

# EMMI - 4<sup>th</sup> Sem Electrical

Short type questions :-

ms

CH-1 → Measuring Instruments

(1) The use of \_\_\_\_\_ instrument merely confined within laboratories as

CH-8 Oscilloscope

- 1 - The source of emission of electrons in a CRT is : barium and strontium oxide coated cathode.
2. In a CRT the focusing anode is located : between pre-accelerating & acceleration anodes.
3. Post acceleration is needed in a CRO if the frequency of the signal is : more than 1 MHz.
4. P<sub>1</sub> phosphor material is used for display in CRTs for : general purpose application.

5. An aquadag is used in a CRO to collect Secondary emission electrons.

6. The bandwidth of a CRO is from 0-20 MHz. The fastest rise time a sine wave can have to be accurately reproduced by the instrument is

17.5 ns

## CH-7. Sensor & Transducer :-

1. A Transducer converts: one form energy into another form of energy.
2. An inverse transducer converts electrical energy into <sup>any</sup> other form of energy.
3. One of the following can act as an inverse transducer piezo electric crystals
4. One of the following is an active transducer photovoltaic cell.
5. A Resistance potentiometer is a zero order instrument.
6. In a resistance potentiometer high value of resistance POT leads to high value of sensitivity.
7. In wire wound strain gauge the changes in resistance of strain ~~is~~ mainly due to change in both length & diameter wire.

8. Unbonded strain gauges are exclusively used for transducer application.

9. The gauge factor is defined as:

$$\frac{\Delta R / R}{\Delta L / L}$$

$$\frac{\Delta L / L}{\Delta R / R}$$

10. Metal foil gauges use flat end turns in order to reduce transverse sensitivity.

11. A thermistor exhibits either a negative or positive change of resistance with increase of temperature depending upon the type of material used.

12. Thermocouples are active transducer.

13. Air cored inductive transducers are suitable for use at higher frequencies.

14. The size of air cored transducer is compared with their iron cored counterparts is bigger.

15. In a ~~EDD~~ LVDT the core is made up of a high permeability, nickel iron hydrogen annealed material in order to produce low harmonics, low null voltage & high sensitivity. The core is slotted to reduce eddy current losses.

16. Capacitive transducers are normally used for dynamic measurement.

17. The dynamic characteristics of capacitive transducers are similar to those of high pass filters.

18. What is order of minimum displacement that can be measured with capacitive transducer. 1  $\mu$ m

19. Piezo-electric transducers are active & inverse transducers.

20. A Hall effect transducer can be used for measurement of power, current, displacement.

Q1. Which of the following optical transducers is an active transducer  
photo voltaic cell

Q2. A photo-conductive cell is useful for low frequency application.

CH-06 ~~Measure~~ Measurement of Resistance, Inductance & Capacitance.

1. A wheatstone bridge can not be used for precision measurement because errors are introduced into on account of Resistance of connecting leads, thermo electric emfs, contact resistances.

2. High resistances are provided with a guard terminal. This guard terminal is used to bypass the leakage current.

3. The value of resistance of an earthing electrode depends upon shape & material of electrode & specific resistance of soil.

4. From the point of view safety, the resistance of earthing electrode should be: low.

5. Maxwell inductance capacitance bridge is used for measurement of inductance of medium Q coils

6. Frequency can be measured by using Wein's bridge.

7. Wagner's Earth devices are used in ac bridge circuit for Eliminating the effect of earth capacitance.

8. A bridge circuit works at frequency of 2 kHz. The following can be used as detectors for detection of null conditions in the bridge headphone & tunable amplifiers.

CH-5 → Measurement of speed frequency  
& power factor meter! -

1- The controlling torque in single-phase power factor meter is provided by

2- There will be serious error if power factor or non-sinusoidal wave form is measured by electrodynamic power factor meter.

This is true of: only single phase meter

3- A 53 Hz reed type frequency meter is polarized with d.c. the new range of frequency meter is: 106 Hz.

4- A phase sequence indicator rotates clockwise for phase sequence of RYB if the phase sequence is changed BRY it will rotate: clockwise

5- An alternator is being synchronized to the busbar whose frequency is 50 Hz. The bulb of the synchroscope flickers at a frequency of 10 Hz. The frequency of the alternator is: 60 Hz or 40 Hz.



