PHYSICS , GROUP FIRST
NEW COURSE
ACADEMIC SESSION : 2015 - 2017 TO 2017 - 2019

TIME: 20 MINUTES
MARKS: 17

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question

QUESTION NO. 1

1	Photocopier and inkjet printer are the application of
	(A) Electricity (B) Electrostatics (C) Magnetism (D) Electromagnetism
2	Selenium is
	(A) Insulator (B) Photoconductor (C) Conductor (D) First insulator than conductor
3	Siemen is the unit of
	(A) Resistivity (B) Resistance (C) Conductivity (D) Conductance
4	The sensitivity of Galvanometer can be increased by
	(A) Decreasing the area of coil (B) Decreasing the number of turns of coil
	(C) Increasing the magnetic field (D) Using a fine suspension
5	If a charge at rest in a magnetic field then force on charges is
	(A) Zero (B) Maximum (C) $q(\overline{V} \times \overline{B})$ (D) $qVB\cos\theta$
6	Mutual induction has a practical role in performance of the
	(A) A.C. Generator (B) D.C Generator (C) Transformer (D) Radio choke
7	Henry is S.I unit of
	(A) Current (B) Resistance (C) Flux (D) Self inductance
8	In three phase voltage across any two lines is about
	(A) 220 V (B) 230 V (C) 400 V (D) 430 V
9	At high frequency ,the value of reactance of the capacitor in A.C. circuit is
	(A) Low (B) High (C) Zero (D) Medium
10	A device used to detect very weak magnetic field produced by brain is named as ?
	(A) MRI (B) CAT Scans (C) Squid (D) CRO
11	The size of base in transistor is
	(A) 10^{-9} m (B) 10^{-8} m (C) 10^{-7} m (D) 10^{-6} m
12	The potential barrier for germanium at room temperature is
	(A) 0.3 volt (B) 0.5 volt (C) 0.7 volt (D) 0.9 volt
13	Photo diode can turn its current on and off in
	(A) Micro-sec (B) Nano- sec (C) Pico - sec (D) Femto - sec
14	Joule second is the unit of
	(A) Energy (B) Wien's constant (C) Boyles law (D) Plank's constant
15	Photons emitted in inner shell transition are
	(A) Continuous X- rays (B) Discontinuous X- rays (C) Characteristic X- rays (D) Energetic X- rays
16	0.1 Kg mass will be equivalent to energy
	(A) 5×10^{8} J (B) 9×10^{15} J (C) 6×10^{16} J (D) 9×10^{16} J
17	S.I unit of absorbed dose is
	(A) Gray (B) Roentgen (C) Curie (D) Rem

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1	Electric lines of force never cross .Why?
2	Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.
3	Define electron volt (ev) and write its relation with joule.
4	What is meant by EEG and ERG?
5	If a charged particle moves in a straight line through some region of space, can to say that the magnetic field in the region is zero.
6	What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon the coil is (a) Maximum (b) Minimum ?
7	What is Lorentz force? Write its formula.
8	What is right hand rule to find the direction of the lines of force?
9	Can a step-up transformer increase the power level? In a transformer, there is no transfer of charge from the primary to the secondary, How is ,than the power transferred?
10	Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have an induced *emf* in the loop.
11	What is back *emf* effect in motors .
12	Name and define the factors responsible for power loss in transformer

QUESTION NO. 3   Write short answers any Eight (8) questions of the following   16

1	What are the uses of rheostat ?
2	Do bends in a wire affect its electrical resistance? Explain.
3	A charge of 90 C passes through a wire in 1 hour and 15 minutes. What is the current in the wire?
4	What is choke?
5	Name the device that will: (a) Permit flow of direct current but oppose the flow of alternating current (b) Permit flow of alternating current but not the direct current.
6	A circuit contains an iron-cored inductor, a switch and a D.C. source arranged in series. The switch is closed and after an interval reopened. Explain why a spark jumps across the switch contacts
7	Define strain energy in deformed materials. Write its formula.
8	Differentiate between intrinsic and extrinsic semiconductors.
9	Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same.
10	Write applications of photo diode.
11	What is the net charge on a n-type or a p-type substance?
12	Why ordinary silicon diodes do not emit light?

