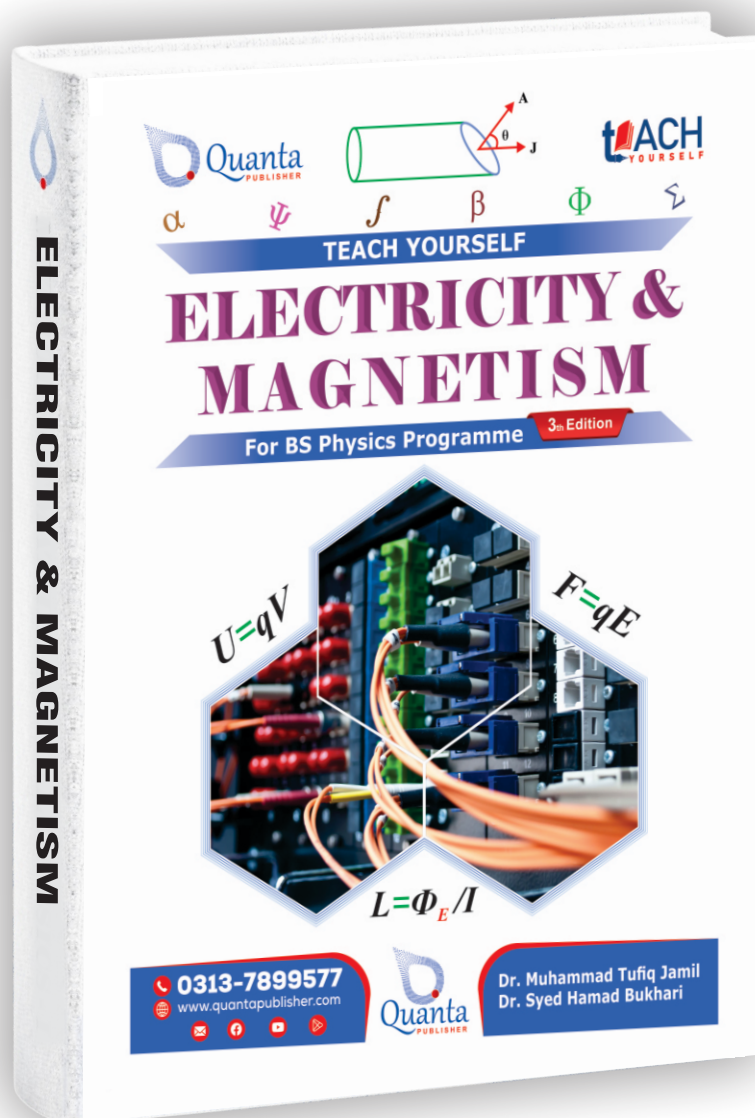




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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

Affiliated Colleges Semester Examinations *Fall-2018-19*

BS (4YDP) Physics

Roll. No: -----

Course Code: Phy-401

Semester-III

Time: 2 Hours & 30 min.

Course Title:


(Subjective)

Electricity & Magnetism-I

NOTE: Attempt All questions

(14+15+15)

- Q. No. 2: a) Discuss electric potential due to quadrupole in detail. (6)
 b) A proton orbits with a speed of 294 km/s just outside a charged sphere of radius 1.13 cm. find charge on sphere. (5)
 c) State Gauss's law. (3)
- Q. No. 3: a) State Biot-Savart law and derive an expression for the magnitude of magnetic field on axis perpendicular to current carrying loop and at the center of the loop. (10)
 b) What is the mean free time between collisions for the conduction of electrons in Cu? And also find out mean free path (λ) for these collisions? Assume an effective speed is 1.6×10^6 m/s. (5)
- Q. No. 4 a) Discuss growth of charge, potential difference and current in RC series circuit. (10)
 b) Four 18Ω resistors are connected in parallel across 27V battery. What is the current through battery and each resistor? (5)

 Department of Physics G.C University Faisalabad

Final Examination 2019 Class: BS-III *Physics* Paper: Electricity and Magnetism -I
 Course Code: PHY-401 Credit hours: 3 (3-0) Time Allowed: 2.30hrs. Marks:30
Fall, 2018-19

Name: Muazma Ayub Roll No: 364612

(Subjective Part)

Note: Attempt all the Questions.

