13

Version No.				
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ROLL NUMBER					

PHYSICS HSSC-II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

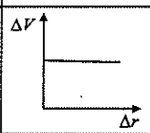
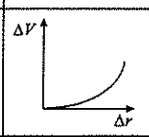
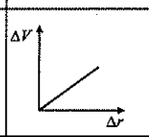
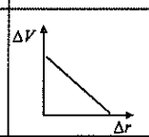
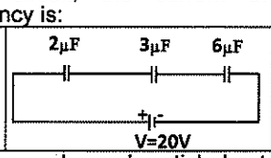
Do not use lead pencil.

حصہ اوّل لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر نگرانِ مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Answer Sheet No. _____

ہر سوال کے سامنے دیے گئے، کریکولم کے مطابق درست دائرہ کو پُر کریں۔ **Invigilator Sign.** _____

Fill the relevant bubble against each question according to curriculum: **Candidate Sign.** _____

	Question	A	B	C	D	A	B	C	D
1.	If the velocity of free electron is doubled, its De-Broglie wave length changes by the factor of:	2	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\sqrt{2}$	○	○	○	○
2.	The energy of photon of wave length 500nm is:	$1.77\,ev$	$1.52\,ev$	$3.10\,ev$	$2.49\,ev$	○	○	○	○
3.	An expression for current gain of a transistor is given by:	$\beta=\frac{I_E}{I_B}$	$\beta=\frac{I_B}{I_E}$	$\beta=\frac{I_B}{I_C}$	$\beta=\frac{I_C}{I_B}$	○	○	○	○
4.	For an atom in excited state n=5, maximum number of transitions that take place is:	10	25	3	5	○	○	○	○
5.	The variation of electric potential due to a point charge with distance is represented by the graph:					○	○	○	○
6.	In RLC series circuit, the current at resonance frequency is:	Zero	Infinite	Maximum	Minimum	○	○	○	○
7.	In the figure, the charge on $3\mu F$ capacitor is: 	$30\mu C$	$40\mu C$	$10\mu C$	$20\mu C$	○	○	○	○
8.	The force acting on a charged particle kept between the plates of charged capacitor is F. If one of the plates of the capacitor is removed, the force on particle becomes:	$\frac{F}{2}$	Zero	F	$2F$	○	○	○	○
9.	The best instrument for the accurate measurement of emf of a cell is:	Potentiometer	Ohm meter	Voltmeter	Ammeter	○	○	○	○
10.	The AC circuit in which current and voltage are in phase, the power factor is:	−1	2	Zero	1	○	○	○	○
11.	The temperature below which the resistivity of super conductor falls to zero is called:	Critical temperature	Kelvin temperature	Absolute temperature	Limiting temperature	○	○	○	○
12.	A 60watt bulb operates at 50% efficiency, the energy dissipated in 10 Seconds is:	$600J$	$700J$	$200J$	$300J$	○	○	○	○
13.	Galvanometer is sensitive when the value of $\frac{C}{BAN}$ is:	Zero	Negative	Small	Large	○	○	○	○
14.	With the increase in speed of motor, the magnitude of back emf:	Decreases	Becomes zero	Does not change	Increases	○	○	○	○
15.	If $\frac{N_s}{N_p}=1$ then the transformer is:	Neither step up nor step down	Rectifier transformer	Step up	Step down	○	○	○	○
16.	A wire is stretched to double of its length its strain is:	0.5	0	2	1	○	○	○	○
17.	PN junction when reverse biased acts as:	Inductor	OFF switch	Capacitor	ON switch	○	○	○	○

• $Q=CV$ • $\frac{1}{C_{eq}}=\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3}$ • $E=\frac{F}{q}$ • $E=\frac{\delta}{\varepsilon}$ • $P=VI\cos\theta$ • $P=\frac{W}{t}$ • $\lambda=\frac{h}{mv}$ • $E=\frac{hc}{\lambda}$ • $\text{strain}=\frac{\Delta L}{L}$

PHYSICS HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 68**

SECTION – B (Marks 42)

