EASWARI ENGINEERING COLLEGE
Department of Electronics and Communication Engineering

QUESTION BANK

SUB.CODE : BE 8254
SUB NAME : Basic Electrical and Instrumentation Engineering

DEGREE/BRANCH : BE/ECE

YEAR//SEM : I/ II

UNIT I AC CIRCUITS AND POWER SYSTEMS

PART–A

1. What are the advantages of underground system? **[MAY 2018]**

2. State the different types of power tariff. **[MAY 2018]**

3. State the advantages of 3 phase system over 1 phase system.

4. Write the expression for determining reactive and apparent power in a three phase circuit.

5. Define the following:

i)Symmetrical system ii)Phase sequence

6. List out the methods of power measurement in three phase balanced circuits.

7. Draw the phasor diagram of line currents and line voltages of a balanced delta connected load.

8. Evaluate the voltage across Y and B in a 3 Φ balanced delta system with voltage across R and Y is 400∠0 0 V. Assume RYB phase sequence

9. A 3Φ 400V supply is given to a balanced star connected load of impedance 8+j6 ohms in each branch. Formulate the line current.

10. In two wattmeter power measurement method, if one wattmeter reads zero, analyze the power factor of the circuit.

11. What are the requirements of protection?

12. What are the basic requirements of a circuit breaker?

13. Differentiate between fuse and protective relay.

14. What is the importance of arc resistance? On what factor does it depend?

15. Distinguish between recovery voltage and restriking voltage?

16. Define the term maximum demand.

17. List the objectives of tariff and the factors affecting it.

18. What is meant by relay operating time?

19. Write the effect of power factor in energy consumption billing.

20. Calculate the power factor if $V(t)=Vm \sin\omega t$ and $I(t)=Im \sin(\omega t - 450)$.

21. Point out the advantages of 3Φ system over 1Φ system.

22. Define power factor.

23. Define line voltage and line current.

24. Compare star and delta connected system.

25. Distinguish between balanced and unbalanced system

PART-B

1. Explain with a simple diagram the basic structure of Electric power system to deliver electricity to the consumer place. **[MAY 2018]**

2. Describe a typical power system protection scheme with suitable illustration.**[MAY 2018]**

3. What is power factor and why is it important and how it can be improved? Discuss.

[MAY 2018]

4. Expalin the analysis of following three phase unbalanced loads:

i) Three wire star connected

ii) Four wire star connected

iii) Delta connected

5. Explain the measurement of power in 3phase circuit using one wattmeter method.

6. What is tariff? What are its objectives? Discuss in detail about different types of tariffs with its applications

7. Explain three phase power measurement by 2 watt meter method for star and delta connected load and determine the power equation and draw the phasor diagram.

8. Compare overhead and underground transmission lines.

9. Explin about the conversion of star and delta conversion and write its expression for each conversion.

10. What is the need of power factor improvement in electrical circuits?

11. Draw the single line diagram of an AC power system and also discuss in detail about transmission and distribution of electrical energy.

12. Discuss in detail about the essential features of protective devices and briefly explain about protective devices used in power system.

13With a neat circuit and phasor diagram explain the three phase power measurement by two wattmeter methods.

14.(i) A symmetrical three phase 400V system supplies a balanced delta connected load. The current in each branch circuit is 20A and phase angle 40° (lag) calculate the line current and total power.

(ii) A three phase delta connected load has Zab = (100+j0) ohms, Zbc = (-j100) ohms and Zca= (70.7 =j70.7) ohms is connected to a balanced 3 phase 400V supply. Determine the line currents Ia , Ib and Ic. Assume the phase sequence abc.

15.(i) A balanced three phase star connected load with impedance 8+j6 ohm per phase is connected across a symmetrical 400V three phase 50Hz supply. Determine the line current, power factor of the load and total power.

(ii) An alternating current is expressed as i=14.14 sin 314t. Determine rms current, frequency and instantaneous current hen t =0.02ms.

16.(i) A balanced star connected load of 4+j3 ohm per phase is connected to a 400V, 3 phase, 50Hz supply. Find the line current, power factor, power, reactive volt ampere and total volt ampere.

(ii) A Voltage source 100V with resistance of 10 ohms and inductance 50 mH, a capacitor 50 microfarad are connected in series. Calculate the impedance when the frequency is (i) 50HZ (ii)500Hz (iii) the power factor at 100Hz.

