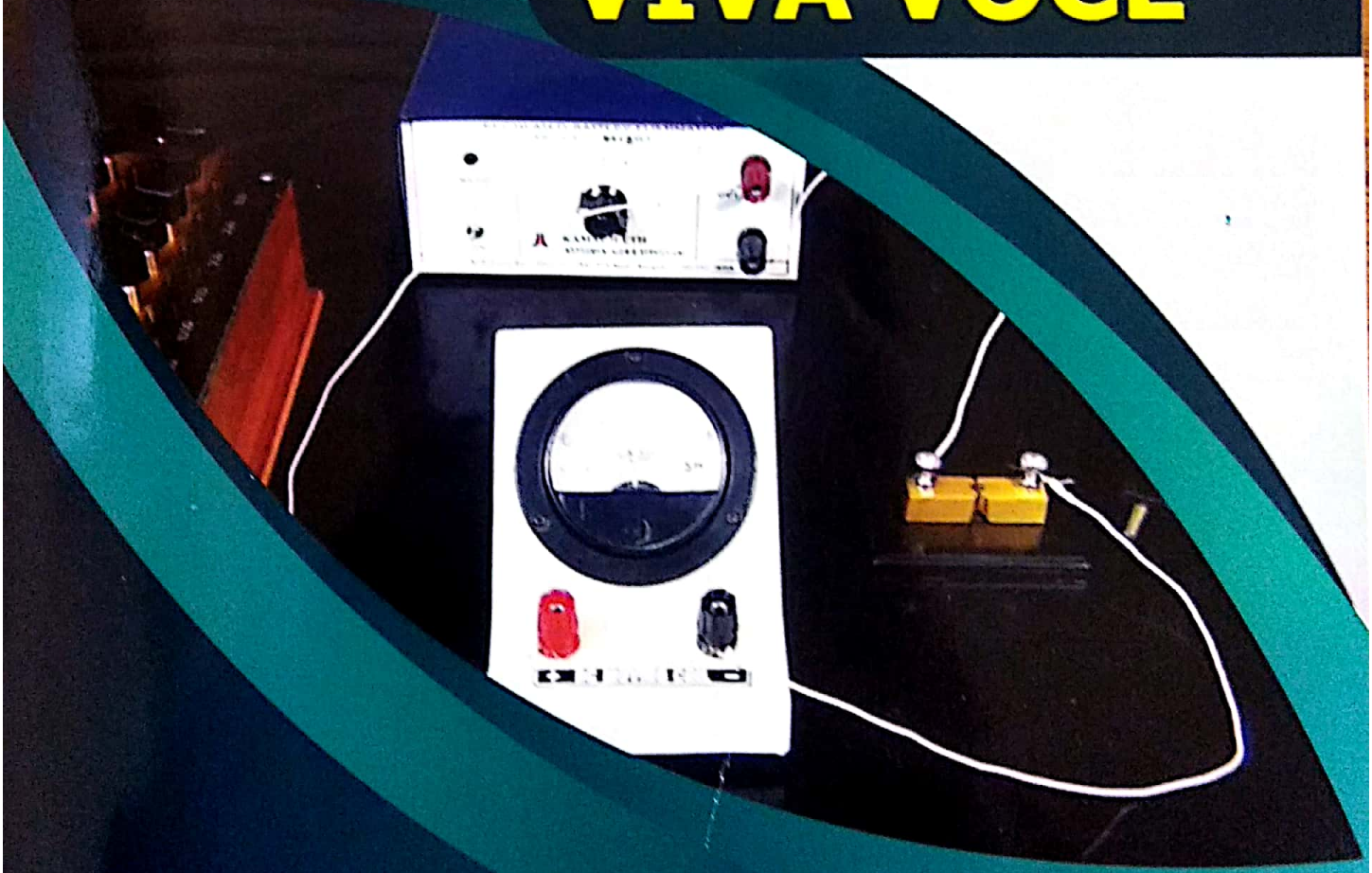
PRE-UNIVERSITY EDUCATION
Bangalore North District

PHYSICS PRACTICAL

II PUC

VIVA VOCE



Practical Examination
Orientation Programme

CONTENTS

PHYSICS PRACTICAL EXAMINATION

General Instruction :
Duration of practical examination 2 hours.
Maximum marks allotted 30 marks.