Q. 2 Answer the following questions briefly. **(14x3=42)**

(i)	What is meant by 'Magnetic Flux' and 'Magnetic Flux density'? Also give their units.	03	OR	Why energy dissipated per cycle (magnetization and demagnetization). For steel is more as compared to iron? Explain briefly.	03
(ii)	What is Wein's displacement law? Explain briefly.	1+2	OR	Prove that $E=-\frac{\Delta V}{\Delta r}$	03
(iii)	Differentiate between controlled and uncontrolled nuclear chain reactions. How is the chain reaction controlled?	03	OR	Why in a transistor the base region is made thin and lightly doped?	03
(iv)	Distinguish between N-type semiconductor and P-type semiconductor.	03	OR	Calculate the longest wave length of radiation for the Lyman series of hydrogen spectra.	03
(v)	Differentiate "Curie temperature" and "Critical temperature".	03	OR	How capacitor discharge ignition system works? Enlist some of its uses.	2+1
(vi)	Briefly explain resistivity. How it depends on temperature?	1+2	OR	How can a galvanometer be converted into voltmeter? Draw circuit diagram as well.	2+1
(vii)	How are eddy currents produced? Identify their heating effects.	03	OR	How Geiger-Muller counter detects and counts radiation?	03
(viii)	In transformer, why laminated iron core is used instead of solid one?	03	OR	A coil having a resistance of 10 Ohm and an inductance of 32mH is connected to 220V, 50Hz AC supply. Calculate current passing through the coil.	03
(ix)	What is meant by peak value and effective value of sinusoidal current? Give relation between them.	03	OR	Differentiate Paramagnetic and Diamagnetic materials with one example each.	03
(x)	Briefly explain working of transistor as a switch.	03	OR	What is meant by Meta-stable state and population inversion for LASER action?	03
(xi)	Calculate De-Broglie wave length of an electron having KE=1200 kev.	03	OR	Discuss the difference between Hadrons and Leptons.	03
(xii)	How much energy is released when 0.5kg of U-235 undergoes fission reaction? (If the disintegration energy per event is Q=208Mev.)	03	OR	What is meant by Alpha factor and Beta factor for common emitter configuration of transistor? Derive relation between them.	03
(xiii)	Briefly explain the principle of metal detector with circuit diagram.	2+1	OR	What is electron volt(ev)? Derive its relation with SI unit of energy.	1+2
(xiv)	Under what condition a source (Battery or cell) gives maximum power output? Discuss briefly.	03	OR	State Lenz's law. Prove that it is according to law of conservation of energy.	1+2

SECTION – C (Marks 26)

Note: Attempt the following questions.

Q.3	State postulates of Bohr's atomic model. Show that energy of the electron in H-atom is quantized.	3+4	OR	Derive an expression for charge to mass ratio for an electron and then calculate its value.	5+2
Q.4	What is photoelectric effect? Why classical physics fails to explain photoelectric effect? Derive Einstein photoelectric equation.	1+2+4	OR	What is potentiometer? Explain its principle, construction and working. Also give some uses.	1+5+1
Q.5	State and explain Gauss's law. Find electric field intensity between two oppositely charged parallel plates.	3+3	OR	Explain the phenomenon of self-inductance of a coil. What is its unit? On what factors self-induction depends?	3+1+2
Q.6	What is RLC series resonance circuit? Draw its impedance diagram. Also give its properties.	2+1+3	OR	What is meant by 'half-life' of a radio-active element? Show that $T_{\frac{1}{2}}=0.693/\lambda$	2+4

$\frac{1}{\lambda}=R_H\left(\frac{1}{p^2}-\frac{1}{n^2}\right)$ $X_L=2\pi fL$ $\lambda=\frac{h}{mv}$ $KE=\frac{1}{2}mv^2$ $R_H=1.0974\times10^7 m^{-1}$ $Z=\sqrt{R_2+X_L^2}$ $N=\frac{N_A\times m}{A}$

$h=6.626\times10^{-34}Js$ $I=\frac{V}{Z}$ $N_A=6.023\times10^{23}$ $E=PQ$ $m_e=9.1\times10^{-31}kg$ $A=Z+N$ $E=N\times Q$