Board of Intermediate & Secondary Education, Mirpur AJK
Physics Model Question Paper, Part-II
Section-A(Marks 17)

Time Allowed: 25Minutes

Q.1 Fill the relevant bubble for each part. Each part carries one mark.

i	The force between two charges is 28 N. If paraffin wax of relative permittivity 2.8 is introduced between charges as medium, then the force reduces to;								
	a)	25N ○	b)	20N ○	c)	15N ○	d)	10N ○	
ii	A rubber ball of radius 2cm has charge of 5μC on its surface, which is uniformly distributed, the value of E at its center is;								
	a)	$10N\ C^{-1}$ ○	b)	Zero ○	c)	$2.5N\ C^{-1}$ ○	d)	$5\times10^{-6}N\ C^{-1}$ ○	
iii	Kirchoff"s first law is based upon the law of conservation of ;								
	a)	Current ○	b)	Charge ○	c)	Voltage ○	d)	Energy ○	
iv	The maximum power delivered to a load resistor R, when the internal resistance of the source is;								
	a)	$r = \infty$ ○	b)	r =R ○	c)	r = Zero ○	d)	r = R/4 ○	
v	When the angle between area and magnetic field lines is 0^o, then magnetic flux will be;								
	a)	Maximum ○	b)	Minimum ○	c)	Half ○	d)	Quarter ○	
vi	The torque acting on a coil is minimum , when vector area of the coil is;								
	a)	Parallel to B ○	b)	Perpendicular to B ○	c)	Antiparallel to B ○	d)	None of these ○	
vii	If a charge is at rest in magnetic field, then the force on the charge is;								
	a)	Zero ○	b)	$q(\vec{v}\times\vec{B})$ ○	c)	$qvBSin\theta$ ○	d)	$qvBCos\theta$ ○	
viii	The power dissipation in L-C circuit is;								
	a)	VI ○	b)	V_0I_0 ○	c)	$V_{rms}I_{rms}$ ○	d)	Zero ○	
xiv	The reactance of an inductor at 50 Hz is 10 Ω. The reactance at 100 Hz become;								
	a)	20 Ω ○	b)	5Ω ○	c)	2.5Ω ○	d)	0.5 Ω ○	
x	A wire is stretched to double of its length, its strain is;								
	a)	2 ○	b)	1 ○	c)	Zero ○	d)	0.5 ○	
xi	Maximum stress which a body bears is called its;								
	a)	Ultimate Tensile stress ○	b)	Permanent stress ○	c)	Elastic stress ○	d)	None of these ○	
xii	A hole in a p-type semiconductor is;								
	a)	An excess electron ○	b)	A missing electron ○	c)	A missing positron ○	d)	An excited electron○	
xiii	Inertial frames of reference have;								
	a)	Zero acceleration○	b)	Uniform acceleration○	c)	Zero external force○	d)	Both a) and b) ○	
xiv	According to de-Broglie equation, which on has the smallest wavelength associated with it;								
	a)	Proton ○	b)	Neutron ○	c)	Electron ○	d)	Alpha Particle○	
xv	The radius of first Bohr orbit for hydrogen is;								
	a)	0.53 m ○	b)	0.53 nm ○	c)	0.053 nm ○	d)	0.53 mm ○	
xvi	The resulting nucleus in the reaction ${}^1_0n+{}^{137}_{56}Ba \rightarrow\ ?+\gamma$								
	a)	${}^{138}_{56}Ba$ ○	b)	${}^{138}_{55}Ba$ ○	c)	${}^{138}_{57}La$ ○	d)	${}^{136}_{56}Ba$ ○	
xvii	Half life of Iodine -137 is 8 days and its weight is 20 mg, after four half lives the amount left undecayed will be;								
	a)	2.50 mg ○	b)	6.25 mg ○	c)	0.625 mg ○	d)	$0.312\ mg$ ○	

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Section-B (Marks 42)

Q.2 Attempt any **FOURTEEN** parts. All parts carry equal marks.

i. Describe the relationship between potential difference and electric potential energy. Also give the difference between units volts and electron-volts.

ii. Under what circumstances, can the potential difference of a battery exceeds its emf? Under what conditions both of these give same value.

iii. How e/m ration of an electron can be determined using velocity selector method?

iv. A galvanometer have a resistance of 100Ω, and gives full scale deflection on 1 mA current. How it can be converted into an ammeter of range 0-10A.

v. State Faraday's law of electromagnetic induction. Give its mathematical form.

vi. Show that the relation $\varepsilon = \frac{\nabla \emptyset}{\nabla t}$ is dimensionally correct.

vii. Explain the difference between inductive reactance and capacitive reactance.

viii. Why a choke cannot control the direct current? Explain.

ix. The *rms* value of current in an A.C circuit is 10A. What is the peak value of current?

x. Explain the difference among Young's, Shear and Bulk Modulus.

xi. A semiconductor acts like insulator at 0K. Can conductivity of semiconductor be raised? If yes, then explain the process.

xii. Why the base current is weak as compared to collector current?

xiii. An n-type semiconductor has large no. of free electrons but still it is electrically neutral. Why?

xiv. State the postulates of special theory of relativity.

xv. Describe the phenomenon of pair production.

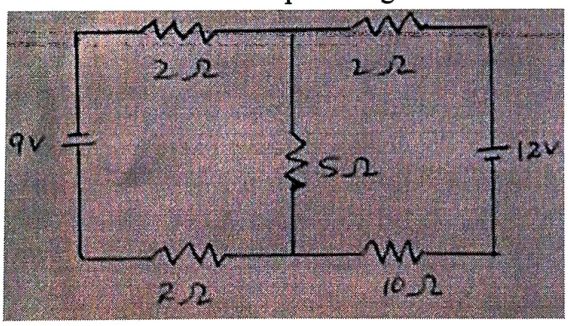
xvi. Find the wavelength associated with an electron in the state n=4 of hydrogen.

xvii. Calculate the shortest wavelength of the Balmer Series.

xviii. With the help of equations, explain the difference between mass defect and binding energy.

xix. Mass of ^{14}N nucleus is 13.999234u. Calculate binding energy.

xx. Find current in each loop of the given circuit.



Section – C (Marks 26)

Note: Attempt any **TWO** questions. All questions carry equal marks. (2×13 =26)

Q.3 a. Define Capacitance of a Capacitor and its units. Derive an expression for Capacitance of a parallel plate Capacitor. Also derive a relation for the energy stored in a Capacitor. **(7)**

b. Why transistor is called current amplifying device? Explain. **(3)**

c. A cable has a length of 12 m and is stretched by 1.2×10^{-4} m when a stress of 8.0×10^{8} N m^{-2} is applied. What is the strain energy per unit volume in the cable when the stress is applied? **(3)**

Q.4 a. What are transformers? Describe the working principle, construction and working of a transformer. Discuss the use and energy losses in transformers. **(6)**

b. A charged particle moves in a straight line through a particular region of space. Could there be a non-zero magnetic field in this region. **(3)**

c. Calculate the shortest and longest wavelength of radiation for Paschen Series. **(4)**

Q.5 a. Explain the construction and working of nuclear Reactor. Also discuss type of Nuclear Reactors. **(6)**

b. What determine the gradient of the graph of inductive reactance against frequency? Explain. **(3)**

c. A 12 volt automobile battery has resistance of 0.012Ω. What is the terminal voltage of this battery the starter draws a current of 100A? Calculate R, R_E, P_R, and P_r. **(4)**

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