15

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.

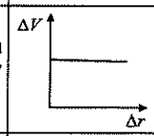
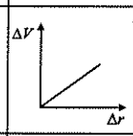
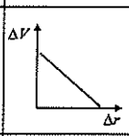
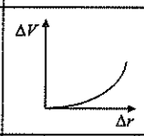
Do not use lead pencil.

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.	What is the SI unit of current gain?	It has no unit	Ampere	Volt	Ohm-meter	○	○	○	○
2.	The variation of electric potential due to a point charge with distance is represented by the graph as:					○	○	○	○
3.	The interior of a hollow charged sphere is a:	Field free region	Strong field region	Weak field region	Partial field region	○	○	○	○
4.	The thermocouple circuit which is used to measure temperature, works on:	Compton effect	Thomson effect	Peltier effect	Seebeck effect	○	○	○	○
5.	Which is **correct** for an open circuit?	$V_t = 0$	$V_t < \varepsilon$	$V_t = \varepsilon$	$V_t = \varepsilon + Ir$	○	○	○	○
6.	What fraction of a radio-active sample will be left after 600 years whose half-life is 150 years?	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	○	○	○	○
7.	Two up quarks and one down quark make:	A Meson	A Proton	A Neutron	A Photon	○	○	○	○
8.	When an electron in an atom goes from a lower orbit to higher orbit its:	KE and PE decrease	KE increases, PE decreases	KE decreases, PE increases	KE and PE increase	○	○	○	○
9.	An electron moves $3\times10^{2} m/s$ perpendicular to magnetic field of $2T$. What is the magnitude of magnetic force?	$4.0\times10^{6} N$	$9.6\times10^{-17} N$	$6.4\times10^{-17} N$	$3.6\times10^{-10} N$	○	○	○	○
10.	If the length of solenoid is doubled but number of turns remain same, then B inside the solenoid becomes:	Four times	Double	One fourth	Half	○	○	○	○
11.	The term $\frac{\Delta\phi}{\Delta t}$ has the same dimensions as:	Current	Flux	Potential difference	Time	○	○	○	○
12.	If back emf is zero, then the coil draws:	Minimum current	Steady current	Zero current	Maximum current	○	○	○	○
13.	In the equation $\Delta\lambda = \frac{h}{m_o c}(1-\text{Cos}\theta)$, which factor is called Compton wave length?	$h(1-\text{Cos}\theta)$	$\frac{h}{m_o c}$	$\frac{1}{m_o c}$	$1-\text{Cos}\theta$	○	○	○	○
14.	In choke coil the reactance X_L and resistance R, are related as:	$X_L = \infty$	$X_L = R$	$X_L << R$	$X_L >> R$	○	○	○	○
15.	In purely inductive circuit, the current:	Lags the emf by 60°	Lags the emf by 90°	Leads the emf by 90°	Is in phase with emf	○	○	○	○
16.	Impurity atoms are doped in semi-conductor to increase:	Resistivity	Protons	Positrons	Conductivity	○	○	○	○
17.	Curie point is a **temperature** where:	Paramagnetic changes to Ferromagnetic material	Diamagnetic changes to Paramagnetic material	Paramagnetic changes to Diamagnetic material	Ferromagnetic changes to Paramagnetic material	○	○	○	○

- $E = -\frac{\Delta V}{\Delta r}$
- $V_t = \varepsilon - Ir$
- $\overline{F} = q(\overline{V} \times \overline{B})$
- $\beta = \frac{\Delta I_c}{\Delta I_B}$
- $B = \frac{Nu_o I}{l}$
- $\varepsilon = \frac{N\Delta\phi}{\Delta t}$

