S.B. Roll No.....

**APPLIED PHYSICS-II**

**2nd Exam/Common/2154/2351/5423/Nov'16**

**Duration:-3 Hrs.** **M.Marks-75**

**SECTION-A**

**Q1. Fill in the blanks:** **(5)**

a) Focal length of concave mirror is _____.
b) In N type Semiconductor_____ are the majority carriers.
c) _____ emission is not associated with laser.
d) Electric charge is a_____ quantity.
e) Driver's mirror is always a _____ mirror.

**Q2. True or False :** **(5)**

a) Electric charge is a vector quantity.
b) The time rate of flow of charge is called electric current.
c) The conductivity of a super conductor is infinite.
d) Diode can work as amplifier.
e) The permitivity of vacuum is more than one.

**Q3. Multiple Choice Questions:** **(5)**

i) Ruby Laser is a:
a) Two level laser b) three level laser c) four level laser d) five level laser

ii) B.O.T (Board of Trade) unit is the unit for measuring.
a) Electrical current b) electric power c) Electric energy consumed d) electrical potential

iii) Conductance is the reciprocal of
a) Current b) Current density c) Resistance d) Resistivity

iv) Magnification produced by a plane mirror is
a) +1 b) +2 c) +1/2 d) -1

v) SI unit of current is
a) ohm b) coulomb c) ampere d) eV

**SECTION B**

**Q4. Short answer type (Attempt any six questions)** **6x5=30**

i) a) Define laws of reflections and refraction?
b) Define focal length of combination of lenses?
ii) State and prove Gauss theorem.
iii) Differentiate between intrinsic and extrinsic semiconductor.
iv) Give some properties of laser light.
v) Difference between N-types and P-type semiconductor.
vi) What is electric current? Differentiate between alternating and direct current ?
i) Find the force between two α- particles separated by a distance of 3.2 fermi in air.
ii) Define following terms: depletion layer, PN Junction diode, real diode ?
iii) Faraday's laws of electromagnetic induction.
a) What are the functions of dielectric ? b) Convert 1 kW into joule.
iv) What is Helium Neon laser?

**SECTION C**

**Q5. Long Answer Type (Attempt any three questions)** **3x10=30**

i) a) State and explain Coulomb's laws of electrostatics. Define one coulomb as a unit of electric charge.
b) What are the factors affecting the capacity of a capacitor?
ii) a) What is wheat stone bridge ? Why it is called balanced wheat-stone bridge?
b) What is resistance of 1 kW and 220 V toaster?
iii) Explain the working of full bridge rectifier with help of diagram.
iv) Define force on a current carrying conductor placed in magnetic field?
v) a) What is a solenoid ? Give its basic diagram, working and the uses.
b) Discuss the terms absorption, spontaneous emission and stimulated emission.

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**APPLIED PHYSICS-II**

**2nd Exam/Common/2154/2351/Nov'17**

**Duration: 3Hrs.** **M.Marks:75**

**SECTION-A**

**Q1. a) Fill in the blanks.** **10x1=10**

i. Field inside a spherical shell of uniform charge density is _____
ii. The field of view of a _____ mirror is maximum.
iii. A convex lens has a focal length of 10 cm., then its magnifying power is _____
iv. The electric Kirchhoff 's second law is based on the law of conservation of _____
v. Refractive index of Cladding is_____ than refractive index of core in an optical fiber.

**b) State True or False.**

vi. Total internal reflection will not take place, when light ray travels from denser to rarer medium.
vii. Electric potential is a vector quantity.
viii. The capacitance of a parallel plate capacitor increases by the introduction of a dielectric slab between its plates.
ix. Two parallel conductors carrying currents in opposite direction will attract each other.
x. In a transistor, the collector-base junction must be reverse biased.

