

phy192 List of Questions

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Q1 In the circuit shown, what is the current flowing through the battery?

- ☐ 1.7A
- ☒ 2.6A
- ☐ 3.1A
- ☐ 4.7A

Q2 In the circuit shown, what is the equivalent resistance in the circuit?

- ☐ $3.7\,\Omega$
- ☒ $4.7\,\Omega$
- ☐ $2.5\,\Omega$
- ☐ $6.3\,\Omega$

Q3 A ray of light travels from air to glass. The incident ray makes an angle of 45 degrees while the refracted ray makes an angle of 30 degrees with the normal to the interface. The speed of light in air is $3.0 \times 10^8 \text{ m/s}$. What is the speed of light in glass?

- ☒ $2.12 \times 10^8 \text{ m/s}$
- ☐ $4.24 \times 10^8 \text{ m/s}$
- ☐ $3.73 \times 10^8 \text{ m/s}$
- ☐ $3.00 \times 10^8 \text{ m/s}$

Q4 The physical principle which accounts for the travelling of sound through longer distances at night is called-----

- ☐ waves
- ☐ polarization
- ☐ diffraction
- ☒ refraction

Q5 Images formed by plane mirrors are -----

- ☐ real
- ☐ diminished
- ☐ enlarged
- ☒ laterally inverted

Q6 The ----- of the eye plays an equivalent role of the screen in optical experiments

- ☐ lens
- ☐ iris
- ☐ optic nerve
- ☒ retina

Q7 The physical phenomenon which accounts for apparent depth of a pool of water is called

- ☐ waves
- ☐ polarization
- ☐ diffraction
- ☒ refraction

Q8 Beyond the critical angle, a ray of light moving from dense to rare medium suffers -----

- ☐ diffraction
- ☐ polarization
- ☒ total internal reflection
- ☐ total internal refraction

Q9 A Wheatstone bridge ABCD (labelled in clockwise direction) with a galvanometer G joined to the junctions B and D. A cell E is connected across AC. Resistances of 15, 10, 4 and X ohms are inserted into the arms AB, BC, CD and DA respectively. The value of X is ----- ohms

- ☒ 2.67
- ☐ 1.34
- ☐ 3.22
- ☐ 2.13

Q10 A current of 0.5A flowing through a wire produces 21J of heat in 1/2 min. The resistance of the wire is ----- ohms to 1 place of decimal

- ☒ $2.8\,\Omega$
- ☐ $3.2\,\Omega$
- ☐ $1.4\,\Omega$
- ☐ $4.6\,\Omega$

Q11 In an experiment to determine the relationship between the current I through a piece of tungsten wire and the potential difference V across it, the theoretical relationship used was $I = kV^n$, where k and n are constants which may be obtained from a straight line graph of the form $y = mx + c$, the symbols having their usual meaning. The corresponding linear equation for this experiment is -----

- ☐ $I = nV + k$
- ☐ $4I = nV^2 + k$
- ☐ $I = \exp V^n + k$
- ☒ $\log I = n \log V + \log k$

Q12 Two resistances $2\,\Omega$ and $3\,\Omega$ are in parallel. The combination is in series with $1.5\,\Omega$ resistance and a power supply of voltage V. There is a current of 3A through the $2\,\Omega$ resistance. What are the values of the current I delivered by, and the voltage V across the power supply?

- ☐ 3A and 10.5V
- ☐ 4A and 9V
- ☒ 4A and 12V
- ☐ 12A and 18V

Q13 Two wires P and Q, each of the same length and same material, are connected in parallel to a battery. The diameter of P is half that of Q. What fraction of the total current passes through P?