QUESTION NO. 4   Write short answers any Six (6) questions of the following   12

1	What are the measurements on which two observers in the relative motion will always agree upon.
2	Can pair production take place in vacuum ? Explain.
3	What is photo cell ? Give its two applications.
4	Define excitation potential.
5	What is meant by a line spectrum? Explain how line spectrum can be used for identification of elements?
6	What do we mean by the term Critical mass?
7	What are isotopes? What do they have in common and what are their differences?
8	Differentiate between mass defect and binding energy.
9	Explain the term absorbed dose and define its unit gray.

SECTION-II

Note: Attempt any Three questions from this section $8 \times 3 = 24$

Q.5.(A)	State and Explain the Ohm's law.	5
(B)	A particle having a charge of 20 electrons on it fall through a potential difference of 100 volts, Calculate the energy acquired by it in electron volts(ev).	3
Q.6.(A)	How energy is stored in an Inductor? Derive relation for energy stored in an Inductor.	5
(B)	A Power line 10.0 m high carries a current 200A. Find the magnetic field of the wire at the ground.	3
Q.7.(A)	What is transistor ? Derive the voltage gain equation of transistor working as an amplifier	1+4
(B)	An iron core coil of 2.0 H and 50 Ω is placed in series with a resistance of 450 Ω. An AC supply of 100 V ,50 Hz is connected across the circuit. Find the current flowing in the coil.	3
Q.8.(A)	What is meant by strain energy? Draw force extension graph for a vertically suspended wire stretched by a variable weight at the other end and by its graph derive a relation to calculate its value	1+4
(B)	What is the de-Broglie wave length of an electron whose kinetic energy is 120 ev?	3
Q.9.(A)	What are isotopes ? How isotopes are separated by mass spectrograph? Also derive its relation	5
(B)	Calculate the longest wave length of radiation for the Paschen series.	3

PHYSICS
GROUP SECOND (NEW COURSE)
ACADEMIC SESSION: 2015 - 2017 TO 2017 - 2019

TIME: 20 MINUTES
MARKS: 17

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

1	Equation $\phi = \vec{E} . \vec{A}$ is applicable to the surface
	(A) Cylindrical (B) Conical (C) Flat (D) Spherical
2	During danger the "eel" turns itself into a living battery then the potential difference between its head and tail can be up to
	(A) 160 V (B) 220 V (C) 440 V (D) 600 V
3	Electric coefficient is represented by
	(A) $\in o$ (B) $\in r$ (C) μo (D) μr
4	The SI unit of flux density is
	(A) Gauss (B) Tesla (C) weber / meter (D) weber
5	The brightness of spot on CRO screen is controlled by
	(A) Anode (B) Cathode (C) Grid (D) plates
6	A transformer steps 220 V to 40 V , If the secondary turns are 40 and then primary turns are
	(A) 20 (B) 40 (C) 120 (D) 220
7	The loss of energy over each A.C.cycle magnetization and demagnetization of transformer core is called as
	(A) Electric current (B) Electronic current (C) Eddy current (D) Conventional current
8	At high frequency, the current through a capacitor of A.C. circuit will
	(A) Zero (B) Small (C) Large (D) Infinity
9	Which of the following waves do not travel at the speed of light
	(A) Radio waves (B) X-rays (C) Sound waves (D) Heat waves
10	Domains contain nearly
	(A) 10^8 to 10^9 atoms (B) 10^{12} to 10^{16} atoms (C) 10^{15} to 10^{20} atoms (D) 10^{25} to 10^{30} atoms
11	Photovoltaic cell is formed from
	(A) Arsenic (B) Carbon (C) Germanium (D) Silicon
12	The gain of an inverting amplifier of external resistances $R_1 = 10\ K\ \Omega$ and $R_2 = 100\ K\ \Omega$ is
	(A) -10 (B) -5 (C) -2 (D) 5
13	The wave-length of emitted radiation of maximum intensity is inversely proportional to the absolute temperature. This is known as
	(A) Faraday's law (B) Rayleigh Jean's law (C) Stefan's law (D) Wien's displacement law
14	Photoelectric effect shows
	(A) Corpuscular nature of light (B) Dual nature of light
	(C) Electromagnetic nature of light (D) Wave nature of light
15	The diameter of an atom is of order of
	(A) 10^{-8} m (B) 10^{-10} m (C) 10^{-12} m (D) 10^{-14} m
16	The specially designed solid state detector can be used to detect
	(A) α -rays only (B) β-rays only (C) γ-rays only (D) X-rays only
17	A pair of quark and antiquark makes a
	(A) baryon (B) lepton (C) muon (D) meson