## Ch-4 - Energymeters & measurement of Energy! -

- 1 - The braking torque provided by a permanent magnet in a single phase energy meter is proportional to the Distance of the permanent magnet from the centre of the rotating disc.
- 2 - In the single phase induction meter in order to obtain true value of energy, the shunt magnet flux should lag behind the applied voltage by:  $90^\circ$ .
- 3 - In an induction type of meter, maximum torque is produced when the phase angle between the two fluxes is:  $90^\circ$ .
- 4 - In a single phase induction type energy meter, the lag adjustment is done to make the pressure coil flux in phase with the applied voltage.

5 - In an induction type energy meter, compensation for static friction is provided by shading bands which are actuated by a permanent magnet provided a constant torque irrespective of load.

6 - In an induction type energy meter runs fast, it can be slowed down by By adjusting the position of braking magnet & making it more away from the centre of the disc.

7 - Creeping in a single phase induction type energy meter may be due to Overvoltage & vibration or friction

8 - V-Ah metering can be done by using Bridge connected rectifiers & a ball & disc friction gearing.

9. Light load adjustment for induction type energy meter are usually done at 5% of full load current.

## CH-3 Wattmeters and measurement of power :-

1. In an electro-dynamometer type of wattmeter the current coil is made fixed.
2. In electro-dynamometer type wattmeter current coil designed for carrying heavy current use stranded wire or laminated conductors :-  
to reduce eddy current losses in conductor.
3. In electro-dynamometer type of wattmeter, the inductance of pressure coil circuit produces error which is higher at low power factor.
4. When measuring power with an electro-dynamometer wattmeter in a circuit where the load current is small the current coil should be connected on the load side.

5. When measuring power with an electro dynamometer wattmeter in a circuit having a low power factor. ∴ - a compensated wattmeter with pressure coil connected on the load side should be used.

~~Ch-2 Analog Ammeters~~

Ch-2 Analog Ammeters & Voltmeters:

- 1- The high torque to weight ratio in an analog indicating instrument indicates - **Low friction loss.**
- 2- A 1 mA ammeter has a resistance of  $1\text{ k}\Omega$  it is to be converted to a 1 A ammeter. The value of shunt resistance is ∴ -  **$0.1001\ \Omega$**
- 3- A 1 mA d'Arsonval movement has a resistance  $1\text{ k}\Omega$ . It is to be converted to a 10 V voltmeter. The value of multiplier resistance is ∴ -  **$9900\ \Omega$**

4- The power consumption pmmc instrument is typically about :-

25 mW to ~~200 mW~~ 200 mW.

5- A meggar is used for measurement of high valued resistances, particularly insulation resistance.

6- The controlling torque in a meggar is provided by :- it does not need any controlling torque.

7- A moving iron instrument can be used for current & voltage measurement :- in both a.c & d.c circuit for frequencies upto about 125 Hz (in case of a.c circuits)

8- In spring controlled moving iron instruments the scale is :- cramped at the lower end and expanded at the upper end.

9- Moving iron instrument when measuring voltages or currents :- indicator type instrument as on panels.

- 10 - The moving iron voltmeter indicate lower value for a.c. voltages than for corresponding d.c. voltages.
- 11 - Horizontally mounted moving iron instrument use: - Air friction damping.
- 12 - An electrodynamic type of instrument finds its major use as: - Both as standard & transfer instrument.
- 13 - The operating magnetic field in an electrodynamic type of instrument has a flux density typically about  $0.005 \text{ Wb/m}^2$ .
- 14 - Thermocouple instruments can be used for a frequency range: - 50 MHz.
- 15 - The heater wire of thermocouple instrument is made very thin in order to have: - To reduce skin effects at high frequencies.
- 16 - Electrostatic type instrument are primarily used as: - Voltmeters.
- 17 - An electrostatic voltmeter draws a small value of current on d.c.: - Under steady state condition respective of applied voltage.

(18.) Which meter has the highest accuracy in the prescribed limit of frequency range :- **Electrodynamometer**

(19) which instrument is the cheapest disregarding the accuracy :- **Moving Iron**

(20) which instrument has the highest frequency range with accuracy within reasonable limits :-