- ☒ 0.20

- ☐ 0.25
- ☐ 0.33
- ☐ 0.50

Q14 In an experiment with a potentiometer, the balanced length of 30cm was recorded when a standard cell (Daniel cell) of electromotive force $\mathcal{E}_1 = 1.1\text{V}$ was introduced in the circuit. The standard cell was then replaced by a Leclanche cell and the balance length recorded was 40cm. The electromotive force \mathcal{E}_2 of the Leclanche cell is -----
-- to 1 place of decimal

- ☐ 1.4V
- ☐ 2.1V
- ☐ 0.3V
- ☐ 1.1V

Q15 constant 60V d.c. supply is connected across two resistors of resistances $400\text{ k}\Omega$ and $200\text{ k}\Omega$. What is the reading of of the voltmeter, also of resistance $200\text{ k}\Omega$ when connected across the $200\text{ k}\Omega$ resistor?

- ☐ 12V
- ☐ 15V
- ☐ 20V
- ☐ 30V

Q16 A battery of emf \mathcal{E} and negligible internal resistance is connected to two resistances R_1 and R_2 in series. What the potential difference across R_2 ?

- ☐ $\frac{\mathcal{E}(R_1 + R_2)}{R_2}$
- ☐ $\frac{\mathcal{E}(R_1 + R_2)}{R_1}$
- ☐ $\frac{\mathcal{E} R_2}{R_1 + R_2}$
- ☐ $\frac{\mathcal{E} R_1}{R_1 + R_2}$

Q17 An electrical source with internal resistance r is used to operate a lamp of resistance R . What fraction of the total power is delivered to the lamp?

- ☐ $\frac{R + r}{R}$
- ☐ $\frac{R - r}{R}$
- ☐ $\frac{R}{R + r}$
- ☐ $\frac{R}{r}$

Q18 What is the reading of the voltmeter

- ☐ zero
- ☐ between zero and 3 V
- ☐ 3 V
- ☐ 6V

Q19 What is the current flowing through the voltmeter?

- ☐ $\frac{4}{R}\text{A}$
- ☐ $\frac{2}{R}\text{A}$
- ☐ 2R A
- ☐ 4R A

Q20 In the circuit shown, resistors X and Y, each of resistance R , are connected to a 6V battery of negligible internal resistance. A voltmeter, also of resistance R is connected across Y. What is the current flowing through X?

- ☐ $\frac{4}{R}\text{A}$
- ☐ $\frac{2}{R}\text{A}$
- ☐ 2R A
- ☐ 4R A

Q21 The bending of a ray of light as it travels from one transparent medium to another is called -----

- ☐ reflection
- ☐ polarisation
- ☐ refraction
- ☐ diffraction

Q22 In the construction of an ammeter, a low resistance called resistance----- is connected in parallel to a suitable galvanometer

- ☐ multiplier
- ☐ shunt
- ☐ milliammeter
- ☐ galvanometer

Q23 The unit of electrical energy expended per unit time is called -----

- ☐ joule
- ☐ ampre
- ☐ volt
- ☐ watt

Q24 The name of the device which provides sliding contact with the potentiometer wire is called -----

- ☐ jockey
- ☐ rheostat
- ☐ galvanometer
- ☐ meter bridge

Q25 The difference between the emf of a battery and the lost volts when discharging is called

- ☐ electromotive force
- ☐ terminal voltage
- ☐ internal resistance
- ☐ lost power

Q26 A device known as ----- may be used for comparison of resistances

- ☐ Wheatstone bridge
- ☐ potentiometer
- ☐ voltmeter

- ☐ rheostat

Q27 A device which may be used to compare the potential differences of electric cells is called -----

- ☐ metre bridge
- ☐ wheatstone bridge
- ☐ rheostat
- ☒ potentiometer

Q28 The term "lost volts" is used to describe ----- of a cell

- ☐ electromotive force
- ☐ terminal potential difference
- ☒ energy dissipated in the internal resistance
- ☐ total current

Q29 The time rate of flow of charge across a unit cross-sectional area of a conductor defines

- ☐ potential difference
- ☐ electromotive force
- ☐ electrical resistance
- ☒ electric current

Q30 A $1\text{ m}\Omega$ resistor is to be made from a 1-mm diameter wire of resistivity 2.8×10^{-8} . Find the length of the wire

- ☐ 4.2cm
- ☐ 3.6cm
- ☒ 2.8cm
- ☐ 1.4cm

Q31 Which of the following is correct?

