TALEEM CITY INSTITUTE

Ameenpur, Faisalabad 03126987979

Name:		Roll#:		Class:	Inter Part-II
Subject:	Physics-12	Date:		Time:	
Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-12,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i Total flux through a closed surface depends on:

(A) Shape of surface (B) Charge enclosed only (C) Medium only (D) Charge and Medium

ii Electric flux does not depend upon:

(A) Medium (B) Shape of closed surface

(C) Charge enclosed (D) Medium and charge enclosed

iii A particle carrying a charge of 2e falls through a potential difference of 3 V. The energy acquired by it is:

(A) 9.6×10^{-18} J (B) 9.6×10^{-19} J (C) 1.6×10^{-19} J (D) 9.6×10^{-17} J

iv The work done is bringing a unit positive charge from infinity to that point in an electric field is called:

(A) Potential (B) Potential difference (C) Absolute potential (D) All of these

v A charge of 10^{-10} C between two parallel plates 1 cm apart experience a force of 10^{-5} N:

(A) 10 V (B) 10^2 V (C) 10^3 V (D) 10^4 V

vi Charge carriers in electrolytes are:

(A) Protons (B) Electrons

(C) Holes (D) Positive and Negative ions

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Describe five/four properties of electric field lines.

ii. Define electric potential difference with unit.

iii. Do electrons tend to go to region of high potential or of low potential?

iv. What is the difference between electric and gravitational force?

v. Define unit of Capacitance give its units.

vi. How can you identify that which plate of a capacitor is negatively charged?

vii. Define dielectric constant give its mathematical form.

viii. What is time constant?

NOTE: Attempt the long question. **(5+3=8)**

3(a) Describe the Millikan's method to find the charge on an electron.

(b) The time constant of a series RC circuit is t = RC. Verify that an ohm time farad is equaivalent to second.

MCQs Ans Key

Q:1 (D) Q:2 (B) Q:3 (B) Q:4 (C) Q:5 (C) Q:6 (D)

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Test Syllabus:	Unit-13,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i Specific resistance of a material depends upon:

(A) Length (B) Area (C) Temperature (D) Both A & B

ii mho-m^{-1} is the unit of:

(A) Resistance (B) Resistivity (C) Conductance (D) Conductivity

iii Temperature coefficient of resistance (α) is equal:

(A) $\frac{R_t+R_o}{R_o\Delta t}$ (B) $\frac{R_o-R_t}{R_o\Delta t}$ (C) $\frac{R_t-R_o}{R_o\Delta t}$ (D) None of these

iv Resistance tolerance for gold colour is:

(A) 50% (B) 30% (C) 20% (D) 5%

v In carbon resistors, which colour band indicates the tolerance of $\pm 10\%$?

(A) White (B) Silver (C) Gold (D) Violet

vi Potentiometer is used to:

(A) Compare emf of two cells (B) Detect internal resistance of cells

(C) Measure potential difference (D) All of these

Q.2 Write short answers of the following questions. **(8x2=16)**

i. A wire of length 10 m has resistance 100 Ω. If the wire is stretched to increase its length three times what will be its new resistance.

ii. Differentiate between resistance and resistivity, their units.

iii. Define Tolerance, give an example.

iv. Give colour code of carbon resistor.

v. What is meant by the tolerance? Find the resistance of the resistor with colors Red-violet-orange-silver.

vi. How is rheostat used as potential divider?

vii. What areThermistor?

viii. Is the filament resistance lower or higher in a 500W 220V light bulb than in 100W 220V bulb?

NOTE: Attempt the long question. **(5+3=8)**

3(a) What is wheat stone bridge? Give its principle, cosstruction and working. How can it be used to find unknown resistance of a write?

(b) The resistance of an iron wire at 0^0C is $1 \times 10^{-4}\Omega$. What is the resistance at 500^0C if temperature. Coefficient of resistance of iron $5.2 \times 10^{-3}K^{-1}$.