Scheme of valuation

A. Weightage of marks

Sl. No.	Particulars	Marks
1.	Performing the Experiment	20
2.	Viva-voce	04
3.	Practical Record	06
	Total	**30**

B. Distribution of marks for performing the Experiment.

Sl. No.	Particulars	Marks
1.	Writing the principle of the experiment	2
2.	Writing the formula and explaining the terms	2
3.	Writing the diagram / figure/ circuit with labelling (At least two parts)	2
4.	Writing the tabular column/observation pattern	2
5.	Constructing the experimental setup/ circuit	3
6.	Performing the experiment and entering the readings into the tabular column/ Observation pattern	4
7.	Substitution and calculation /plotting the graph and calculation	3
8.	Result with unit	2
	Total	**20**

C. Viva-voce

1. Four questions must be asked and each question carries 1 mark.
2. The questions in the viva-voce should be simple, direct and related to the experiment to be performed by the student.

Expt-1 Resistance per unit length of a wire

Q - Determine the resistance per unit length of a given wire by plotting potential difference versus current graph.

1. State Ohm's law.

Ans : The electric current flowing through a conductor is directly proportional to the potential difference across its ends, provided the temperature and other physical conditions remains constant.

2. How do you conclude that the conductor used in experiment obeyed Ohm's law ?

Ans : It is done by two results.

i) The ratio of V/I cames to be constant.

ii) A graph of a I versus V to be a straight line.

3. What is resistance of a conductor ?

Ans : It is the effective opposition offered by a conductor to the flow of electric current through it.

4. How does the resistance of the conductor varies with its length ?

Ans : Resistance of the conductor varies directly proportional to its length.

5. What is the significance of the reciprocal of slope of I-V graph ?

Ans : The reciprocal of slope of I-V graph measures resistance.

6. Is there any change in resistance per unit length of a wire, when its length reduced to half of the original value ?

Ans : No, It is remains constant for a given wire.

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Expt-2 Resistivity of the material of a wire

Q - Determine the reistance of a given wire using a metre bridge and hence determine resistivity of the material of wire. Given the radius of the wire, r = ... m.

1. Define resistivity of the material of a wire.

Ans : It is the resistance of a given wire of unit length and unit area of cross section.

2. Does the resistivity of the material of the given wire depend on its dimensions?

Ans : No. It is independent on its dimensions.

3. What is a metre bridge ?

Ans : It is a modified form os Wheatstone's network.

4. Why metal strips are made thick in metre bridge ?

Ans : To reduce their resistance.

5. What is null point ?

Ans : It is a point on the wire, where the galvanometer shows zero (null) deflection.

6. How do you verify the proper connection in metre bridge experiment ?

Ans : If the deflection in the galvanometer is opposite, when the jockey (slider) is placed at two extreme ends of the meter bride wire, then the connection is proper.

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Expt-3 Combinations of resistances

Q - a) Verify the law of series combination of resistances using a meter bridge.
Given R_1 = ... Ω and R_2 = ... Ω
b) Verify the law of parallel combination of resistances using a metre bridge.
Given R_1 = ... Ω and R_s = ... Ω

1. What is the need of combination of resistances ?

Ans : To get the desired range of resistance required for electrical circuit.

2. How does the resistance change in series combination?

Ans : Resistance increases in series combination.

3. What is the effective resistance of two equal resistances connected in series ?

Ans : $R_{eff} = 2R$

4. How does the resistance change in parallel combination?

Ans : Resistance decreases in parallel combination.

5. What is the effective resistance of two equal resistances connected in parallel ?

Ans : $R_{eff} = \frac{R}{2}$

6. What is the potential difference across the galvanometer at null point ?

Ans : Zero.

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Expt-4 Comparision of emfs of two cells

Q - Compare emfs of two given cells using potentiometer.

1. What is emf of a cell ?

Ans : The emf (electromotive force) of a cell is the potential difference across the terminals of the cell when it is in open circuit.

2. Can we measure emf by a voltmeter ?

Ans : No. The voltmeter measures the terminal p.d of a cell.

3. What is a Potentiometer ?

Ans : It is an instrument used to measure the potential difference or emf of a cell.

4. Why is a potentiometer preferred over a voltmeter for measuring the emf of a cell ?

Ans : A potentiometer draws no current from the cell whose emf is to be measured. On the other hand, the voltmeter always draws some current.

