dynamometer type wattmeter with a neat sketch. | 12M |
| 2 | a | Discuss the errors of single phase energy meter. | 6M |
| | b | A 50A, 230 V meter on full load test makes 61 revolutions in 37 seconds. If the normal disc speed is 520 revolutions per Kwh , find the percentage error. | 6M |
| 3 | a | A single phase kilo watt hour meter makes 500 revolutions per kilo watt hour. It is found on testing as making 40 revolutions in 58.1 seconds at 5KW full load. Find the percentage error | 6M |
| | b | Explain driving system , moving system and braking system in a single phase induction type energy meter | 6M |
| 4 | a | Explain the measurement of LPF and UPF. | 6M |
| | b | Explain about creeping and its compensation in single phase induction type energy meter. | 6M |
| 5 | a | Explain the friction compensation in single phase induction type energy meter. | 6M |
| | b | Explain stray magnetic field errors in electro dynamometer type wattmeter. | 6M |
| 6 | a | Explain the construction of Two element and Three element dynamometer wattmeter's | 6M |
| | b | Derive the torque equation for electro dynamo meter type wattmeter | 6M |
| 7 | a | Explain errors caused by vibration of moving system electro dynamometer type wattmeter | 6M |
| | b | Explain the advantages and disadvantages of single phase Induction type Energy meter | 6M |
| 8 | | Explain with a neat sketch the construction and working of a single-phase dynamometer type wattmeter | 12M |
| 9 | | Explain the working of 2 element energy meter with a neat diagram. | 12M |
| 10 | | Write short notes on<br>(i) Advantages of Two element wattmeter<br>(ii) Creeping error<br>(iii) Driving and braking torque<br>(iv) LPF<br>(v) Errors in Dynamometer type wattmeter.<br>(vi) UPF | 12M |

## UNIT-IV

## INSTRUMENT TRANSFORMER AND POTENTIOMETERS

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|---|---|---|---|
| 1 | a | Discuss C T and P T. | 6M |
| | b | Why secondary of C.T should not be open? | 6M |
| 2 | | Explain the construction of (i) Current transformer (ii) Potential transformer. | 12M |
| 3 | a | With neat figure explain the working of an ac potentiometer. | 8M |
| | b | Discuss the significance of standardization. | 4M |
| 4 | a | How do you standardize a potentiometer? Explain with a neat diagram. | 6M |
| | b | Discuss slide wire DC potentiometer. | 6M |
| 5 | a | Explain the construction and working principle of Crompton's DC potentiometer | 8M |
| | b | Explain the term "Standardization" of Potentiometer. | 4M |
| 6 | a | Explain the applications of DC potentiometers. | 6M |
| | b | List the advantages of potentiometers | 6M |
| 7 | a | How do you measure current and voltage using potentiometer. | 4M |
| | b | Describe the construction and working of co-ordinate type Potentiometer & its standardization. | 8M |
| 8 | | Describe the construction and working of Polar type Potentiometer & its standardization. | 12M |
| 9 | a | Describe the construction and working of a d.c potentiometer. | 6M |
| | b | What is standardization? Explain | 6M |
| 10 | | Explain the construction and working of Current transformer | 12M |

## UNIT-V

## MAGNETIC MEASUREMENTS AND DIGITAL METERS

| | | | |
|---|---|---|---|
| 1 | a | Derive the equation of motion for ballistic galvanometer. | 6M |
| | b | Explain six point methods. | 6M |
| 2 | | Explain the construction and working principle of flux meter with a neat diagram | 12M |
| 3 | a | Determine leakage factor with flux meter. | 6M |
| | b | compare flux meter and ballistic galvanometer | 6M |
| 4 | | Describe the construction and working of a moving coil ballistic galvanometer. | 12M |
| 5 | | Draw a neat figure and explain the working of a C R O. | 12M |
| 6 | | Describe briefly how the following measurements can be made with the use of CRO (i) Frequency (ii) Phase angle (iii) voltage | 12M |
| 7 | a | Discuss A C testing. What are Iron losses ?.How do they vary with frequency? | 8M |
| | b | Write explanatory notes on flux meter. | 4M |
| 8 | | Describe about basic principle and working of digital meters in detail | 12M |
| 9 | a | With neat diagram, explain about cathode ray tube | 8M |
| | b | List some application of CRO | 4M |
| 10 | a | Write a short note on Horizontal and vertical amplifier | 8M |
| | b | List some application of digital meters | 4M |