Q.No.2. Give the short answers of following questions.

(a) Find the capacitance of two concentric spherical shells with radii "a" and "b". (2)

(b) What is the significance of Equation of continuity of charges? (2)

(c) Find the total charge in coulomb's of 75 Kg of electrons. (2)

Q. No.3.

(a) Calculate Electric Potential due Point and System of N-point charges. (4)

(b) Describe the Gauss's Law in terms of Volume charge density (2)

Q. No.4.

(a) Find the magnitude of Electric field such that α -particle placed in it, would experience a force equal to its weight.. (3)

(b) Explain the concept of conservation of Electric Charge. (3)

Q. No. 5

(a) Write a note on Atomic Magnetism. (4)

(b) Calculate the value of Nuclear Magnetron. (2)

Q. No. 6

(a) Define and Explain Ampere's Law. (1)

(b) Consider three charges are placed at the vertices of equilateral triangle having perimeter 36cm such that $q_1=q$, $q_2=-4q$ and $q_3=2q$. Where $q=150\text{nC}$. What is the electric potential energy of the system? (1)

Govt. Postgraduate College of Science

Samanabad, Faisalabad ■ 041-2661920

BS PHYSICS

Mid Term Exams 2018

3rd Semester


Course Code

Electricity & Magnetism-I

Phy-401

Time: 1:00 Hours

Max. Marks: 12

Roll. No: 

Note: Attempt ALL questions.

- Q: 1 a) Define electric potential. Calculate electric potential due to point charge and N-point charges. (0.5+3.5+1)
- b) What is Gaussian surface? (2)
- Q: 2 a) A proton orbits with a speed 294 km/s just outside the charged sphere of radius 1.13 cm. Find charge on the sphere. (3)
- b) Calculate dipole moment of electron and proton 4.3 nm apart. (2)

GOVT. COLLEGE UNIVERSITY, FAISALABAD

FINAL TERM EXAMINATION 2020 (SPRING SEMESTER)

Roll No. _____
Course Code: PHY-402

BS PHYSICS
Course Title: Electricity & Magnetism-II

Semester: 4th
Credit: 3(3-0)

Q1. Each question has four possible answers tick the right answer. (50 x 1 = 50)