17.(i) Three impedances Z1 = 3∟45° ohm, Z2 = 10 √2∟45° ohm, Z3 = 5 ∟-90° ohm are connected in series. Calculate applied voltage if voltage across Z1 = 27∟-10° V.

(ii) A delta connected load as shown in figure is connected across 3 phase 100 volt supply. Determine all line currents. (8)

18.i)Compare power transmission using over head line and underground cable.

Ii)Draw a simple model of UPFC ?

19.What are the advantages of high transmission voltage for the transmission of electrical power?

UNIT – II TRANSFORMER

PART–A

1. What are the various losses in a transformer? **[MAY 2018]**
2. Define voltage regulation of transformer. **[MAY 2018]**
3. What is an ideal transformer?
4. Draw the phasor diagram of an ideal transformer.
5. Why transformer core is laminated?
6. Differentiate core type and shell type transformer.
7. Why transformer rating is in KVA?
8. What is eddy current loss?
9. Draw the no load phasor diagram of a transformer.
10. What is the condition for maximum efficiency in transformer?
11. Name the tests that are performed on a transformer.
12. What is magnetizing current?
13. What are the two components of core loss?
14. Write the emf equation of transformer?
15. Draw the equivalent circuit of transformer .
16. Why the efficiency of transformer is higher as compared to other electrical machines?
17. Why the short circuit test is performed on the high voltage side of the transformer?
18. Why core loss is almost negligible in short circuit test?
19. Why core loss is neglected in open circuit test?
20. Does the flux in a transformer core increase with load?
21. Draw the approximate equivalent circuit of transformer
22. What are the losses occurring in a transformer?
23. Why low voltage winding is placed next to the core and after high voltage winding?
24. What is the function of oil in transformer?
25. Why the main flux remain s physically constant from no load to full load?

26. What are the different types of transformer?

27. Give expression for secondary resistance as referred to primary.

28. Write the name of material used for transformer core?

29. Name the loss that can be obtained by conducting no load test on the transformer

30. What are the uses of open circuit test and short circuit test performed on a transformer?

31. What is transformer?

32. Define transformation ratio .

PART – B

1. Draw the equivalent circuit diagram of transformer with respect to primary side.

2. A 200KVA, 3300/ 240 V single phase transformer has 80 turns on the secondary winding.Assuming an ideal transformer,calculate primary and secondary currents on full load,the maximum value of flux and the number of primary turns. [MAY 2018]

3. What is meant by auto transformer? Explain the principle of operation of an auto transformer with a neat sketch. [MAY 2018]

4. Derive EMF equation of a transformer.

5. Explain the operating principle of transformer and derive the emf equation.

6. Draw equivalent circuit of a transformer.

7. Discuss about

i) Transformer losses and efficiency

ii)Explain the working of auto transfer

8.(i)The OC and SC tests on a 4 kVA, 200/400 V, 50 Hz single phase transformer gave the following results: OC tests on LV side: 200 V, 1 A, 100 W, SC test with LV side shorted: 15 V, 10 A, 85 W, Determine the parameters of the equivalent circuit and draw and equivalent circuit referred to LV side.

(ii)Draw the phasor diagram and explain the operation of a practical transformer on load.

9. Deduce the equivalent circuit of transformer starting from the basic.

10. What are the various losses in a transformer and how each loss varied with load? Derive the condition for maximum efficiency of a transformer.

11. Give the theory of open circuit and short circuit tests on a single phase transformer and show how from these tests efficiency and percentage voltage drop of a load of known magnitude and power factor can be obtained.

12. With neat sketches explain the constructional details of transformer .

13. (i)Describe the tests to determine the core loss and the full load copper loss of a single phasetransformer?

(ii)A 2000/200V transformer has primary resistance and reactance of 2 ohm and 4 Ohm respectively. The corresponding secondary values are 0.025 Ohm and 0.04 Ohm. Determine (i) equivalent resistance and reactance of primary referred to secondary (ii) total resistance and reactance referred to secondary,

(iii) equivalent resistance and reactance of secondary referable to primary,

(iv) total resistance and reactance referred to primary.

14.(i)Draw Kapp's regulation diagram and explain how the regulation of the transformer in determined from the diagram?

(ii)The required no load voltage ratio in a 150 kVA, 50 Hz, 1_ transformer 5000/250 v. Find the efficiency at half rate kVA, UPF and also efficiency at full load 0.8 pf lag if the full load cu losses are 1800 W. Core losses are 1500 W.