5. Why don't we use a copper wire as a potentiometer wire ?

Ans : Copper wire has a high temperature co-efficient of resistance and low resistivity hence no appreciable potential drop across the ends of the potentiometer wire.

6. What is meant by sensitivity of a potentiometer ?

Ans : It is the smallest potential difference that it can measure.

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Expt-5 Internal resistance of a cell

Q - Determine the internal resistance of a given cell using potentiometer.

1. What is meant by internal resistance of a cell ?

Ans : It is the resistance offered by the electrolyte to the flow of ions to their respective electrodes.

2. Does the internal resistance depends on the current drawn from the cell ?

Ans : yes, the internal resistance increases as more current is drawn from the cell.

3. Potentiometer is used to determine the internal resistance of which cell - primary cell or secondary cell ?

Ans : Primary cell only.

4. Can we consider the potentiometer as an ideal voltmeter?

Ans : Yes. It can be considered as an ideal voltmeter.

5. Is it possible to carry out the experiment with a battery of emf less than the emf of the given primary cell ?

Ans : No.

6. Why do we prefer a potentiometer with a larger bridge wire ?

Ans : To decrease the potential gradient of the wire. Smaller the potential gradient, more is the sensitivity of potentiometer wire.

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Expt-6 Figure of merit of a galvanometer

Q - Determine the resistance of a galvanometer, by half deflection method and find its figure of merit.

1. What is a galvanometer ?

Ans : It is a device used for detecting feeble (very small) electric current in circuits.

2. Why the scale of galvanometer has zero in the middle ?

Ans : A needle at zero in the middle can deflect on both sides.

3. Do you have positive and negative terminal in the galvanometer ?

Ans : No, the pointer can deflect on either side of zero in the middle.

4. Define figure of merit of galvanometer.

Ans : It is the current required to produce a unit deflection in the galvanometer.

5. How the figure of merit of a galvanometer related with its current sensitivity ?

Ans : The figure of merit of a galvanometer is equal tot he reciprocal of its current sensitivity.

6. Why is this method called half deflection method ?

Ans : It is so because the deflection is made half by using a shunt resistance.

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Expt-7 Conversion of a galvanometer into an ammeter and a voltmeter

Q - a) Convert given galvanometer into ammeter
Given, figure of merit of galvano meter, K = ... $Adiv^{-1}$.
Resistance of galvanometer, G = ... Ω
a) Convert given galvanometer into voltmeter
Given, figure of merit of galvanometer, K = ... $Adiv^{-1}$
Resistance of galvanometer, G = ...Ω

1. What is an ammeter ?

Ans : An ammeter is an instrument for measuring electric current in circuits.

2. Why is an ammeter used in series in a circuit ?

Ans : The whole current to be measured is passed through it.

3. How do you convert the given galvanometer into an ammeter ?

Ans : A galvanometer is converted into an ammeter by connecting a low resistance (shunt) in parallel with the galvanometer.

4. What is a voltmeter ?

Ans : A voltmeter is an instrument for measuring electric potential difference between two points in a circuit.

5. What do you understand by the range of a voltmeter ?

Ans : It is the maximum value of the potential difference which the voltmeter can measure.

6. How do you convert the given galvanometer into a voltmeter ?

Ans : A galvanometer is converted into a voltmeter by connecting a high resistance in series with the galvanometer.

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Expt-8 Frequency of AC

Q - Determine the frequency of alternating current using sonometer and an electromagnet.
Given, mass per unit length of wire, m = ... Kgm^{-1}.

1. What is meant by frequency of AC ?

Ans : It is the number of cycles completed by AC in one second.

2. Which type of waves are produced in the sonometer wire ?

Ans : Transverse stationary waves are produced in the sonometer wire.

3. Which parameter changes when the distance between the knife edges is varied ?

Ans : The natural frequency of the sonometer wire changes.

4. When will the sonometer wire resonate ?

Ans : When the frequency of AC mains is equal to the natural frequency of the vibration of the wire.

5. How does the resonating length of the wire vary with the tension in the string ?

Ans : Resonating length increases with the tension in the sonometer wire (String)

6. What is the value of frequency of DC ?

Ans : The frequency of DC is zero.

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Expt-9 Focal length of a concave mirror

Q - Determine the focal length of concave mirror by u-v method.

1. What is a Concave mirror ?

Ans : A spherical mirror whose reflecting surface is towards the centre of the sphere of which the mirror is a part is called concave mirror.