1. The law that the induced e.m.f. and current always oppose the cause producing them is due to
 - a) Faraday
 - b) Lenz
 - c) Newton
 - d) Coulomb
2. If current in a conductor increases then according to Lenz's law self-induced voltage will
 - a) Aid the increasing current
 - b) Tend to decrease the amount of current
 - c) Produce current opposite to the increasing current
 - d) Aid the applied voltage
3. As per Faraday's laws of electromagnetic induction, an e.m.f. is induced in a conductor whenever it
 - a) Lies perpendicular to the magnetic flux
 - b) Lies in a magnetic field
 - c) Cuts magnetic flux
 - d) Moves parallel to the direction of the magnetic field
4. Electric potential and Electromotive force (EMF) are
 - a) Different terms
 - b) Have different units
 - c) Same terms
 - d) Undefined terms
5. Which is the property of a coil by which a counter emf is induced when the current through the coil changes?
 - a) Self-inductance
 - b) Mutual inductance
 - c) Capacitance
 - d) None of these
6. Direction of induced emf is determined by
 - a) Fleming's left-hand rule
 - b) Fleming's right hand rule
 - c) Faraday's law
 - d) Right hand thumb rule
7. The relation between the direction of induced emf and the direction of motion of the conductor is?
 - a) Parallel
 - b) Equal
 - c) Not related
 - d) Perpendicular
8. Find the average current in an inductor if the total current in the inductor is 26A.
 - a) 10A
 - b) 26A
 - c) 13A
 - d) 5A
9. Calculate the value of stored energy in an inductor if the value of inductance is 20H and 4A of current flows through it.
 - a) 220J
 - b) 150J
 - c) 190J
 - d) 160J
10. The line integral of the magnetic field intensity is given by
 - a) Turns
 - b) Flux density
 - c) MMF
 - d) Current element
11. Unit of electric flux density is
 - a) coulomb
 - b) farad / meter
 - c) coulomb / meter²
 - d) weber / meter²
12. 1 Tesla =
 - a) 1 wb- m²
 - b) 1 wb/ m²
 - c) 1 wb
 - d) 1 wb/m
13. The charging time constant of a circuit consisting of a capacitor is the time taken for the charge in the capacitor to become _____ % of the initial charge
 - a) 33
 - b) 63
 - c) 37
 - d) 36
14. In electromagnetic waves the phase difference between electric field vector and magnetic field vector is
 - a) zero
 - b) $\pi/2$
 - c) π
 - d) $\pi/3$
15. The SI unit of magnetic induction is:
 - a) Gauss
 - b) Oersted
 - c) Weber
 - d) Tesla
16. The unit of \sqrt{LC} is:
 - a) Henry
 - b) Farad
 - c) Ampere
 - d) Second
17. Dimension of $1/\sqrt{\mu_0\epsilon_0}$ are those of:
 - a) Velocity
 - b) Momentum
 - c) Energy
 - d) None of these
18. The dimensions of RC matches with:
 - a) R/L
 - b) LR
 - c) L/R
 - d) both a&b
19. Two identical cells are first connected in series then parallel the ratio of balancing lengths in two cases will be:
 - a) 4:1
 - b) 1:4
 - c) 2:1
 - d) Cannot be answered
20. The self-inductance of a straight conductor is:
 - a) Zero
 - b) Infinity
 - c) Very small
 - d) Cannot be determined
21. In an oscillating LC circuit maximum charge on capacitor is q the charge on capacitor when energy is stored equally between electric and magnetic field:
 - a) $q/\sqrt{2}$
 - b) $q/\sqrt{3}$
 - c) q
 - d) q/2
22. Which of the following is scalar quantity?
 - a) Magnetic flux
 - b) emf
 - c) both a& b
 - d) none of these