11

PHYSICS HSSC–II

16

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)	Water has a large dielectric constant, but it is rarely used in capacitors. Why?	03	OR	What is meant by moderator, used in atomic reactors? Give example.	2+1
(ii)	How will capacitance of a parallel plate capacitor be affected if area of plates is doubled and separation between them is halved?	03	OR	What is meant by 'critical mass', 'sub-critical mass' and 'super critical mass' for fission chain reaction?	03
(iii)	How does stator help rotator to rotate in A.C. motor?	03	OR	As rate of doing work increases by motor, the back emf decreases. Why?	03
(iv)	How can a rheostat be used as potential divider? Draw circuit diagram as well.	03	OR	What is meant by alpha factor and beta factor for common emitter configuration of transistor? Give relation between them.	03
(v)	Calculate the current flowing through a circuit of resistance 1500 ohm connected with a battery of emf 100V with internal resistance 0.01 Ohm.	03	OR	Briefly explain the terms 'magnetic flux' and 'magnetic flux density'? Give their units as well.	03
(vi)	Can an electron at rest be set in motion with a magnet? Explain briefly.	1+2	OR	Differentiate between spontaneous and stimulated emissions. Also show in diagrams.	03
(vii)	What is the time period of an electron projected into a uniform magnetic field of 20mT and moves in a circle of radius 6cm?	03	OR	Why is common emitter configuration of transistor widely used in amplifier circuits?	03
(viii)	What is choke coil? Give its importance in A.C. circuits.	1+2	OR	How are eddy currents produced? Identify their heating effects.	03
(ix)	What determines the gradient of a graph of inductive reactance against frequency? Explain briefly.	03	OR	Write Stefan-Boltzmann law for black body radiation. Give its mathematical expression as well.	2+1
(x)	Differentiate, between 'critical temperature' and 'curie temperature' with examples.	03	OR	How a galvanometer can be converted into ammeter? Explain with the help of diagram also derive formula.	03
(xi)	Why in a transistor, the base is thin and lightly doped? Explain briefly.	03	OR	A 24.0V car battery powers a 30.0 watt bulb. How many charges pass through it, in each second?	03
(xii)	Which factors cause to produce magnetic field in an atom? Explain briefly.	03	OR	How did De-Broglie prove the third postulate of Bohr's atomic model? Explain briefly.	03
(xiii)	Under what condition Compton shift has maximum wavelength? Also calculate Compton shift wavelength.	1+2	OR	What is meant by depletion layer in PN-Junction? How is it developed? Explain briefly.	2+1
(xiv)	When a solid is heated it begins to glow, why does it first appear red?	03	OR	How many basic forces of nature exist? Describe any two briefly.	1+2

SECTION – C (Marks 26)

Note: Attempt the following questions.

Q.3	Explain the concept of electric potential. Derive an expression for electric potential at a point in electric field due to a point charge.	1+6	OR	State postulates of Bohr's atomic model. Show that radii of the orbit of H-atom are quantized.	3+4
Q.4	What is meant by emf(ε), internal resistance(r) and terminal potential difference(V_t) of a battery? Derive relation between them. Under what condition $V_t > \varepsilon$?	3+3+1	OR	What is AC generator? How is an AC generator used to produce an alternating current? Derive mathematical expression of A.C. Also show it graphically.	1+2+4
Q.5	The Half life of Radium is $5.0\times10^{10}S$.A sample contains 6.0×10^{16} nuclei. Calculate. a. Decay constant. b. How many radium nuclei will decay per second? Express your answer in curies.	2+2+2	OR	A sinusoidal alternating voltage of angular frequency ω is connected across a capacitor C. Find mathematical expression for instantaneous voltage, current and average power dissipated per cycle of applied voltage.	06
Q.6	Explain the phenomena of pair production and pair annihilation.	06	OR	Describe the magnetic properties of material explained on the basis of B-H curve.	06

ε_r for water $= 80$ $\quad C = \frac{A\varepsilon_o\varepsilon_r}{d}$ $\quad F = \frac{mv^2}{r}$ $\quad IR = \varepsilon - Ir$ $\quad F = q(V \times B)$ $\quad v = \frac{s}{t} = \frac{2\pi r}{T}$ $\quad X_L = 2\pi fL$

$I = \frac{Q}{t}$ $\quad \Delta\lambda = \frac{h}{m_o c}(1 - \cos\theta)$ $\quad \lambda = \frac{0.693}{T_{\frac{1}{2}}}$ $\quad A = \lambda N$ $\quad 1Bq = \frac{Ci}{3.70\times10^{10}}$ $\quad mvr = \frac{nh}{2\pi}$

$P = VI$ $\quad c = 3\times10^8 ms^{-1}$ $\quad h = 6.626\times10^{-34} Js$ $\quad m_o = 9.1\times10^{-31} kg$