**Q2. Multiple Choice Questions.** **5x1=5**

**i.** The focal length of a concave lens is 20 cm. What is its power?
(a) + 20 D (b) – 20 D (c) – 5 D (d) + 5 D

**ii.** The capacitance of a parallel plate capacitor does not depend upon the
(a) Material of the plates (b) Medium between the plates
(c) Area of the plates (d) distance between the plates

**iii.** Kilo watt hour is the unit used for measuring
(a) Electric current (b) Electric Power (c) Electric Potential (d) Electric Energy

**iv.** Fleming's Right Hand rule is applied to find the direction of?
(a) Electric field (b) Current (c) Magnetic field (d) Magnetic force

**v.** Laser is based on the principle of
(a) Stimulated absorption (b) Spontaneous emission (c) Stimulated emission (d) all of above

**SECTION-B**

**Q2. Attempt any six questions.** **6x5=30**

a. A needle placed 45 cm from a lens, forms an image on a screen placed 90 cm on the other side of the lens. Identify the type of lens and determine its focal length. What will be the size of the image, if the size of needle is 5.0 cm?
b. Derive an expression for electric field intensity due to a charged straight conductor.
c. Explain how will you convert a galvanometer into a voltmeter
d. What is three level laser and four level laser? Explain with diagrams.
e. Explain the effect of temperature on the conductivity of intrinsic semi conductors.
f. Why the width of depletion layer decreases on forwarding biasing of pn-junction diode.
g. What are single-mode and multi-mode optical fibers? Explain with diagrams.
h. Define the following : (a) Knee Voltage (b) depletion Region (c) Potential barrier

**SECTION-C**

**Attempt any three questions.** **10x3=30**

**Q3.** What is astronomical telescope? Explain its construction and working. Find an expression for its magnifying power. **10**

**Q4.** What is Wheat stone bridge principle? Explain with diagram how it is used to calculate unknown resistance? **10**

**Q5.** Explain full- wave bridge rectifier working with circuit and wave diagrams in detail. **10**

**Q6.** a) What is optical fiber? Explain various applications of optical fibers. **7**
b) What is doping? How extrinsic semi-conductors are made with doping? **3**

**Q7.** a) What is principle of a parallel plate capacitor? Describe the various factors affecting the capacity of a capacitor? Explain **6**
b) Differentiate between paramagnetic, diamagnetic and ferromagnetic materials. **4**

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# APPLIED PHYSICS-II

**2nd/COMMON/2154/2351/5423/May'16**

**Duration: 3 hrs** **M. Marks=75**

## SECTION- A

**Q1. (A)Fill in the Blanks.** **1x5=5**

**a.** Focal length of a plane mirror is _____.
**b.** The unit of electric charge is _____.
**c.** A _____ is a non conducting material which separates the plates of a capacitor.
**d.** The conductors which obey ohm's law are called _____.
**e.** 1 Tesla = _____ Gauses.

**(B) State TRUE OF FALSE.** **1x5=5**

**f.** Iron is a ferromagnetic material.
**g.** The device which converts a.c to d.c is called rectifier.
**h.** A laser is a coherent source because it contains many wavelengths.
**i.** Total internal reflection is used in optical fibres.
**j.** Magnification of concave lens is always constant.

**(C) Choose Correct one:** **1x5=5**

**I)** Magnification produced by a plane mirror is:
**(a)** +1 **(b)** +2 **(c)** +1/2 **(d)** -1

**II)** The law that governs the force between electric charges is called:
**(a)** Ampere's Law **(b)** Coulomb's Law **(c)** Faraday's Law **(d)** Ohm's Law

**III)** A Ruby Laser is a:
**(a)** Two level laser **(b)** three level laser **(c)** four level laser **(d)** five level laser

**IV)** The CGS unit of magnetic field B is:
**(a)**Tesla **(b)** gauss **(c)** $TmA^2$ **(d)** $Am^2$

**V)** Slide wire bridge is an application of:
**(a)** Wheatstone bridge **(b)** Potentiometer **(c)** Kirchoff's law **(d)** None of these

## SECTION- B

**Q2. Attempt any SIX Questions:** **6x5=30**

**i.** What is Coulomb's law of electrostatics?
**ii.** What is meant by power of a lens? Give units of power of lens.
**iii.** Drive an expression for electric field due to infinite plane charged sheet.
**iv.** The radius of the earth is 6400 Km. what is its capacitance?
**v.** Differentiate between alternating and direct current.
**vi.** Drive an expression for the heat produced by electric current in a conductor.
**vii.** Write down Faraday's Law of Electromagnetic Induction.
**viii.** Differentiate between N-Type and P-Type semiconductors.