- ☐ Kirchhoff's junction rule represents conservation of momentum
- ☐ Kirchhoff's loop rule represents conservation of charge
- ☒ Kirchhoff's loop rule represents conservation of energy
- ☐ Kirchhoff's junction rule represents conservation of energy

Q32 Two resistances of 2Ω each are connected in parallel and then connected in series to a 1Ω resistance. What is the equivalent resistance

- ☐ 1Ω
- ☒ 2Ω
- ☐ 3Ω
- ☐ 4Ω

Q33 A slide-wire potentiometer is balanced against 1.0182V standard cell at slide contact of 40.2cm. For an unknown emf the slide contact is 11.9cm. What is the emf of the unknown cell?

- ☐ 1.24V
- ☐ 0.24V
- ☐ 1.53V
- ☒ 0.30V

Q34 The slide wire of the figure shown is balanced when the the uniform slide wire AB is divided as shown. The value of the resistance X is _____ Ω

- ☐ 6
- ☐ 5
- ☐ 3
- ☒ 2

Q35 The diagram shown is called a _____

- ☐ rheostat
- ☐ thermostat
- ☒ wheatstone bridge
- ☐ potentiometer

Q36 The advantage of potentiometer over voltmeter in measurements of emf is that

- ☐ the potentiometer wire is assumed to be uniform
- ☒ it does not draw current from the circuit under test
- ☐ the temperature of the wire must remain constant
- ☐ faults may arise due to breaks or wrong connections in the circuit

Q37 Which of these is not a useful precaution in an electrical experiment?

- ☐ key should be removed between readings to avoid battery run-down
- ☒ jockey should be dragged on resistance wires
- ☐ the connections in the circuit should be tight
- ☐ readings should be recorded as soon as they are obtained

Q38 Which of the following is not true about a rheostat?

- ☒ It is a constant current instrument
- ☐ It is a variable resistor with moving contact
- ☐ It is used for varying the current in a circuit
- ☐ It is used for varying the resistance in a circuit

Q39 In an experiment, potential difference is plotted on the ordinate (vertical axis) and current on the abscissa (horizontal axis). The slope of the graph represents

- ☐ potential difference
- ☐ current remains constant
- ☒ resistance
- ☐ resistivity

Q40 For a metallic conductor, Ohm's law holds provided

- ☐ potential difference varies uniformly
- ☐ current remains constant

- ☐ temperature remains constant
- ☐ potential difference remains constant

Q41 In the circuit diagram shown, the wire PQ has the resistance of 5Ω and the driver cell has an emf of 2.00 V. What is the value of the resistance R if a balance point is obtained at 0.60 m along PQ when measuring an emf of 6.00mV?

- ☐ 95Ω
- ☐ 195Ω
- ☐ 495Ω
- ☐ 995Ω

Q42 In the circuit diagram shown, the device marked X is a -----

- ☐ rheostat
- ☐ voltmeter
- ☐ jockey
- ☐ galvanometer

Q43 The null condition in potentiometer experiment shows that

- ☐ the potential difference under test is zero
- ☐ current is varying in the circuit
- ☐ potential differences are varying in the circuit
- ☐ potential difference are balanced

Q44 The potentiometer wire plays equivalent role of which of these devices in a circuit?

- ☐ rheostat
- ☐ thermostat
- ☐ galvanometer
- ☐ ammeter

Q45 The advantage of potentiometer over voltmeter in measurements of emf is that

- ☐ the potentiometer wire is assumed to be uniform
- ☐ it does not draw current from the circuit under test
- ☐ the temperature of the wire must remain constant
- ☐ faults may arise due to breaks or wrong connections in the circuit

Q46 Which of these is not a useful precaution in an electrical experiment?

- ☐ key should be removed between readings to avoid battery run-down
- ☐ jockeys should be dragged on resistance wires
- ☐ the connections in the circuit should be tight
- ☐ readings should be recorded as soon as they are obtained

Q47 Which of the following is NOT true about a rheostat?