24. Electromagnetic waves transport energy equal to:
 a) $mv^2/2$ b) hf c) mc^2 d) hf/c
25. Faradays law are consequence of conservation of:
 a) Charge b) Magnetic field
 c) Energy and magnetic field d) Energy
26. A magnet droops down a long vertical copper tube its velocity as it falls down the tube.
 a) Decreases b) Increases
 c) Remains constant d) First increases then decreases
27. Which one of the following Maxwell equation says that isolated magnetic poles do not exist?
 a) $\text{div } \vec{D} = \rho$ b) $\text{div } \vec{B} = 0$
 c) Both a& b d) Generalized Ampere's law
28. For electromagnetic waves Maxwell generalized
 a) Gauss's law of electricity b) Gauss's law of magnetism
 c) Ampere's law d) Faraday's law
29. If L, C and R represents inductance capacitance and resistance then the which following represents frequency?
 a) R/L b) $1/RC$ c) $1/\sqrt{LC}$ d) all of these
30. For time varying currents the field or waves will be
 a) Electromagnetic b) Magneto static
 c) Electrostatic d) Electrical
31. According to the faradays law EMF stand for
 a) Electromagnetic field b) Electromagnetic force
 c) Electromagnetic friction d) Electromotive force
32. A moving charge will produce:
 a) Electric field only b) Magnetic field only
 c) Both a&b d) None of above
33. When the conduction current density are same the dissipation factor will be
 a) Zero b) Minimum c) Maximum d) Unity
34. When a magnet is in motion relative to a coil the induced e.m.f. does not depends upon
 a) Resistance of the coil b) Motion of the magnet
 c) Number of turns of the coil d) Pole strength of the magnet
35. At parallel resonance, the current flowing through L and C are
 a) Infinite b) Zero c) Equal d) Unequal
36. Inductor opposes change in
 a) Current b) Voltage
 c) Voltage and current d) Neither voltage or current
37. A coil does not consume any power.it should be
 a) Resistive b) capacitive c) Inductive d) None of these
38. Inductance have dimensions of
 a) Flux/ length b) Ampere/ second
 c) Flux/ampere d) Flux/current
39. Electrons remain bound to nucleus due to which force:
 a) Electrostatic b) Gravitational c) Nuclear d) None of these
40. Current through an inductor follows when circuit is closed:
 a) Linear growth b) Exponential growth
 c) Linear decay d) Cannot be predicted
41. When two ends of a circular uniform wire are joined to the terminals of a battery, the field at the center of the circle
 a) Will be zero b) Will be infinite
 c) Will depend on the amount of e.m.f. applied d) Will depend on the radius of the circle
42. The unit of flux is the same as that of
 a) Reluctance b) Resistance
 c) Permeance d) Pole strength
43. The Biot-savart's law is a general modification of
 a) Kirchlhoff's law b) Lenz's law
 c) Ampere's law d) Faraday's laws
44. Magnetic moment is a
 a) Pole strength b) Universal constant
 c) Scalar quantity d) Vector quantity
45. Which of the following rays are not electromagnetic waves?
 a) Gamma rays b) Beta rays c) Heat rays d) X rays
46. If the capacitance of the L-C circuit is made four times, then the frequency of the circuit becomes
 a) Twice b) One half c) Four times d) None
47. The value of the steady current which when flowing through the same resistor produces heat at the same rate as the mean rate of heat produced by the alternating current is
 a) Average current b) Sinusoidal current c) r.m.s current d) Net current
48. pure resistor circuit the voltage and current are
 a) Lagging each other b) They are at 90° phase difference
 c) They have zero phase difference d) No phase difference
49. Parallel resonant circuit is sometimes known as
 a) Rejector circuit b) Acceptor circuit
 c) Inductive circuit d) Capacitive circuit
50. Which of the following waves do not travel at speed of light:
 a) Radio waves b) Heat waves c) X-rays d) Sound waves



UNIVERSITY OF THE PUNJAB

Second Semester - 2018

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Electricity & Magnetism

TIME ALLOWED: 15 Mints.

Course Code: PHY-103 / PHY-12328 Part - I (Compulsory)

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.

- Q.1 Encircle the correct answer from given multiple choices in each part. (1 x 10)
- A closed spherical surface of radius r in a uniform electric field \vec{E} . What is electric flux through the surface?
 - $4\pi r^2 E$
 - $\pi r^2 E$
 - $2\pi r^2 E$
 - 0
 - What is the capacitance of a single spherical conductor of radius r surrounded by air?
 - $4\pi\epsilon_0 r$
 - $4\pi\epsilon_0 r^2$
 - $2\pi\epsilon_0 r$
 - $4\pi\epsilon_0/r$
 - Electric charges A and B are attracted to each other. Electric charges B and C repel each other. If A and C are held close together they will
 - Repel
 - Attract
 - Not affect each other
 - More information is needed to answer
 - An electric dipole of dipole moment \vec{P} in a uniform electric field \vec{E} will experience a minimum potential energy
 - When \vec{P} is antiparallel \vec{E}
 - When \vec{P} is parallel to \vec{E}
 - When \vec{P} is perpendicular to \vec{E}
 - All above are incorrect
 - The resistance R of a particular object does not depend on?
 - The material of which it made
 - The length
 - The cross sectional area
 - The applied potential difference
 - Ampere's Circuital Law and which of the following law in electrostatics are analogous
 - Lenz's law
 - Gauss's law
 - Biot-Savart's Law
 - Faraday's law
 - The materials in which the atoms have no permanent magnet dipole moments are
 - Ferromagnetic
 - Paramagnetic
 - Diamagnetic
 - Both (a) & (b)
 - Induced electric field is produced by
 - Changing magnetic flux
 - Changing electric charge
 - Changing resistance
 - Both (b) & (c)
 - A positive charge q moving with constant velocity v through magnetic field B , will experience maximum magnetic force when, the angle between v and B is
 - 0°
 - 180°
 - 90°
 - both (a) and (b)
 - The value permeability in air is
 - $4\pi \times 10^{-7} B/m$
 - $2\pi \times 10^{-7} H/m$
 - $4\pi \times 10^7 H/m$
 - $4\pi \times 10^{-7} H/m$



UNIVERSITY OF THE PUNJAB

Second Semester - 2018

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Electricity & Magnetism

TIME ALLOWED: 2 Hrs. & 45 Mints.