15. A 100 KVA 1100/200v single phase transformer has the following parameters.

R1 = 1**Ω**, X1= **3Ω**, R2=0.**04Ω,** X2=0.01**2Ω** . Find the equivalent resistance and leakage reactance referred to High Voltage winding.

16. Draw the equivalent circuit of a single phase 1100/220 V transformer on which the Following results were obtained.

i . 1100V, 0.5A, 55W on primary, secondary being open circuited. (8)

ii. 10v, 80A, 400W on low voltage side, high voltage being short circuited. (8)

Calculate the voltage regulation and efficiency of the above transformer when secondary supply is 100A at 0.8 pf lagging.

UNIT III - DC MACHINES

PART-A

1. Specify the function of the commutator in a DC machine. [MAY 2018]

2. Write the equation for emf induced in a DC machine. [MAY 2018]

3. Why in a DC machine the armature core should be laminated?

4. In a DC machine the armature is rotating and the field is stationery. True or False.
5. State the losses in a DC machine.
6. State the condition for maximum efficiency in a DC generator.
7. How many number of parallel paths are available in lap & wave windings?
8. State the function of commutator in DC machine.
9. Write the emf equation of DC generator.
10. What is meant by armature reaction?
11. What is meant by excitation?
12. Name the 2 types of armature winding.
13. What is the purpose of field winding of a DC machine?
14. What is the function of brushes in a DC machine?
15. Name the different types of DC generators.
16. List out the essential parts of a DC machine.
17. Define back & front pitch of lap winding in DC machine.
18. What are the effects of armature reaction in DC machine?
19. Draw the load characteristics of DC shunt generator. State why the terminal voltage decreases when load current increases?
20. Draw the load characteristics of DC series generator.
21. Draw the open circuit characteristics of a DC generator.
22. Write the torque equation of DC motor.
23. A DC series motor should always be started with load-Why?
24. State 2 applications of DC shunt motor.
25. Draw the speed torque characteristics of DC shunt motor.
26. State the condition for maximum efficiency in a DC motor.
27. Explain how to limit the starting current of DC motor.
28. Name the starters used for starting in DC motors.
29. Why are starters necessary for DC motor?

30. What is meant by back emf in DC motor?

31. Mention the different methods of speed control of DC shunt motor?

32. Mention the different methods of speed control of DC series motor?

33. Define critical resistance.

34. Name the different methods of testing available for DC machines.

35. Draw the connection diagram for Swinburne's test.

36. Draw the connection diagram of a long shunt compound generator.

37. What is commutation in DC machine?

38. State Faraday's law of Electromagnetic induction and Lenz law.

39. Mention the following functions in DC Machine

(i) Commutator (ii) Brushes (iii) Yoke (iv) Field coils.

40. What are the main constructional elements of a DC Machine?

41. What is meant by excitation of dc machine? What are the different methods for the excitation of DC Machine?

42. What are the necessary conditions for the generators to be self-excited?

43. Mention any 2-popular methods for the speed control of DC Shunt motor.

44. What is meant by motor ? How the Faraday's Left hand rule is used explain it.

45. Define critical resistance of a dc generator?

46. List the different method of speed control of DC Shunt motor?

47. In speed control of DC Shunt Motor how the armature control method is distinguished with field control method.

48. What are the different techniques used for the speed control of DC Series Motor?

49. Write the formulae for voltage equation of a DC Motor.

50. What is meant by armature reaction?

51. Write the formulae for generated emf of a Generator.

52. State two applications of DC shunt motor and series motor.

53. What is the significance of back emf Motor?

54. List the different variable and constant losses in electrical machine.

55. What is the basic principle of a DC Generator? How the Faraday's Right Hand rule is implemented explain it.

56. Draw the mechanical characteristics of DC Series and DC Shunt Motor.

57. Explain the circuit for Star connection and Delta connection.

58.Draw the open circuit characteristics of D.C generator.

59. List the types of D.C motors. Give any one difference between them.

PART-B

1. Describe the construction of DC machines with neat sketch. **[MAY 2018]**

2. Explain with a neat diagram, the armature control and field control method of speed control of DC shunt motor. **[MAY 2018]**

3. With neat diagram explain the working of3 point starter.

4. Explain in detail electrical, mechanical & electro-mechanical characteristics of DC Compound motor.

5. Explain Swinburne's test with neat diagram.

6. A shunt machine, connected to a 200 V mains has a armature resistance of 0.15 and the field resistance is 100 . Find the ratio of its speed as a generator to its speed as a motor, the line current in each case is 75 A.