- ☐ It is a constant current instrument
- ☐ It is a resistor with moving contact
- ☐ It is used for varying the current in a circuit
- ☐ It is used for varying the resistance in a circuit

Q48 In an experiment, potential difference is plotted on the vertical axis and current on the horizontal axis. The slope of the graph represents

- ☐ resistivity
- ☐ conductivity
- ☐ resistance
- ☐ conductance

Q49 For a metallic conductor, Ohm's law holds provided

- ☐ potential difference varies
- ☐ current remains constant
- ☐ temperature remains constant
- ☐ potential difference remains constant

Q50 The lens of the human eye is

- ☐ concave
- ☐ converging
- ☐ planoconcave
- ☐ diverging

Q51 Which of the following precautions is NOT applicable to experiment involving planoconvex lens?

- ☐ planoconvex lens should have small focal length
- ☐ parallax error should be avoided
- ☐ the surface of the lens should be cleaned properly
- ☐ the tip of the optical pin should be at the same level with the principal axis of the lens

Q52 A glass prism of refracting angle 60 degrees gives a minimum deviation of 47degrees. What is the refractive index of the glass?

- ☐ 1.61
- ☐ 1.20
- ☐ 1.52
- ☐ 1.41

Q53 Calculate the distance and magnification of an object placed 20cm from a converging lens

- ☐ 60cm and 0.3 times the size of object
- ☐ 20cm and 0.3 times the size of object
- ☐ 60cm and 3 times the size of object
- ☐ 80cm and 3 times the size of object

Q54 Diopter measures

- ☐ linear magnification of lens

- ☐ power of lens
- ☒ inverse of object distance from lens
- ☐ inverse of image distance from lens

Q55 Which of the following is not true about diverging lens

- ☐ the principal focus is positive
- ☒ the principal focus is negative
- ☐ they produce virtual images only
- ☐ they form virtual, erect and smaller images of real object

Q56 In an experiment to determine the focal length of a convex lens, $1/u$ was plotted on horizontal and $1/v$ on the vertical axis, where u and v have their usual meaning. What is the physical significance of the reciprocal of the intercept on the horizontal axis?

- ☐ linear magnification
- ☐ focal length
- ☒ object distance
- ☐ image distance

Q57 In an experiment to determine the focal length of a convex lens, $1/u$ was plotted on horizontal and $1/v$ on the vertical axis, where u and v have their usual meaning. What is the physical significance of the reciprocal of the slope of the graph?

- ☒ linear magnification
- ☐ focal length
- ☐ object distance
- ☐ image distance

Q58 In practical experiment involving the use of optical pins, parallax is reduced or removed if on slightly displacing one's eye from side to side

- ☐ the object and image are not coincident but move together in same directions
- ☐ the object and image move in opposite directions relative to each other
- ☒ the object and image are coincident and move together in the same direction
- ☐ the object and image are coincident and remain stationary

Q59 In an experiment with a concave mirror, the image of an optical pin which is 4 times its size was cast on a screen 6m from the object pin. How far from the object pin should the mirror be placed?

- ☐ 8m
- ☐ 6m
- ☐ 3m
- ☒ 2m

Q60 The image of an object which is between the concave mirror's reflecting surface and its principal focus is

- ☐ in front of the mirror erect real and diminished
- ☐ behind the mirror inverted real and diminished
- ☐ in front of the mirror erect virtual and enlarged
- ☒ behind the mirror erect virtual and enlarged

Q61 diopter is the unit of

- ☐ linear magnification
- ☒ power of lens
- ☐ inverse of object distance from lens
- ☐ inverse of image distance from lens

Q62 In an experiment involving the convex lens

- ☐ images must always be sharply focused
- ☐ the tip of object pin must be at the same height as the centre of lens
- ☒ images obtained must be magnified
- ☐ parallax error must be avoided

Q63 Describe the image of candle positioned 20cm in front of a concave mirror of focal length 30cm

- ☐ virtual, inverted, 12cm behind mirror and magnified 3 times
- ☐ real, inverted, 12cm in front of mirror and diminished 3 times
- ☒ virtual, erect, 60cm behind mirror and magnified 3 times
- ☐ real, erect, 60cm in front of mirror and diminished 3 times