QUESTION NO. 2   Write short answers any Eight (8) questions of the following   16

1	Show that : 1 ohm × 1 farad = 1 second
2	Define electron volt and show that 1 ev = 1.6×10^{-19} J
3	State Gauss's law, write its formula.
4	Electric lines of force never cross why ?
5	What is Lorentz force, write its formula.
6	What is meant by Digital multimeter?
7	Why the volt meter should have a very high resistance?
8	Why does the picture on a TV screen become distorted when a magnet is brought near the screen?
9	What is SI unit of mutual inductance and also define it?
10	What is difference between D.C. generator and D.C. motor?
11	Does the induced *emf* in a circuit depend on the resistance of the circuit?
12	Can a DC motor be turned into DC generator? What changes are required to be done?

QUESTION NO. 3   Write short answers any Eight (8) questions of the following   16

1	Write down the names of effects of current for its detection.
2	What are the difficulties in testing whether the filament of lightened bulb obeys Ohm's law?
3	Describe a circuit which will give a continuously varying potential.
4	At what frequency will an inductor of 1.0 H have a reactance of 500 Ω ?
5	How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50 Hz source?
6	Name the device that will: (a) Permit flow of direct current but oppose the flow of alternating current. (b) Permit flow of alternating current but not the direct current.
7	Differentiate between amorphous and polymeric solids.
8	What are superconductors? Give example.
9	Define stress and strain, what are their units?
10	What are the uses of Photodiode?
11	Why charge carriers are not present in depletion region?
12	How does the motion of an electron in a n-type substance differ from the motion of holes in a p-type substance?

QUESTION NO. 4   Write short answers any Six (6) questions of the following   12

1	Does the brightness of a beam of light primarily depends on the frequency of photon or on the number of photons?
2	Why we do not observe a Compton effect with visible light?
3	What is threshold frequency and work function?
4	Why does laser usually emit only one particular colour of light?
5	What is meant by a line spectrum? Explain, how line spectrum can be used for the identification of elements?
6	A particle which produces more ionization is less penetrating. Why?
7	Why are heavy nuclei unstable?
8	What will be the change in mass number and charge number during alpha decay?
9	What are isotopes ? Give an example.

SECTION-II

Note: Attempt any Three (3) questions from this section $8 \times 3 = 24$

Q.5.(A)	State and explain Ohm's law. Also explain the behaviour of ohmic and non-ohmic devices with the help of graph.	5
(B)	Determine the electric field at the position $\vec{r} = (4\hat{\imath} + 3\hat{\jmath})$ m caused by a point charge q = 5×10^{-6} C placed at origin.	3
Q.6.(A)	State Faraday's law and derive relation for induced *emf*.	5
(B)	Alpha particles ranging in speed from 1000m/s to 2000 m/s enter into a velocity selector where the electric intensity is 300 Vm^{-1} and the magnetic induction 0.20T. Which particle will move un-deviated through the field?	3
Q.7.(A)	Explain the principle of Generation transmission and reception of electromagnetic waves.	5
(B)	A current flowing into the base of transistor is 100 μ A . Find its collector current I_C . its emitter current I_E if the value of current gain β is 100.	3
Q.8.(A)	Write down a note on construction, working and uses of a Photocell.	5
(B)	A 1.25 cm diameter cylinder is subjected to a load of 2500 kg. Calculate the stress on bar in mega Pascal .	3
Q.9.(A)	Define and explain Nuclear fission.	5
(B)	The wavelength of K x-ray from copper is 1.377 $\times 10^{-10}$ m What is the energy difference between the two levels from which this transition results?	3