MCQs Ans Key

Q:1 (D) Q:2 (D) Q:3 (C) Q:4 (D) Q:5 (B) Q:6 (D)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-14,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i The force on current carrying conductor placed in magnetic field is expressed by:

(A) $\vec{F} = I\vec{L}.\vec{B}$ (B) $\vec{F} = I\vec{L} \times \vec{B}$ (C) $\vec{F} = I^2\vec{L} \times \vec{B}$ (D) $\vec{F} = I\vec{B} \times \vec{L}$

ii The value of permeability of free space in SI unit is:

(A) $4\pi \times 10^{-9} WbA^{-1}m^{-1}$ (B) $4\pi \times 10^{-7} WbA^{-1}m^{-1}$

(C) $4\pi \times 10^{-10} WbA^{-1}m^{-1}$ (D) $4\pi \times 10^{7} WbA^{-1}m^{-1}$

iii The field inside a solenoid is given by:

(A) $\mu_o nI$ (B) $\mu_o n^2 I$ (C) $\mu_o nI^2$ (D) $\mu_o NI$

iv When a charged particle is projected opposite to the direction of magnetic field, it experiences a force equal to:

(A) $qvB\cos\theta$ (B) qvB sin 90º (C) qvB (D) zero

v The e/m of a neutron is:

(A) less than electron (B) zero (C) greater than election (D) the same as electron

vi The value of e/m is smallest for:

(A) Proton (B) Electron (C) $\beta - particle$ (D) Positron

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Describe the change in magnetic field inside a solenoid carrying a steady current I if length of solenoid is doubled but number of turns remains the same.

ii. Write two uses of CRO.

iii. How brightness on screen of CRO can be controlled?

iv. What is C.R.O? Also give its two uses.

v. How can you explain the wave form of various voltages formed in CRO?

vi. What is the function of 'X' and 'Y' plates in C.R.O?

vii. Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate?

viii. Define right hand rule for determining the direction of the magnetic field.

NOTE: Attempt the long question. **(5+3=8)**

3(a) How e/m of an electron can be determined? Explain.

(b) A 20.0 cm wire charging a current of 10.0 A is placed in a uniform magnetic field of 0.30 T. If the wire makes an angle of 40^o with the direction of magnetic field. Find the magnitude of the force acting on the wire.

MCQs Ans Key

Q:1 (B) Q:2 (B) Q:3 (A) Q:4 (D) Q:5 (B) Q:6 (A)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-15,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i A metal rod of 1m is moving at a speed of $1ms^{-1}$ in a direction making an angle 30^o with 0.5 T magnetic field. The emf produced is:

(A) 0.25 N (B) 2.5 N (C) 0.25 V (D) 2.5 V

ii The negative sign with induced emf in Faraday's law is in accordance is in:

(A) Lenz's law (B) Amperes law (C) Gauss law (D) Boyle's law

iii Lenz's Law deals with:

(A) Magnitude of emf (B) Direction of emf

(C) Direction of induced current (D) Resistance

iv Energy density in inductor is given by:

(A) $\frac{1}{2}\frac{B}{\mu_o}$ (B) $\frac{1}{2}\frac{B}{\mu_o^2}$ (C) $\frac{1}{2}\frac{B^2}{\mu_o}$ (D) $\frac{1}{2}\frac{B^2}{\mu_o^2}$

v Which one of the following is not present in an A.C generator?

(A) Armature (B) Magnet (C) Slip rings (D) Commutator

vi The principle of an electric generator is based upon:

(A) Ampere's law (B) Faraday's law (C) Coulomb's law (D) Kirchhoff's law

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Name four methods to produce induce emf.

ii. Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have induced emf in the loop?

iii. Does the induced emf always act to decrease the magnetic flux through a circuit?

iv. In a certain region the earth's magnetic field point vertically down, when a plane flies due to north, which wingtip is positively charged?

v. A square loop of wire is moving through a uniform magnetic field. The normal to the loop is oriented parallel to the magnetic field. Is an emf induced in the loop? Give a reason for your answer.

vi. A suspended magnet is oscillating freely in a horizontal plane. The oscillations are strongly damped when a metal plate is placed under the magnet. Explain why this occurs?

vii. On which factors the mutual inductance of the two coils depends?

viii. How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?

NOTE: Attempt the long question. **(5+3=8)**

3(a) Derive the formula for energy stored in an inductor. Also define inductor.