Course Code: PHY-103 / PHY-12328 Part – II

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

- Q.2** Give the short answer of each question (2 x 10 = 20)
- i. What does it mean to say that a physical quantity is (a) quantized (b) conserved?
 - ii. Describe briefly the procedure for finding the force exerted by continuous charge distribution on a point charge.
 - iii. Electric field at any point on positive y axis due to line of charge is given by $E = \frac{\kappa L}{y\sqrt{y^2+L^2/4}}$
compute electric field due to infinitely long line of charge.
 - iv. State Faraday's law. What describes the negative sign in this law?
 - v. Electric lines of force never cross, why?
 - vi. When I current pass through toroid windings of N turns, write the formula for magnetic field for interior path. Also describe direction of magnetic field within toroid by right-hand rule.
 - vii. Discuss the analogies and differences between Biot-Savart law and Coulomb's law.
 - viii. How you conclude that electric potential energy reside in the volume between the plates of the capacitor.
 - ix. Why do not we simply define the direction of magnetic field B to be the direction of magnetic force that acts on moving charge?
 - x. Explain why a spherical shell exerts no electrostatic force on a charged particle placed inside it.
- Q3.** (a) What is electric dipole? Derive the expression for the magnitude of electric field at any point due to dipole. (6)
- (b) A plastic rod whose length is 220 cm and radius is 3.6 mm, carries a negative charge of magnitude 3.8×10^{-7} C, spread uniformly over its surface. What is the electric field near the midpoint of the rod, at a point on its surface? (4)
- Q.4** (a) By applying Biot-Savart law, calculate the magnetic field at any point, due to current passing through straight wire segment of length L. (6)
- (b) A solenoid has the length 1.23 m and an inner diameter 3.55 cm. It has five layers of winding of 850 turns each and carries a current 5.57 A. What is B at its center? (4)
- Q.5** (a) Prove that the displacement current between the plates of a parallel plate capacitor is equal to conduction current in the connecting wires. (6)
- (b) Prove that in parallel plate capacitor, the displacement current, $i_d = C \frac{dV}{dt}$ (4)



UNIVERSITY OF THE PUNJAB

Roll No.

Third Semester 2018
 Examination: B.S. 4 Years Programme

PAPER: Physics-III (Electricity & Magnetism)
 Course Code: PHY-211/21307

TIME ALLOWED: 30 mins.
 MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

SECTION – I (Objective Part)

(1×10 = 10)