2. Define focal length of a concave mirror.

Ans : It is the distance between the pole and the principle focus of a concave mirror.

3. What is the relation between focal length of a mirror and its radius of curvature ?

Ans : The focal length of a mirror is equal to half of its radius of curvature, i.e. $f = \frac{R}{2}$.

4. What is the nature of the image formed by a concave mirror when an object is kept between F and 2 F ?

Ans : The image formed by a concave mirror is real and inverted.

5. When does a concave mirror produce a virtual image?

Ans : When the object is placed between the principal focus (F) and the pole (P) of a concave mirror.

6. Concave mirror is used as shaving mirror, why ?

Ans : When face lies between principal focus and pole of a concave mirror, an errect and enlarged image of the face in formed.

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Expt-10 Focal length of a Convex lens

Q - Determine the focal length of convex lens by plotting a graph of u versus v.

1. What is a convex lens ?

Ans : A lens which is thick in the middle and thin at the edges is called a convex lens.

2. Define focal length of a convex lens ?

Ans : It is the distance between optical centre of a convex lens and its principal focus.

3. Can a convex lens be used as a magnifier ?

Ans : yes, when an object is placed between the pole and the principal focus (i.e. $u < f$), the image is virtual, erect and enlarged, hence it can be used as a magnifier.

4. Define principal focus of a convex lens.

Ans : It is a point on the principal axis of a convex lens at which all the rays converges after refraction.

5. Why the object must be placed between f and 2f of a convex lens ?

Ans : To have a real, enlarged and inverted image.

6. Which convex lens has more focal length, thick lens or thin lens ?

Ans : A thin convex lens.

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Expt-11 Focal length of a Convex mirror

Q - Determine the focal length of concave lens using a convex lens.

1. What is a convex mirror ?

Ans : A spherical mirror whose reflecting surface is away from the centre of the sphere of which the mirror is a part is called convex mirror.

2. Does a convex mirror produce real image for real object ?

Ans : No.

3. What type of image is formed by a convex mirror ?

Ans : A convex mirror forms a virtual, erect and diminished image.

4. Why convex lens is used in finding the focal length of a convex mirror ?

Ans : We use a convex lens to have a real image, because light reflected from convex mirror is diverging.

5. It mirror formula applicable for a plane mirror ?

Ans : Yes, it is applicable.

6. How do you distinguish between concave mirror and convex mirror without touching ?

Ans : We see our face in the mirror from a close distance, if the magnification is more than one (enlarged image), mirror is concave.

If the magnification is less than one (diminished image), mirror is convex.

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Expt-12 Focal length of a Concave lens

Q - Determine the focal length of convex mirror using a convex lens.

1. What is a concave lens ?

Ans : A lens which is thin in the middle and thick at the edges is called a concave lens.

2. What is the nature of image produced by a concave lens ?

Ans : Concave lens always produce a virtual, erect and diminished image.

3. What is the value of magnification in the case of concave lens ?

Ans : It is always less than one and negative i.e. $m < 1$.

4. What is the sign of focal length of a concave lens ?

Ans : Focal length is negative for Concave lens.

5. What type of lens is an air bubble inside water ?

Ans : Concave lens.

6. For which type of eye defect, Concave lens is used ?

Ans : Myophia or Short sightedness.

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Expt-13 Angle of minimum deviation

Q - Determine the angle of minimum deviation for a given glass prism by plotting a graph of angle of incidence versus angle of deviation.

1. What is a prism ?

Ans : It is an optical medium bounded by at least two non parallel surfaces.

2. Define angle of the prism.

Ans : The angle between the two refracting surfaces of a prism is called angle of the prism.

3. Define angle of minimum deviation.

Ans : The least value of deviation for a ray passing through a prism is called angle of minimum deviation.

4. When does minimum deviation occur ?

Ans : When the angle of incidence is equal to the angle of emergence.

5. What does the graph of angle of incidence (i) and angle of deviation (d) indicates ?

Ans : The d-i graph indicates that there is one value of angle of incidence for which angle of deviation is minimum.

6. Is the angle of minimum deviation same for all the colours of light ?

Ans : No. It is different for different colours.

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Expt-14 Refractive index of a glass

Q - Determine the refractive index of the given glass slab using travelling microscope.

1. Define absolute refractive index.

Ans : It is defined as the ratio of the velocity of light in vacuum to that in a given medium.