(b) A solenoid has 250 turns and its self inductance is 2.4 m H. What is the flux through each turn when the current is 2A? what is induced emf when the current changes at the rate of $20As^{-1}$

MCQs Ans Key

Q:1 (C) Q:2 (A) Q:3 (C) Q:4 (D) Q:5 (D) Q:6 (B)

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Subject:	Physics-12	Date:		Time:	
Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-16,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i In case of capacitor the unit of reactance is:

(A) Ohm (B) Mho (C) Farad (D) Henry

ii The combined effect of resistance and reactance is knows as:

(A) Inductance (B) Conductance (C) Resistance (D) Impedance

iii In R-L series circuit phase angle is given by:

(A) $\theta = tan^{-1}\frac{1}{\omega LR}$ (B) $\theta = tan^{-1}\omega LR$ (C) $\theta = tan^{-1}\frac{R}{\omega L}$ (D) $\theta = tan^{-1}\frac{\omega L}{R}$

iv The expression P = VI holds only when current and voltage are:

(A) In phase (B) Out of phase

(C) At right angle to each other (D) At angle of 120^o

v At resonance frequency, the impedance of RLC series circuit is:

(A) Maximum (B) Minimum (C) Zero (D) Infinite

vi In RLC series circuit, the condition for resonance is:

(A) $X_L < X_C$ (B) $X_L > X_C$ (C) $Z > X_C$ (D) $X_L = X_C$

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Define peak value and peak to peak value of A.C voltage?

ii. What is the main reason for the world wide use of A.C?

iii. What do you mean by phase lag and phase lead?

iv. Which quantity, voltage or current leads in a capacitor and by how much angle?

v. A 100 μF capacitor is connected to an alternating voltage of 24 V and frequency 50 Hz. Calculate the current in the circuit.

vi. What is meant by inductive and capacitive reactance.

vii. How power is calculated in an A.C circuit? Write its formula.

viii. Write down two advantages of the phase A.C supply.

NOTE: Attempt the long question. **(5+3=8)**

3(a) What is R-C series circuit? Find the impedance of R-C series circuit.

(b) An A.C voltmeter reads 250 V. What is its peak and instantaneous values if the frequency of alternating voltage is 50 Hz?

MCQs Ans Key

Q:1 (A) Q:2 (D) Q:3 (D) Q:4 (A) Q:5 (B) Q:6 (D)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-17,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i Example of ductile substance is:

(A) Glass (B) Wood (C) Lead (D) Oxygen

ii The Young's Modulus of Mercury is:

(A) 70×10^9 Nm^{-2} (B) 15×10^9 Nm^{-2} (C) Zero (D) 91×10^9 Nm^{-2}

iii Conductors have conductivities of the order of:

(A) $10^3\ (\Omega m)^{-1}$ (B) $10^7\ (\Omega m)^{-1}$ (C) $10^5\ (\Omega m)^{-1}$ (D) $10^9\ (\Omega m)^{-1}$

iv Which type of impurity is to be added to a pure semi-conductor crystal to provide holes?

(A) Monovalent (B) Trivalent (C) Tetravalent (D) Pentavalent

v In p-type substances, the minority carriers are:

(A) Electrons (B) Protons (C) Holes (D) Neutrons

vi A solid having regular arrangement of molecules throughout its structure is called:

(A) Amorphous solid (B) Polymeric solid (C) Glassy solid (D) Crystalline solid

Q.2 Write short answers of the following questions. **(8x2=16)**

i. What is difference in elasticity and plasticity?

ii. Define ultimate tensile strength (UTS) and fracture stress.

iii. Define modulus of elasticity. Show that unit of modulus of elasticity and stress are same.

iv. What are ductile materials, Give its two examples.

v. Which is more eleastic, steel or rubber? Why?

vi. Differentiate between insulators and conductors.

vii. Define the curie temperature.

viii. Where are squids? Explain.

NOTE: Attempt the long question. **(5+3=8)**

3(a) What is meant of strain energy? How can it be determined from the force extension graph?

(b) A cylindrical copper wire and a cylindrical steel wire each of length 1.5 m and diameter 2.0 mm are joined at one end to form a composite wire 3.0 m l ong. The wire is loaded until its length becomes 3.003 m. Calculate the strain in copper and steel wires and the force applied to the wire. (Young's modulus of copper is $1.2 \times 10^{11}\ Pa$ and for steel is $2.0 \times 10^{11} Pa$).