- Q.1. Each question has four possible answers, select the correct answer and Encircle it, Overwriting, Cutting, erasing or use of lead pencil will carry zero credit.
- (i) A hollow conducting ball has a single positive charge $-Q$ fixed at the center. The ball has no net charge. The charge on the inner surface of the ball will be
 (a) $+2Q$ (b) $+Q$ (c) $-Q$ (d) Zero
- (ii) A conductor of resistivity ρ has current density \vec{J} . If \vec{E} is the electric field intensity applied inside then its value is equal to
 (a) $\frac{\rho}{J}$ (b) $\frac{\rho}{\epsilon_s}$ (c) $\frac{\vec{J}}{\rho}$ (d) $\rho\vec{J}$
- (iii) Lenz's law deals with the
 (a) Magnetic field of EMF (b) direction of EMF
 (c) Both the direction and magnitude of EMF (d) direction of induced current
- (iv) The electric field intensity between two oppositely charged plates is
 (a) $E = \frac{\sigma}{2\epsilon_0}$ (b) $E = \frac{\epsilon_0}{2\sigma}$ (c) $E = \frac{\sigma}{\epsilon_0}$ (d) $E = \frac{\sigma\epsilon_0}{2}$
- (v) The integral involved in the expression of Ampere's law is of the form of
 (a) volume integral (b) surface integral (c) line integral (d) none as above
- (vi) Which of the following law was modified by Maxwell by introducing displacement current
 (a) Gauss's law (b) Faraday's law (c) Ampere's law (d) Biot-Savart's law
- (vii) The value of Bohr magneton is
 (a) $\frac{e}{4\pi m}$ (b) $\frac{eh}{2\pi m}$ (c) $\frac{eh}{4\pi m}$ (d) $\frac{eh}{\pi m}$
- (viii) The dimensions of RC matches with
 (a) LR (b) $\frac{L}{R}$ (c) $\frac{R}{L}$ (d) $\frac{L^2}{R}$
- (ix) The product $(\vec{P} \times \vec{E})$ is equal to
 (a) force (b) electric dipole (c) torque (d) electric potential
- (x) The magnitude of the Poynting vector is
 (a) $\frac{P}{A}$ (b) $\frac{\mu_0}{c} B^2$ (c) $\frac{SA}{c}$ (d) $\frac{1}{\mu_0} \frac{dU}{dt}$



UNIVERSITY OF THE PUNJAB

Third Semester 2018
 Examination: B.S. 4 Years Programme

Roll No.

PAPER: Physics-III (Electricity & Magnetism)
 Course Code: PHY-211/21307

TIME ALLOWED: 2 hrs. & 30 mins.
 MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SECTION – II (Subjective Part)

Note: Attempt all Questions

Q.2. Write short answers of the following questions: (2×10 = 20)

- i. Explain briefly what do you mean by quantization of charge.
- ii. What is meant by an electric field of continuous charge distribution?
- iii. Differentiate between electric and magnetic dipoles.
- iv. Define the term "motional EMF".
- v. What is meant by the term *Joule heating* in a circuit?
- vi. Show that, the capacitance with dielectric is given by $C' = K_e C$.
- vii. State Faraday's law & give reason for its negative sign.
- viii. You are given a length ℓ of copper wire. How would you arrange it to obtain maximum inductance?
- ix. How do you distinguish between ϵ_0 and μ_0 ?
- x. Why a *pn* junction is sometimes called a nonlinear circuit element?

Q.3: (a) State Gauss' law of electrostatics, and use it to find out electric field at a distance r due to an infinite line of charge.

- (b) A plastic rod, whose length L is 220 cm and whose radius r is 3.6 mm, carries a negative charge q of magnitude $3.8 \times 10^{-7} C$, spread uniformly over its surface. What is the electric field near the midpoint of the rod, at a point on its surface?
 (5, 5)

Q.4: (a) Use Biot-Savart's law to obtain an expression for magnetic field due to a current i in a straight wire segment of length L .

- (b) Discuss the decay of charge in R-C series circuit and derive an expression for current during discharge.
 (5, 5)

Q.5: (a) Derive an expression for torque acting on a current carrying loop placed in a uniform external magnetic field \vec{B} .

- (b) What are Maxwell's equations? Write down their mathematical forms.
 (5, 5)



UNIVERSITY OF THE PUNJAB

Second Semester - 2018

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Electricity & Magnetism (IT)

TIME ALLOWED: 15 Mints.

Course Code: PHY-122 / IT-12399 Part – I (Compulsory)

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.**Please encircle the correct option. Each MCO carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

Question no.1: Choose the best option.