Q64 Which of the following is correct about tracing ray diagrams with curved mirrors

- ☐ rays incident at the centre of the mirror are reflected through the centre of curvature
- ☐ rays passing through the centre of curvature are reflected through the principal focus
- ☐ rays passing through the principal focus are reflected on themselves
- ☒ rays parallel and close to the principal axis are reflected through the principal focus

Q65 Convex mirrors are mostly used as

- ☐ magnifying glasses
- ☒ driving mirrors
- ☐ dentist mirrors
- ☐ artist mirrors

Q66 In an experiment involving a spherical mirror, $1/v$ was plotted on the vertical axis and $1/u$ on the horizontal axis. What is the linear magnification?

- ☐ slope of the graph
- ☒ inverse of the slope of the graph
- ☐ intercept on the vertical axis
- ☐ intercept on the horizontal axis

Q67 Which of the following is NOT true of experiments involving curved mirrors?

- ☒ image distance is negative for real image
- ☐ object distance is positive
- ☐ image distance is negative for virtual image
- ☐ focal length is negative for convex mirrors

Q68 In an experiment, derived values such as those obtained from four figure tables should be recorded to at least ----- decimal places

- ☐ 2
- ☐ 3
- ☐ 5
- ☐ 7

Q69 Which of the following is NOT applicable when plotting the graph of experimental data?

- ☐ Lines of bestfit should always be used
- ☐ circled dots or crosses may be used to show plotted points
- ☐ thin, sharp and continuous lines are acceptable
- ☐ the scale must be chosen to make the graph occupy as small as possible of the graph page

Q70 An estimate of the refractive index of glass is 1.5. If the angle of incidence is 30° the angle of refraction is

- ☐ 19°
- ☐ 60°
- ☐ 35°
- ☐ 70°

Q71 The critical angle for total internal reflection at an air - water interface is approximately 48° . In which of the following situations will total internal reflection occur.

- ☐ light incident in water at 40°
- ☐ light incident in water at 55°
- ☐ light incident in air at 40°
- ☐ light incident in air at 55°

Q72 In experimental observations involving rectangular glass blocks,

- ☐ the angle of incidence is less than the angle of refraction in general
- ☐ the angle of incidence is equal to the angle of refraction
- ☐ the angle of incidence is greater than the angle refraction when light is moving out of the block
- ☐ the angle of refraction is less than the angle of incidence when light is entering the block

Q73 Which of the following is NOT a precaution in optical experiments that involve glass blocks?

- ☐ sharp, thin lines should be drawn to represent the rays
- ☐ The glass block must be properly replaced on the traced outline
- ☐ Optical pins must cluster together
- ☐ Optical pins must be kept erect

Q74 When refraction occurs which of the following remains unchanged?

- ☐ wave number
- ☐ wavelength
- ☐ velocity
- ☐ frequency

Q75 From the graph, what is the critical angle for glass - air interface?

- ☐ 42°
- ☐ 48°
- ☐ 50°
- ☐ 90°

Q76 From the graph, what is the critical angle for water - air interface?

- ☐ 42°
- ☐ 48°
- ☐ 50°
- ☐ 90°

Q77 Light in glass is incident at the surface with air at an angle of 30° . From the graph, at what angle is it refracted?

- ☐ 56°
- ☐ 42°
- ☐ 24°
- ☐ 17°

Q78 Light in water is incident at the surface with air at an angle of 30° . From the graph, at what angle is it refracted?

- ☐ 20°
- ☐ 24°
- ☐ 42°
- ☐ 48°

Q79 According to the graph, at what angle is light refracted if it strikes the surface of glass at an angle of 30° ?

- ☐ 17°
- ☐ 30°
- ☐ 42°
- ☐ 48°

Q80 According to the graph, at what angle is light refracted if it strikes the surface of water at an angle of 30° ?

- ☐ 20°
- ☐ 24°
- ☐ 43°
- ☐ 48°