MCQs Ans Key

Q:1 (C) Q:2 (C) Q:3 (B) Q:4 (B) Q:5 (A) Q:6 (D)

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Subject:	Physics-12	Date:		Time:	
Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-18,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i When a pn-junction is reverse biased the depletion region is:

(A) Widened (B) Narrowed (C) Normal (D) None of these

ii Photovoltaic cell is formed from:

(A) Arsenic (B) Carbon (C) Germanium (D) Silicon

iii Which component of the transistor has greater contration of impurity:

(A) Base (B) Emitter (C) Collector (D) Emitter andCollector

iv For non-inverting amplifier if $R_1 = \infty\,\Omega$, $R_2 = 0\,\Omega$ then gain of amplifier is:

(A) -1 (B) 0 (C) +1 (D) Infinite

v LDR becomes necessary when op-amp is used as a:

(A) Night switch (B) Inverter (C) Rectifier (D) Comparator

vi In a comparator circuit, when intensity of light decreases, then resistance of LDR:

(A) R_L increases (B) R_L decreases (C) V_R decreases (D) V_- increases

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Define depletion region and potential barrier.

ii. What is potential barrier in a p-n junction?

iii. What is the role of potential barrier in a diode. Hoe is it formed in a diode?

iv. How the current flows in forward and reverse biased diode?

v. What is the biasing requirement of the junction of a transistor for its normal operation?

vi. Write some important uses of operational amplifier.

vii. Write briefly about operational amplifier.

viii. What is the principle of virtual ground? Write the gain of inverting amplifier.

NOTE: Attempt the long question. **(5+3=8)**

3(a) What is meant by rectification explain full wave rectification by bridge rectifier. What is the use of a filter circuit?

(b) What is operational amplifier? Discuss the action of op.amp as inverting and non-inverting amplifier. Also calculate voltage gain in each case.

MCQs Ans Key

Q:1 (A) Q:2 (A) Q:3 (C) Q:4 (C) Q:5 (D) Q:6 (A)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-19,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i The dimensions of Plank's constant is same as that of:

(A) Energy (B) Power (C) Acceleration (D) Angular momentum

ii Joule-second is the unit of:

(A) Energy (B) Wein's constant (C) Planck's constant (D) Boyle's law

iii The energy of photon is given by:

(A) $\frac{mv^2}{2}$ (B) hf (C) $V_o e$ (D) $m_o c^2$

iv Potassium cathodes in photocell emit electrons for a light:

(A) Visible (B) Infra-red (C) Ultra-violet (D) X-rays

v Light of 4.5 eV is incident on a Cesium surface and stopping portential is 0.25 eV, maximum K.E. of emitted electrons is:

(A) 4.5 eV (B) 4.25 eV (C) 4.75 eV (D) 0.25 eV

vi Compton wavelength is:

(A) $\frac{h}{m_o c^2}$ (B) $\frac{hc}{m_o}$ (C) $\frac{h}{m_o c}$ (D) $\frac{hc}{m_o \lambda}$

Q.2 Write short answers of the following questions. **(8x2=16)**

i. What happens to total radiation from a black body if its absolute temperature is doubled?

ii. What is stopping potential?

iii. Write equation of pair production.

iv. When light shines on a surface, is momentum transferred to the metal surface?

v. What is wave particle duality? Give its one practical use?

vi. Is it possible to create a single electron from energy? Explain.

vii. If the following particles have same energy which has the shortest wave length alpha particle or neutron.

viii. State uncertainty principle. Give its two mathematical froms.

NOTE: Attempt the long question. **(5+3=8)**

3(a) Write a note on Compton effect.

(b) An electron is accelerated through a potential difference of 50 V calculate its de-Broglie's wavelength.