2. What is meant by least count of travelling microscope?

Ans : The least measurement that can be done in travelling microscope is called its least count.

3. What is normal shift ?

Ans : It is the difference between actual depth and apparent depth.

4. What is the cause of normal shift ?

Ans : Normal shift is due to refraction of light.

5. Why lycopodium powder is spread over the glass surface?

Ans : To focus the microscope to the top surface of glass slab accurately.

6. Is refractive index of glass slab depends on its thickness?

Ans : The refractive index of a material of glass slab does not depends on its thickness.

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Expt-15 Refractive index of water

Q - a) Determine refractive index of water using concave mirror.
b) Determine refractive index of water using plane mirror and convex lens.

1. Define refractive index of a medium.

Ans : It is defined as the ratio of the velocity in vacuum to the velocity of light in a given medium.

2. Name the liquid lens formed between plane mirror and glass convex lens.

Ans : Liquid plano Concave lens.

3. What is the value of Radius of curvature of the bottom surface of the liquid lens ?

Ans : Radius of curvature is infinity.

4. Which optical medium has least refractive index, water or glass ?

Ans : Water.

5. Is the refractive index of water depends on the focal length of convex lens.

Ans : No, it is independent of focal length of convex lens.

6. Name the types of lenses of the combination in this experiment.

Ans : Convex lens and plano concave lens.

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Expt-16 Semi conductor diode

Q- a) Draw I-V characteristic curve of a p-n junction diode in forward bias and find cut-in voltage.
b) Draw I-V characteristic curve of a p-n junction diode in reverse bias and find reverse saturation current.

1. What is a semi conductor diode ?

Ans : It is a two terminals are junction device.

2. How do you forward bias the junction diode ?

Ans : Junction diode is forward biased by connecting p-type to positive and n-type to negative terminal of the battery.

3. What is meant by cut in voltage ?

Ans : The forward bias voltage at which the forward current raises sharply, is called cut in voltage or knee voltage.

4. What is meant by junction p.d ?

Ans : The p.d. developed across the p-n junction due to the diffusion of charge carriers is called junction p.d.

5. How do you reverse bias the junction diode ?

Ans : Junction diode is reverse biased by connecting p-type to negative and n-type to positive terminal of the battery.

6. What is breakdown voltage ?

Ans : It is the reverse bias voltage at which the reverse current increases rapidly in reverse biased condition.

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Expt-17 Zenior diode

Q - Draw I-V characteristic curve of zener diode in reverse bias and find reverse breakdown voltage.

1. What is a Zener diode ?

Ans : A heavily doped junction diode which is sharp reverse breakdown voltage is called Zener diode.

2. How do you reverse bias the Zener diode ?

Ans : Zenior diode is reverse biased by connecting n-type to positive and p-type to negative terminal of the battery.

3. What is Zener voltage ?

Ans : It is the voltage at which the current raises sharply is reverse biased condition.

4. How does the reverse breakdown voltage in a Zener diode depend ?

Ans : Reverse breakdown voltage is a Zener diode depends on amount of doping.

5. What is the main use of Zener diode ?

Ans : Zener diode is used as a voltage regulator.

6. Under which bias condition a Zener diode is used as a voltage regulator ?

Ans : Zener diode is used as a voltage regulator in reverse bias condition.

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Expt-18 Transistor

Q- a) Draw input characteristic curve of n-p-n transistor and find input resistance.

b) Draw output characteristic curve of n-p-n transistor and find output resistance.

c) Draw transfer characteristic curve of n-p-n transistor and calculate current gain and voltage gain. Given, input resistance R_i = ... Ω out resistance, R_0 = ... Ω

1. What is a transistor ?

Ans : Transistor is a three terminals and two junctions semi-conducting device.

2. What is the basic action of transistor ?

Ans : The transistor is amplify the signal from law resistance region to high resistance region.

3. Name the different regions of a transistor.

Ans : (1) Emitter (2) Collector and (3) Base.

4. How Emitter-Base junction and collector-Base junction are biased ?

Ans : Emitter - Base junction is forward biased and Collector - Base junction in reverse biased.

5. Define current amplification factor of a CE transistor.

Ans : It is defined as the ratio change in collector current (ΔI_C) to the change in base current (ΔI_B) at constant collector-Emitter voltage (V_{CE})

6. Why CE mode is preferred over CB mode in a transistor?

Ans : Because of high voltage gain and power gain of CE mode.

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₹ 15/-