## SECTION- C

**Attempt any THREE Questions.** **10x3=30**

**Q3. (a)** With the help of labeled diagram explain the construction and working of simple microscope and find its magnifying power. **5**
**(b)** Find equivalent capacitance when three capacitors are connected in series and parallel. **5**
**Q4. (a)** What is Kirchhoff's 1st and 2nd law? **7**
**(b)** Convert 1 KWh into Joule. **3**
**Q5. (a)** Drive an expression for the force between two parallel conductors carrying current. **5**
**(b)** What are magnetic lines of force? Give properties of magnetic lines of force. **5**
**Q6.** What is Rectifier? Explain half wave rectifier with diagram. **10**
**Q7.**What is Ruby and He-Ne laser? Explain both with diagrams. **10**

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**APPLIED PHYSICS – II**

**2nd Exam/Common/2154/2351/5423/May'17**

**Duration: 3hrs.** **M. Marks=75**

**SECTION A**

**Q1 Fill In The Blanks.** **1x5=5**

a. Focal length of a telescope is ……..
b. SI unit of electric flux is ……..
c. The device which converts a.c. into d.c. is called ……..
d. The materials which are weakly repelled by a magnet are called ……..
e. 1 Tesla = …….. Gauss.

**State True Or False.** **1x5=5**

f. A concave mirror always produces a real image.
g. A dielectric is a non conducting material which separates the plates of a capacitor.
h. AC generator works on the principal of electromagnetic induction.
i. Total internal reflection is used in optical fibres.
j. A laser is a coherent source because it contains many wavelength.

**CHOOSE CORRECT ONE.** **1x5=5**

k. Magnification produced by a plane mirror is:
   (a) +1 (b) +2 (c) +1/2 (d) -1
l. The law that governs the force between electric charges is called:
   (a) Gauss's Law (b) Coulomb's Law (c) Faraday's Law (d) Ohm's Law
m. He- Ne Laser is a :
   (a) Two level laser (b) three level laser (c) four level laser (d) five level laser
n. The CGS unit of magnetic field B is:
   (a) Tesla (b) gauss (c) TmA2 (d) Am2
o. Slide wire bridge is an application of:
   (a) Wheatstone bridge (b) Potentiometer (c) Neither (a) nor (b) (d) None of these

**SECTION B**

**Q2 Attempt any six Questions.** **6x5=30**

i. Define refraction and give its laws.
ii. What is meant by power of a lens? Give units of power of lens.
iii. Find the electric field due to a point charge of 2μC at a distance of 9m in vacuum.
iv. Convert 1 KWh into Joule.
v. Define current. What is AC and DC?
vi. Write down the properties of LASER.
vii. State and explain Ohm's law with circuit diagram.
viii. Differentiate between intrinsic and extrinsic type semiconductors.

**SECTION C**

**Attempt Any Three Questions:** **10x3=30**

**Q3.** With the help of ray diagrams explain the different types of image formation by a convex lens.

**Q4.** (a) State and explain gauss's theorem.
(b) Calculate the electrostatic force between a proton and an electron separated by a distance of 10 nm in vacuum.

**Q5.** (a) Differentiate between E.M.F. and Potential difference.
(b) Define magnetic flux. Write down its properties.

**Q6.** Explain the working of p-n junction diode in detail with diagram.

**Q7.** (a) Write down the applications of optical fibres in detail.
(b) Three capacitors each of 3 pF are connected in series to each other. Find their equivalent capacitance.

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**APPLIED PHYSICS-II**

**2nd Exam/Common/2154/2351/5423/May'19**

**Duration: 3Hrs.** **M.Marks:75**

**SECTION-A**

**Q1. a) Fill in the blanks.** **15x1=15**

i. Focal length of Plane mirror is_____
ii. Output of He- Ne laser is a _____Wave.
iii. _____are majority charge carriers in P- type semiconductors.
iv. Slide wire bridge is an application of_____
v. 1 Tesla = _____Gauss.

**b) State True or False.**

vi. Reciprocal of resistance is called Conductance.
vii. Total internal reflection is used in optical fibers.
viii. No. of diodes used in bridge rectifier is 3.
ix. Magnification of Concave lens is always constant.
x. To increase capacity of a parallel plate condenser, a sheet of mica should be introduced between the plates.