MCQs Ans Key

Q:1 (D) Q:2 (C) Q:3 (B) Q:4 (A) Q:5 (B) Q:6 (C)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-20,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i The energy of the 4^{th} orbit in hydrogen atom is:
(A) -2.1 eV (B) -3.50 eV (C) -13.60 eV (D) -0.85 eV

ii The energy of electron in ground state of hydrogen atom is -13.6 eV, then its energy in fourth orbit is:
(A) -3.4 eV (B) -0.85 eV (C) -54.4 eV (D) -13.6 eV

iii An electron in H-atom is excited from from ground state n=4. How many spectral lines are possible in this case?
(A) 6 (B) 5 (C) 4 (D) 3

iv Production of X-rays is reverse process of:
(A) Photo-electric effect (B) Compton effect (C) Annihilation (D) Pair production

v Laser can be made by creating:
(A) Meta stable (B) Population inversion (C) Excited state (D) All of these

vi For Holography we use:
(A) X-rays (B) Laser (C) $\gamma - rays$ (D) $\beta - rays$

Q.2 Write short answers of the following questions. **(8x2=16)**

i. Can an electron in the ground state of hydrogen atom absorb a photon of energy 13.6 ev or greater them 13.6 ev?
ii. Define characteristic X-rays and continuous X-rays.
iii. What is meant by stimulated emission?
iv. Distinguish between stimulated emission and spontaneous emission.
v. Define population inversion and meta stable state.
vi. What is mean by population inversion and lasing action?
vii. Give any two uses of laser in medicine.
viii. What is meant by population inversion? Explain.

NOTE: Attempt the long question. **(5+3=8)**

3(a) Electron in a X-ray tube are accelerated through a potential difference of 3000 V. If these electrons were slow down in a target. What will be the minimum wavelength of the X-rays produced?

(b) Find the speed of electron in the first Bohr orbit.

MCQs Ans Key

Q:1 (D) Q:2 (B) Q:3 (A) Q:4 (D) Q:5 (D) Q:6 (B)

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Test Type #	Type 9 - Short Test (No Choice) - Marks=30				
Test Syllabus:	Unit-21,				

Q.1 Circle the Correct Answers. **(6x1=6)**

i Which of the following is similar to electron?

(A) $\beta - particle$ (B) $\alpha - particle$ (C) Neutron (D) Proton

ii The force which is responsible for the breaking up of the radioactive element is:

(A) Weak nuclear force (B) Strongnuclear force (C) Electromagnegtic force (D) Gravitational force

iii Half life of Uranium-239 is:

(A) 26.5 minutes (B) 24.5 minutes (C) 25.5 minutes (D) 23.5 minutes

iv Relation for half life of any radioactive element is:

(A) $T_{\frac{1}{2}} = \lambda(0.693)$ (B) $\lambda = T_{\frac{1}{2}}(0.693)$ (C) $T_{\frac{1}{2}} = \frac{0.693}{\lambda}$ (D) $T_{\frac{1}{2}} = \frac{\lambda}{0.693}$

v $\alpha - particle$ carries a charge:

(A) -e (B) +2e (C) -2e (D) No charge

vi In the reaction $X + {}^{17}_{8}O \rightarrow {}^{4}_{2}\mathrm{He}, X$ is:

(A) ${}^{1}_{1}\mathrm{H}$ (B) ${}^{2}_{1}\mathrm{H}$ (C) ${}^{0}_{1}\mathrm{e}$ (D) ${}^{0}_{-1}\mathrm{e}$

Q.2 Write short answers of the following questions. **(8x2=16)**

i. What are the reasons of unstablity of heavy nuclei?

ii. In ${}^{236}_{92}\mathrm{U}$, find (a) Atomic number (b) Charge Number (c) Number of Neutrons (d) Number of Electrons.

iii. What is radioactive decay? Give an example.

iv. Describe a brief account of interaction various types of radiations with matter.

v. Explain how α and β particles may ionize an atom without directly hitting electrons. What is the difference in the atom of the two ionization?

vi. What are the uses of nuclear reactor?

vii. Explain the working of control rods in a nuclear reactor.

viii. What are baryons and mesons? How they are formed?

NOTE: Attempt the long question. **(5+3=8)**

3(a) Describe the principle construction and uses of G.M Counter for detecting nuclear radiations.

(b) Radiation from a point source obeys inverse square law. If count rate at a distance of 1.0 m from Geiger counter is 360 counts per minute. What will be its count rate at 3.0 m from the source?

MCQs Ans Key

Q:1 (A) Q:2 (A) Q:3 (D) Q:4 (C) Q:5 (B) Q:6 (A)