7. A dc motor takes an armature current of 110 A at 480 V. The armature current resistance is 0.2. The machine has 6 poles and the armature is lap connected with 864 conductors. The flux per pole is 0.05 wb Calculate

(i) The speed (ii) the gross torque developed by the armature.

8. The armature winding of a 200 V, 4 pole, and series motor is lap connected. There are 280 slots and each slot has 4 conductors. The current 45A and the flux per pole is 18 mWb. The field resistance is 0.3, armature resistance is 0.5 and the iron and friction losses total 800 W. The pulley diameter is 0.41 m. Find the pull in Newton at the rim of pulley.

9. A 400 V dc shunt motor takes 5 A at no load. Its armature resistance (including brushing) is 0.5 and shunt field resistance is 200. Estimate the efficiency when the motor takes 50 A on full load.

10. Explain the construction of DC machine in detail & derive the emf equation of DC generator.

11. Discuss the open circuit & load characteristics of DC shunt generator.

12. Describe the construction and working of DC Generator.

13. Explain the different methods of speed control of D.C. Motors.

14. A 250 V, DC shunt motor has Rf= 150 Ω and Ra = 0.6 Ω. The motor operates on no load with a full field flux at its base speed of 1000 rpm with Ia = 5 A. If the machine drives a load requiring a torque of 100 Nm, calculate armature reaction and speed of the motor. If the motor is required to develop 10 kW at 1200 rpm. What is the required value of the external series resistance in the field circuit? Assume linear magnetization. Neglect the saturation and armature reaction.

15. A 220 V shunt motor has an armature resistance of 0.2 Ω and field resistance of 110 Ω. The motor draws 5 A at 1500 rpm at no load. Calculate the speed and shaft torque if the motor draws 52 A at rated voltage.

16. A 2 pole, 3 phase, 50 Hz, 2300 V synchronous machine has 42 slots. Each slot has two conductors in a double layer winding. The coil pitch is 17 slots. Each phase winding has two parallel paths. Calculate flux / pole required to generate a phase voltage of 2300 / V.

17. A 50 Hz, 400 V, 4-pole cylindrical rotor synchronous generator has 36 slots, two layer winding with full pitch coils of turns each. The mean air-gap diameter is 0.16 m, axial length 0.12 m and a uniform air-gap of 2 mm. Calculate the value of the resultant AT / pole and the peak air – gap flux density. The machine is developing an electromagnetic torque of 60 N-m as a generator at a torque angle of 26 . What should be the rotor AT / pole? What is the stator AT and the angle it makes with the resultant AT? Also find the stator current.