(10×1=10)

- 1) The temperature of the system decreases in an _____.
 - a) adiabatic compression
 - b) isothermal expansion
 - c) isothermal compression
 - d) adiabatic expansion
- 2) The process of heat transfer by the movement of mass from one place to another is called
 - a) Convection
 - b) Conduction
 - c) Radiation
 - d) None of these
- 3) The efficiency of Carnot Engine is ____%.
 - a) 0 %
 - b) 99 %
 - c) 100 %
 - d) None of these
- 4) Equal amounts of heat are absorbed by 100 g samples of various solid metals with differing specific heat values. Which of the following statements is true regarding metals and their specific heat values?
 - a) The metal with the smallest specific heat will undergo the smallest change in temperature.
 - b) The metal with the greatest specific heat will undergo the smallest change in temperature
 - c) The metal with the greatest specific heat will resist melting to a greater degree at its melting point.
 - d) none of these
- 5) Which of two temperature change are equivalent?
 - a) $1\text{ K} = 1\text{ F}$
 - b) $1\text{ F} = 1\text{ C}$
 - c) $1\text{ K} = 1\text{ C}$
 - d) none of these
- 6) Electric charges obey _____.
 - a) Newton's first law of motion
 - b) Newton's second law of motion
 - c) Newton's first third of motion
 - d) none of these
- 7) The direction of the current density is _____ to drift velocity
 - a) opposite
 - b) in the direction of
 - c) current density is a scalar
 - d) none of these
- 8) The direction of a magnetic field within a magnet is
 - a) from front to back
 - b) from north to south
 - c) from south to north
 - d) none of these
- 9) Magnetic field outside a solenoid is _____.
 - a) exactly zero
 - b) strong
 - c) infinite
 - d) negligible
- 10) Bar magnet is divided in two pieces. Which of the following statements is true?
 - a) The bar magnet is demagnetized.
 - b) The magnetic field of each separated piece becomes stronger.
 - c) The magnetic poles are separated.
 - d) Two new bar magnets are created.



UNIVERSITY OF THE PUNJAB

Second Semester - 2018

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Electricity & Magnetism (IT)

Course Code: PHY-122 / IT-12399 Part – II

TIME ALLOWED: 2 Hrs. & 45 Mints.

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

 Question no.2: Write short answers of the following questions. (10×2=20)

1. What is the significance of entropy? Describe briefly.
2. In a system undergoing adiabatic compression, what are the values of internal energy and heat if work done on the system is 500 J?
3. How many laws of thermodynamics are there? Give statements.
4. State and explain Ohm's law.
5. Sketch the electric field lines due to a uniform line of charges, uniform shell of charges and two opposite charges (dipole).
6. An electric bulb draws a current of 0.43 A for 18 minutes. Calculate the amount of electric charge that flows through the circuit.
7. In what sense are electricity and magnetism related? Explain briefly.
8. What is capacitance? Discuss the dependence of capacitance on q , ΔV and geometry.
9. Describe two main ways to generate electricity by electromagnetic induction.
10. State Lenz's law. Briefly explain.

 Question no.3: (6+6+3=15)

- a) Explain the phenomena of an insulator and a conductor in an electric field with the help of diagrams.
- b) State and explain Ampere's law. Give its any two applications (e.g. by finding the magnetic field of wire, solenoid etc).
- c) A Carnot engine has the same efficiency (i) between 200 K and 600 K and (ii) between T K and 850 K. Calculate the temperature T of the sink.

 Question no.4: (10+5=15)

- a) Find the magnetic force on a single static charge, single moving charge and a current carrying wire.
- b) The electric field at point P is zero. Find the unknown charge Q?



(Final – TERM EXAM)

BS-258-16-20

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BS Physics 4th semester session (2016 – 2020)

BSSP-16-24

Course title: (Electricity and Magnetism –II)
 Time allowed: 2 Hours

Code: PHYS – 206
 Max. Marks: 50

Attempt all questions

Q.No.1	<p>Write short answers of the following questions</p>	2x10=20
	<ol style="list-style-type: none"> I. When AC passes through the inductor, is the voltage leads or lags the current, also show it by vector diagram? II. Define Faraday,s Law and Lenz,s Law? III. Differentiate between the alternating current and displacement current? IV. Can the EMF in the inductor be in the same sense as the EMF of the source? Which gives the inductor its magnetic energy? V. How electromagnetic waves are generated? VI. Show that 1Volt = 1Weber / Second? VII. Why is it useful to use the rms notations for alternating current and voltages? VIII. Can a charge particle at rest be set in motion by the action of a magnetic field? IX. Why would power distribution system be less effective without alternating current? X. In Faradays Law of induction, does the induced EMF depend on the resistance of the circuit? 	
Q.No.2	<p>Long Questions</p>	
	<ol style="list-style-type: none"> (a) Write a brief note on a single loop RLC circuit (Acceptor Circuit)? (b) Discuss Growth of current in LR series circuit, Also find the time constant of the circuit? (c) Explain Differential and integral form of Maxwell’s equations in detail? 	<p>10 10 10</p>

BS-258-16-20-200.

