VIVA VOCE QUESTIONS

SUBJECT : APPLIED PHYSICS II

1. *Sensitivity of the Carey Foster Bridge is the same as the sensitivity of the Wheatstone bridge. Bridge is most sensitive when all the four resistances are of the same order. As far as accuracy is concerned that would also depend upon the sensitivity of a galvanometer or detector.*

2. *The Carey Foster Bridge is a modified form of the Metre Bridge. In Carey Foster Bridge there is no end resistance whereas in Metre bridge end resistance affects our readings. Carey Foster Bridge can measure low and high resistance more accurately than Metre Bridge.*

3. *Specific resistance is defined as the resistance offered by unit length and unit cross-section of the substance to a current when a voltage is applied to it. Resistance of a conductor is defined as the measure of the opposition to current flow in an electric circuit.*

4. *Position of null point changes on the wire when the resistance connected in the outer gaps is interchanged. The value of resistance is equal to the resistance of the differences of bridge wire i.e., (L - l).*

5. *A solid substance that has a conductivity between that of an insulator and that of the most metals. The difference between intrinsic and extrinsic semiconductor is that intrinsic semiconductors are the pure form of semiconductor materials. Whereas extrinsic semiconductors are impure semiconductors formed by adding an impurity to a pure semiconductor.*

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6. *A band gap is an energy range in a solid where no electronic States can exist. Valence band is the range in the energy graph where all the valence electrons reside whereas the conduction band is the range of energy contained by all the free electrons. Fermi level is the highest energy state occupied by electrons in a material at absolute zero temperature.*

7. *Band gap energy of semiconductors decreases with increase in temperature.*

8. *Probe is used to measure the resistivity of any semiconductor material. It is collinear because no anisotropy can be detected with the collinear contacts of the four point probe.*

9. *Hall effect is the movement of charge carriers through a conductor towards a magnetic attraction. The natural electron drift of the charge carriers causes the magnetic field to apply a Lorentz Force to these charge carriers.*

10. *As temperature is increased, the Hall Coefficient decreases.*

11. *The magnetic force disrupts the normal flow of electrons causing more collisions with atoms and other electrons which increases the resistance of the wire.*

12. *The Hall Coefficient is defined as the ratio of the induced electric field to the product of the current density and the applied magnetic field.*

13. *Value of Planck's Constant is approximately 6.626*10 -34 .It describes the behaviour of particles and waves on the atomic scale.*

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14. *No, the number of electrons emitted per unit time depends on the intensity and frequency of the light that shines on the metal surface.*

15. *Light emitting diode is a semiconductor light source that emits light when current flows through it.*

16. *The Photoelectric Effect is the generation of electric charge when light hits a material like a semiconductor. The changing of kinetic energy of a mobile electron into radiant energy is called the Reverse Photoelectric Effect. No, the Reverse Photoelectric Effect can not be observed with a metal surface because the photons emitted are usually outside the range of visible light.*

17. *The resistance-change factor for degree Celsius of temperature change is called the temperature coefficient of resistance. Its unit is "alpha". Materials which have useful engineering applications usually show relatively rapid increase with temperature, i.e., higher coefficient. The higher the coefficient ,the greater an increase in electrical resistance for a given temperature increase.*

18. *The most reproducible type of sensor is made from Platinum because it is a stable unreactive metal which can be drawn down to fine wires but is not too soft. Because of the properties of platinum, it is used as a sensing element in thermometers.*

19. *Junction diode is a semiconductor rectifying device in which the barrier between the two regions of opposite conductivity produces the rectification. When a diode is connected in a Forward Bias a negative voltage is applied to the N-type material and a positive voltage is applied to the P-type material. When a diode is connected in Reverse Bias the voltage potential is connected to negative P-type material and*

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positive to the N-type material across the diode which has the effect of increasing the PN junction diode's width.

20. *The major difference between PN junction and the zener diode is that the PN junction diode only in the forward direction whereas the zener diode allows the current to flow both in the forward and reverse direction. One of the major differences between the Avalanche and Zener Breakdown is that Avalanche Breakdown occurs because of the collision of the electrons, whereas the Zener Breakdown occurs because of the high electric field.*

21. *We need to know the Vz , Izmax and the maximum power of the Zener. Considering the voltage input , choose a resistor that won't break the zener Pzmax . Measure the Zener voltage, check both resistor and Zener temperature. Adjust the resistor value until Iz reaches a reasonable value in accordance with your power supply requirements.*

22. *Digital oscilloscope is a complex electronic device composed of various software and electronic hardware modules that work together to capture, process, display and store data that represents the signals of interest of an operator. X-Y mode is a specialised two-channel mode of Oscilloscope when the signal of channel 1 is used for the derivation along the horizontal axis(X) and the signal of channel 2 along the vertical axis (Y).*

23. *Phase difference between two waves is the difference between the starting points. So the concept of phase difference is used to generalize the representation of a wave. Amplitude, frequency, wavenumber and phase shift can change the phase difference between waves.*

24. *Fluorescent material is used on the screen of CRT.*

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25. *The capacitor is a component which has the ability to store energy in the form of an electrical charge producing a potential difference across its plates. The property of a capacitor to store charge on its plates in the form of an electrostatic field is called the capacitance of the capacitor. RC time constant is a measure that helps us figure out how long it will take a capacitor to charge to a certain voltage level. The capacitor in this RC charging circuit is virtually fully charged and the voltage across the capacitor is now approximately 98% of its maximum value,0.98Vs. Time constant for an RC discharge circuit is given as the voltage across the plates representing 37% of its final value, with its final value being 0 volt.*

26. *RC circuit is used in camera flashes, pacemaker, timing circuit etc.*

27. *The specific charge of an electron can be determined when an electron moves in both magnetic field and electric field which are mutually perpendicular to each other, so that the net force on the electron is made zero. The significance of e / m ratio is that two particles with the same e / m ratio move in the same path in a vacuum, when subjected to the same electric and magnetic fields.*

28. *The charged particle moves in helical motion in both electric and magnetic field.*

29. *In a CRT the electron beam starting from cathode strikes the screen producing a visible effect. The Beam contains negatively charged particles in motion and hence it is equivalent to a conductor carrying current. Now Earth's magnetic field can be affected unless it is parallel to the beam when it is not affected. That is the reason why CRT is kept in N-S direction.*

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30. *50 Hertz is the frequency of AC mains in India. 1 Hertz means one cycle per second.*

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