UNIT IV AC MACHINES

PART – A

1. State the advantages and disadvantages of three phase induction motor. **[MAY 2018]**

2. Draw the basic circuit of capacitor start capacitor run motor. **[MAY 2018]**

3. Write the principle of operation of a transformer.

2. Name the types of alternators.

3. Why induction motors are called as asynchronous motors?

4. Which type of 3θ Induction motor develops higher starting torque?

5. How can the direction of rotation of 3 phase Induction motor be reversed?

6. Why an 3θ Induction motor cannot run at syn. Speed?

7. What is slip of 3θ Induction motor?

8. What is the condition for producing maximum torque in a 3θ Induction motor?

9. Is the maximum torque of a 3θ Induction motor dependent on the rotor resistance?

10. What is the relationship of developed torque of a 3θ Induction motor with supply voltage?

11. How does slip varies with load?

12. What are the losses in 3θ Induction motor?

13. Draw torque slip characteristics of 3θ Induction motor

14. Differentiate squirrel cage and slip ring Induction motor

15. Why a starter is necessary to start an Induction motor?

16. What are the various types of starters used for SCIM?

17. Draw the equivalent circuit of 3θ Induction motor

18. Write the applications of 3θ Induction motor

19. What are the various methods used for speed control of 3 □ Induction motor?

20. Why single phase induction motor is not self starting?

21. What is double field revolving theory?

22. What is meant by Induction motor?

23. What are the two types of 3 phase Induction motor?

24. Write the advantages of stationery armature and rotating field in an alternator.

25. Compare salient & non-salient pole synchronous machines.

26. Deduce the relation between the number of poles, frequency and speed of the alternator.

27. State the advantages & disadvantages of using short pitched & distributed winding in alternator.

28. Write short notes on the following: Turbo-alternators, armature reaction.

29. Distinguish between hydro & turbo generators.

30. State the working principle of alternator.

31. What is meant by full pitched & short pitched windings?

32. What is meant by winding factor?

33. Why alternators are rated in KVA rather than in KW?

34. What is meant by synchronous impedance of alternator?

35. Define regulation in alternator.

36. What type of rotor is adopted for high speed alternators?

37. Name the 2 types of alternators depending on rotor construction.

38. Why are salient pole alternators more suitable for low speed & non salient pole for high speed operation?

39. What is an exciter?

40. What is the effect of armature reaction for an alternator for zero power factor lagging?

41. What is hunting?

42. Write the torque equation of synchronous motor.

43. What are the advantages of brushless alternator?

44. List the applications of hysteresis motor.

PART – B

Explain the principle of operation of three phase induction motor with essential constructional features. **[MAY 2018]**

2.Describe the construction and principle of working of stepper motor with neat diagram.

[MAY 2018]

3. Explain the working principle of 3 phase Induction motor.

4. Draw and explain the torque speed characteristics of 3 phase Induction motor?

5. Explain the construction and operation of 3 phase Induction motor.

6. Explain the different methods of speed control of 3 phase Induction motor.

7. Explain double field revolving theory of 3 phase Induction motor.

8. Explain different types of starters used for 3 phase Induction motor.

9. A 3300 V, 10 pole, 50 Hz, three-phase star connected motor has slip ring rotor resistance per phase = 0.015and standstill reactance per phase = 0.25 Ohm. If the motor runs at 2.5 percent slip on full load.Find,

(i) the speed of the motor.

(ii) speed at which the torque will be maximum.

(iii) the ratio of maximum torque to full load torque.

10. Explain the torque Vs Slip characteristics of a slip ring three phase induction motor?

11. Write the advantages of stationery armature and rotating field in an alternator.

12. Compare salient & non-salient pole synchronous machines.

13. Deduce the relation between the number of poles, frequency and speed of the alternator.

14. State the advantages & disadvantages of using short pitched & distributed winding in alternator.

15. Write short notes on the following: Turbo-alternators, armature reaction.

16. Derive the expression for torque of an 3 phase Induction motor and obtain the condition for maximum torque.

17. Discuss methods of starting of synchronous motor.

18.Discuss torque equation synchronous motor.

19. Write short notes on brushless alternator & hysterisis motor.

20. Explain how to calculate regulation using emf method

21. A 3 phase 12 pole synchronous machine has a star connected full pitch winding with108 slots and 12 conductor s per slot. The flux perpole is 50 mWb and sine distributed. The speed of rotation is 500 rpm. Find the frequency, phase emf and line emf.

22. Describe the construction and working of 3 phase induction motor.

23. A 600 V, 600 KVA single phase alternator has Ra =0.3 _. An exciting current of 5 A produces an emf of 400 V, on open and an armature current of 200 A on short circuit. Calculate

1.Synchronous impedance

2. The full load regulation with 0.8 p.f lagging.

24. Derive the induced emf equation of an alternator.

25. From the following test results, determine the voltage regulation of A 2000 V single phase alternator delivering a load current of 100 A at 0.8 lagging p.f . Test results: An excitation of 2.5 A produces a current of 100 A in the stator winding on short circuit and an emf of 500 V on open circuit. Assume an effective resistance of 0.8.

26. Explain the construction of synchronous machine & derive the emf equation.

27. Explain how to calculate regulation using mmf method..

UNIT V MEASUREMENT AND INSTRUMENTATION

PART-A

1. What are the different types of errors in measurement system? [MAY 2018]

2. What are the broad classifications of measuring instruments? [MAY 2018]

3. Define errors in measurement.
4. What is transducer?

5. What is meant by error? Classify.

6. What is meant by static and dynamic characteristics?

7. What is meant by Standard and list out its types?

8. What is the need for measurement and what are its types?

9. What is the function of manipulation element in a measurement system?

10. What are Primary standards? Where are they used?

11. How are instruments classified?

12. What is an absolute instrument? Give examples

13. What is a secondary instrument? Give examples.

14. Why MI instruments can be used on both AC and DC?

15. What are the errors that occur in MI instruments?

16. What is meant by sensitivity?

17. Define accuracy and resolution.

18. What is meant by static characteristics in measurement system? Mention any 4-static characteristics of instrumentation.

19. Define the following static characteristics (i) Accuracy (ii)Precision (iii)Span (iv) Static sensitivity.

20. What is meant by dynamic characteristics in measurement system? Mention any 4-dynamic characteristics of measurement system.