BS-Physics (IV) Semester (2017-21)

BS-414-17-21

Electricity and Magnetism- II PHYS(206)

Max.Marks 60.

Max.Time. 2^{1/2} hours.

Q No.1 Attempt all given short questions. (10 X 2)

- i) Define Faraday's Law of Electromagnetic Induction.
- ii) What is the difference between Forced Oscillations and Damped Oscillations?
- iii) Describe shortly eddy currents.
- iv) How can root mean square (rms) voltage of an AC circuits be non-zero where its average value is zero?
- v) Discuss in your own words what it means that an alternating current "leads" or "lags" an alternating emf.
- vi) What are some applications of step-up transformer? Of a step-down transformer?
- vii) What is the physical significance of poynting vector?
- viii) Can an electromagnetic wave be deflected by a magnetic field? By an electric field?
- ix) How a displacement current between parallel plates appear?
- x) If rms value of electric field in an electromagnetic wave is doubled, by what factor does the average intensity of wave change?

Q No.2 Describe growth and decay of current in RL series circuit giving the diagrams of voltage through resistance R and L in both cases.(6+4)

Q No.3 (i) Derive an expression of in AC power factor circuits?

(ii) In RLC series circuit, let $R=160 \Omega$, $C=15\mu\text{F}$, $L=230\text{mH}$, $f=60\text{Hz}$, $\mathcal{E}_m=36\text{V}$. Find rms emf, rms current, power factor and power dissipated across resistance.(5+5)

Q No.4 (i) Write a short note about the generation of an electromagnetic wave from an electric dipole antenna.

(ii) Do e.m waves carry energy? Derive an expression for energy transport and the poynting vector? (5+5)

Q No.5 (i) Write a short note on transformer? Can a transformer have equal secondary and primary windings?

(ii) Discuss the single loop RLC series circuit, derive an expression for current, impedance, frequency and draw its phasor diagram also. (4+6)

G.C UNIVERSITY FAISALABAD

COURSE TITLE: Electricity & Magnetism II (BS Physics) Marks: 24
Course Code: PHY-402 4th Semester Time: 1.45 Minute
Roll No. Subjective Part Spring: 2019

Q.2 a) State and explained Lenz's law and show that it is in accordance with law of conservation of energy. (5+3)

b) The magnetic field in the interstellar space of our galaxy has a Magnitude of about 100 Pico Tesla (PT) calculate the corresponding energy density.

Q.3 a) Discuss growth of current in R-L series circuit connected to a battery.

b) Draw the sketch of electromagnetic waves spectrum categorically. (5+3)

Q.4 a) what is an electromagnetic oscillator quantitatively.

b) In an oscillator L-C circuit $L=1.13$ mH and $C=3.88$ micro farad (μF) the maximum charge on the capacitor 9.24 micro coulomb (μC). Find the maximum current. (5+3)

Govt. Postgraduate College of Science

Samanabad, Faisalabad ■ 041-2661920

BS Physics

Mid Term Exams 2019

4th Semester

Course Code

Electricity & Magnetism-II

Phy-402

Time: 1:00 Hours

Max. Marks: 12

Roll. No: -----

Note: Attempt ALL questions. Each question carries 06 marks.

- Q: 1 a) Discus the growth of current and voltage in R-L series circuit. 4
b) The current in RL series circuit builds upto one third of its steady state value in 5.22 sec. Calculate the inductive time constant. 2
- Q: 2 a) What is electromagnetic oscillator. Discus electromagnetic oscillations quantitatively. 4
b) Show that L/R and time have the same units. 2