**Thermocouple**.

## Mcq emmi

- Resistances can be measured with the help of
  - wattmeters
  - voltmeters
  - ammeters
  - ohmmeters and resistance bridges
- Which of the following essential features is possessed by an indicating instrument ?
  - Deflecting device
  - Controlling device
  - Damping device
  - All of the above
- A moving-coil permanent-magnet instrument can be used as \_\_\_\_\_ by using a low resistance shunt.
  - ammeter
  - voltmeter
  - flux-meter
  - ballistic galvanometer
- A potentiometer may be used for
  - measurement of resistance
  - measurement of current
  - calibration of ammeter
  - all of the above
- An ammeter is a
  - secondary instrument
  - absolute instrument
  - recording instrument
  - integrating instrument
- A moving iron instrument can be used for
  - D.C. only
  - A.C. only
  - both D.C. and A.C.
  - none
- An induction wattmeter can be used for
  - both D.C. and A.C.
  - D.C. only
  - A.C. only
  - any of the above
- An ohmmeter is a
  - moving iron instrument
  - moving coil instrument
  - dynamometer instrument
  - none of the above
- For measuring a very high resistance we should use
  - Kelvin's double bridge
  - Wheat stone bridge
  - Meggar
  - None of the above
- The electrical power to a meggar is provided by
  - battery
  - permanent magnet D.C. generator
  - AC. generator
  - any of the above
- In a meggar controlling torque is provided by
  - spring
  - gravity
  - coil
  - eddy current
- The operating voltage of a meggar is about
  - 6 V
  - 12 V
  - 40 V
  - 100 V



11. Basically a potentiometer is a device for

- (a) comparing two voltages
- (b) measuring a current
- (c) comparing two currents
- (d) measuring a voltage
- (e) none of the above

12. In order to achieve high accuracy, the slide wire of a potentiometer should be

- (a) as long as possible
- (b) as short as possible
- (c) neither too small not too large
- (d) very thick

13. To measure an A. C. voltage by using an A.C. potentiometer, it is desirable that the supply for the potentiometer is taken

- (a) from a source which is not the same as the unknown voltage
- (b) from a battery
- (c) from the same source as the unknown voltage
- (d) any of the above

14. For measurements on high voltage capacitors, the suitable bridge is

- (a) Wein bridge
- (b) Modified De Santy's bridge
- (c) Schering bridge
- (d) Any of the above

15. Standard resistor is made from

- (a) platinum
- (b) maganin
- (c) silver
- (d) nichrome

16. The power factor of a single phase load can be calculated if the instruments available are

- (a) one voltmeter and one ammeter
- (b) one voltmeter, one ammeter and one wattmeter
- (c) one voltmeter, one ammeter and one energy meter
- (d) any of the above

17. The pointer of an indicating instrument should be

- (a) very light
- (b) very heavy
- (c) either (a) or (b)
- (d) neither (a) nor (b)

18. Which of the following essential features is possessed by an indicating instrument ?

- (a) Deflecting device
- (b) Controlling device
- (c) Damping device
- (d) All of the above

19. The resistance can be measured most accurately by  
(a) Voltmeter-ammeter method (b) bridge method  
(c) multimeter (d) Megger
20. Schering bridges are used for the measurement of .....  
(a) Unknown capacitance (b) Dielectric loss  
(c) Power factor (d) All of these
21. Induction type instruments are generally used as .....  
(a) Ammeter  
(b) Voltmeter  
(c) Wattmeter  
(d) All of these
22. Permanent-magnet moving-coil ammeters have uniform scales because :  
(a) of eddy current damping  
(b) they are spring-controlled  
(c) their deflecting torque varies directly as current  
(d) both (b) and (c).
23. The meter that is suitable for *only* direct current measurements is :  
(a) moving-iron type  
(b) permanent-magnet type  
(c) electrodynamic type  
(d) hot-wire type.
24. A moving coil voltmeter measures—  
(a) only a.c. voltages  
(b) only d.c. voltage  
(c) both a.c. and d.c. voltages  
(d) none
25. The most efficient form of damping employed in electrical instruments is :  
(a) air friction  
(b) fluid friction  
(c) eddy currents  
(d) none of the above.
26. A \_\_\_\_\_ device prevents the oscillation of the moving system and enables the latter to reach its final position quickly  
(a) deflecting  
(b) controlling  
(c) damping  
(d) any of the above
27. Most common form of A.C. meters met with in every day domestic and industrial installations are  
(a) mercury motor meters  
(b) commutator motor meters  
(c) induction type single phase energy meters  
(d) all of the above

28. Which of the following meters are not used on D.C. circuits

- (a) Mercury motor meters
- (b) Commutator motor meters
- (c) Induction meters
- (d) None of the above

29. The household energy meter is

- (a) an indicating instrument
- (b) a recording instrument
- (c) an integrating instrument
- (d) none of the above

30. In majority of instruments damping is provided by

- (a) fluid friction
- (b) spring
- (c) eddy currents
- (d) all of the above