21. What is meant by error ? Mention the different types of errors produced in measurement system.

22. How the active transducer is distinguished with passive transducer? Give examples for each.

23. What is meant by analog and digital transducer ? Give examples for each.

24. How the primary transducer is distinguished with secondary transducer ? Give examples for each.

25. What is meant by variable resistance type or potentio meter ? How the potentio meter can be classified?

26. Draw the schematic diagram for translational type potentio meter and also write the mathematical expression for output voltage.

27. Mention the different materials used for potentio meter.

28. What is meant by strain gauge ? And also define the term Piezo resistive effect.

29. What are the different materials used for the construction of strain gauges ? And also write the formulae for gauge factor.

30. What is meant by semi conductor type strain gauges ? Mention the different materials used for the construction and also write the advantages of it.

31. What is meant by thermistor ? Why thermistor is said to be Negative Temperature Coefficient of Resistance(NTCR) ?

32. What is meant by RTD ? Write the mathematical expression for RTD? Why RTD is said to be Positive Temperature Coefficient of Resistance(PTCR) ?

33. Draw the schematic diagram of parallel plate capacitor. And also write the mathematical expression for it.

34. Mention any 4-applications of capacitance type transducer.

35. What is meant by piezo electric effect ? Give any 4-materials used for piezo electric effect.

36. What is meant by variable inductive transducer ? Mention the different types of variable inductive transducer.

PART-B

1.Describe the static and dynamic characteristics of measurement system. [MAY 2018]

2.Explain the working principle of resistive transducer and give some of its application. [MAY 2018]

3.Explain the working of following sensors

i)Strain Gauge

ii)Thermistor

4. Explain in detail variable resistive and capacitive transducer.

5. What are the functional elements of generalized instrumentation systems?

6. (i)Explain types of error in measurement and instrumentation systems.

(ii)Explain units and standards.

7. Explain piezoelectric transducer.

8. With a neat diagram explain in detail the Construction of a RVDT .

9. With a neat diagram explain in detail the Construction of a LVDT.

10.Explain the following characteristics of measurement system (i) Static Characteristics (ii) Dynamic Characteristics.

11. What is meant by error in measurement system? Explain the following types of errors (i) Gross Error (ii) Systematic Error (iii) Random Error.

12. Explain the following types of transducer (i) Active and Passive Transducer (ii) Primary and Secondary Transducer (iii) Analog and Digital Transducer (iv) Transducer and Inverse Transducer.

13. What is meant by variable resistance transducer or potentio meter ? Explain the following types of potentio meter (i) Translational type Potentio meter (ii)Rotational type potentio meter (iii) Helical type potentio meter. And also write the advantages, disadvantages and applications of it.

14. What is meant by Piezo electric effect ? Obtain the mathematical expression for gauge factor in strain gauge. Explain the different types of strain gauges (i) Wire wound type strain gauges (ii) Bonded metal foil strain gauges (iii) Thin film type of strain gauges (iv) Semi conductor type strain gauges (v) Rosettes. And also write the applications of strain gauges.

15. Explain the principle, construction, working, mathematical expression of RTD. Also explain the following RTD Scheme (i) Two lead arrangement (ii) Three lead arrangement (iii) Four lead platinum thermometer.

16. Explain the principle, construction, working, mathematical expression of Thermistor.And also write the advantages, disadvantages and applications of it.

17. Explain the following types of capacitive type transducers (i) Parallel plate capacitor (ii) Cylindrical plate capacitor (iii) Capacitor type transducer as microphone.

18. What is meant by piezoelectric effect ? Mention any 4-materials used for piezoelectric effect. Obtain the expression for output voltage and equivalent circuit of piezoelectric crystal. And also write the advantages, disadvantages and applications of it.

19.What is meant by variable inductive transducer ? Explain the following different types of variable inductive transducer (i) Variation of self - inductance of the coil (ii) Variation of mutual inductance of the coil (iii) Production of eddy current.

20. Explain the construction, working and characteristics of LVDT. And also write the advantages, disadvantages and applications of it.

21. Explain the construction, working and characteristics of RVDT.

22. Explain the operation of

i) Capacitor microphone

ii) Piezoelectric transducer

23. Explain static and dynamic characteristics of Measurement systems .

24.What is meant by Linear Variable Differential Transformer(LVDT) ? Draw the schematic diagram of LVDT. And also write the output equation for (i) Null Position (ii) Left Position (iii) Zero Position.

Prepared by,

Approved by,

HOD/ECE