**c) Multiple Choice Questions**

xi. Laser is base on the principal of
a) Total internal reflection b) Refraction
c) Population inversion d) Spontaneous emission

xii. The focal length of convex lens is 50 cm, what is its power?
a) + 2 D b) - 2D
c) – 50 D d) + 50 D

xiii. Electric lines of force about a negative point charge are
a) Circular, clockwise b) Circular, anticlockwise
c) Radial inward d) Radial outward

xiv. Fleming' s left hand rule is applied to find the direction of
a) Magnetic field b) Magnetic force
c) Electric field d) current

xv. Which of the following substances is not a semiconductor?
a) Si b) Ge c) Tl d) Au

**SECTION-B**

**Q2. Attempt any six questions.** **6x5=30**

a. What is Coulomb's law of electrostatics?
b. The radius of earth is 6400 km. What is its capacitance?
c. Differentiate between N –type and P – type semi conducors.
d. What is a simple microscope? Find expression for its magnifying power.
e. Give some properties of laser light.
f. Explain conversion of galvanometer into ammeter. Why ammeter is always connected in series in circuit?
g. What is Helium Neon laser?
h. Write down the Faraday's law of electromagnetic induction.
i. State and explain ohm's law with circuit diagram.

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**SECTION-C**

**Attempt any three questions.** **3x10=30**

**Q3.** What is wheat stone bridge? Derive the condition for balanced wheat stone bridge.

**Q4.** a) Derive an expression for the force acting on a current carrying conductor placed in magnetic field.
b) A convex lens of power + 4 D and a convex lens -3 D are placed in contact. What is equivalent power of the combination?

**Q5.** a) Find equivalent resistance when three resistances are connected in series.
b) State and explain Kirchoff's law.

**Q6.** a) Discuss the terms absorption, spontaneous emission and stimulated emission.
b) Differentiate between E.M.F. and Potential difference

**Q7.** Derive an expression for force between two parallel current carrying conductors and also define one ampere.

**Q8.** a) State and explain Gauss's theorem.
b) Convert 1 KWh into joule.

**Q9.** Explain working of P-n junction diode in detail with diagram.

**Q10**. a) Explain population inversion.
b) Write properties of electric lines of force.

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**APPLIED PHYSICS-II**

**2nd Exam/Common/2154/2351/5423/Sep'2020**

**Duration: 1.15 Hrs.** **M.Marks:25**

**SECTION-A**

**Q1. Attempt any three questions.** **3x5=15**

a. Distinguish between P-type and n-type semiconductors.
b. What is Gauss law in electrostatics?
c. What do you mean by term 'LASER'? Give any three properties of laser light.
d. What is total internal reflection? What are conditions for it.
e. Define electric power and electric energy. Give their S.I. units.
f. What are factors affecting capacitance of a capacitor.
g. What is population inversion, stimulated emission?
h. State laws of reflection of light.
i. Define coulumb's law of electrostatics. Give C.G.S and S.I. units of charge.

**SECTION-B**

**Q2. Attempt any one question.** **1x10=10**

i. What is simple microscope? Derive expression for its magnifying power.
ii. Define electric field intensity .Derive expression for electric field due to a straight charged conductor.
iii. What is wheat stone bridge? Explain with diagram. Derive condition for balanced wheat-stone bridge.
iv. What is Lorentz force? Derive expression for force on a conductor carrying curtrent placed in magnetic field.
v. Give construction and working of He-Ne laser.
vi. a) How will you convert galvanometer into ammeter? Explain.
b) Two resistances 2 ohm and 6 ohm are connected in series. What will be equivalent resistance?

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**APPLIED PHYSICS-II**

**2nd Exam/Common/2154/2351/5423/Jun'2021**

**Duration: 1.15Hrs.** **M.Marks:25**

**SECTION-A**

**Q1. Attempt any three questions.** **3x5=15**

a. Calculate the speed of light in glass of refractive index 1.5. Given that speed of light in air is $3.0 \times 10^8$ m/sec.
b. What is total internal reflection? What are necessary conditions for total internal reflection?
c. What are properties of electric lines of force?
d. Determine the force between two charges, each of one coulomb when they are separated at one metre distance in air.
e. State and explain Ohm's law.
f. What is the effect of temperature on resistance?
g. Discuss the crystal structure of semiconductors.

**SECTION-B**

**Q2. Attempt any one question.** **1x10=10**

i. What is lens? Derive lens formula for thin convex lens.
ii. State gauss law of electrostatics. By using gauss law derive an expression for electric field Intensity due to long straight charged conductor.
iii. a) State and explain Kirchhoff's second law.
b) The length of wire of radius 0.007cm is 1000cm. If the resistance of the wire is 30 ohm, what is specific resistance of its material?
iv. Explain full wave bridge rectifier.