(Please write your Exam Roll No.) Exam Roll No. 01314227

END-TERM EXAMINATION

FIRST SEMESTER [BCA]– DECEMBER-2007

Paper Code: BCA-109	Subject: Basic of Physics
Paper ID:20109	(Batch: 2005-2007)
Time : 3 Hours	Maximum Marks : 75

Note: Attempt five questions in all Q.No.1 is compulsory and is a of 25 marks. Q.No.2 -5 are of 12.5 marks each.

Q.1 (a) Compare the properties of conservative and non-conservative forces, give two examples of each?

(b) In what way electric and magnetic fields are different?

(c) How can we detect the presence of magnetic field on an unknown planet?

(d) Distinguish between *weight* and *mass*?

(e) Does the Work-Energy Theorem holds if friction acts on an object? Justify.

Q.2 State Newton's Third Law of Motion? Describe an experiment to verify this law?

OR

(a) What are *pseudo-forces*?

(b) Describe in brief the microscopic basis of friction?

Q.3 Two clay balls of equal mass and speed strike each other head-on, stick together and come to rest. Describe conservation of kinetic energy and linear momentum?

OR

(a) Can the transitional kinetic energy of a system change into rotational energy in the absence of external force? Justify your answer?

(b) Show that the speed v reached by a car of mass m, that is driven with constant power P is given by

$$v = (3 \times P/m)^{1/3}$$

where x is distance travel from the rest position.

Q. 4 (a) Two diagonally opposite corners of a square carry Q charge each and two other corners of the same square carry q charge. If the resultant force on q is zero show that

$$q = -2\sqrt{2}Q$$

(b) Determine the current drawn from a 12 V supply with internal resistance 0.5 Ω by the following infinite network each resistor is 1 Ω resistance.

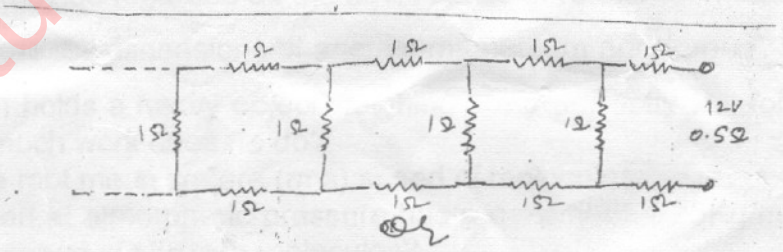

Fig 1

State the Gauss Law? Use it to obtain an expression for electric field E due to a none conducting charged solid sphere of radius R. Plot E vs the distance x from the center of the sphere.

Q.5 State the Lenz Law? And show that how it constant with law of Conservation of energy?

OR

Discuss briefly the Peltier Effect. Discuss how it is complimentary to the Seaback effect?

****

StudentSuvidha.com

Download Study Material from StudentSuvidha.com

(Please write your Exam Roll No.) Exam Roll No. 008601 2005

END TERM EXAMINATION

FIRST SEMESTER [BCA] DECEMBER-2008

Paper Code: BCA109	Subject: Basics of Physics
Paper Id: 20109	(Batch: 2005-2008)
Time : 3 Hours	Maximum Marks :75

Note: Q.1 is compulsory. Attempt one question from each unit.

Q1 (a) 'Two electric field lines cannot intersect' is true or false. Justify.
(b) Give two examples each for conservative and non-conservative force.
(c) What is the physical significance of capacitance?
(d) According to Newton's third law any force is accompanied by an equal and opposite force. How can a movement take place?
(e) Can we use ac in electrolysis? Justify your answer.
(f) Give two examples of non-ohmic devices. Does the relation R=V/I holds for these?
(g) Can the kinetic energy of a system increased without applying any external force on it? Justify.
(h) A proton moving with speed 1.6×10^6 m/s in a straight line enters a strong magnetic field along the field direction, How shall its path and velocity changes.
(i) A meteriorite burns in the atmosphere before it reaches the earth's surface. What happens to its momentum?
(j) What are 'minority charge carriers' in semiconductor physics? **(10x2.5=25)**

UNIT-I

Q2 (a) Is it possible for a particle to describe a curved path if no force acts on it? Does the answer depend upon the frame of reference chosen to view the particle? Justify. **(7.5)**
(b) Compute the initial upward acceleration of rocket of mass 1.3×10^4 kg if the initial upward force produced by its engine (the thrust) is 2.6×10^5 N. Do not neglect the weight of the rocket. **(5)**

Q3 (a) What do you understand by the term 'limiting friction'? Discuss with the help of suitable examples. **(6.5)**
(b) A car of mass m is moving with velocity. If μ is the coefficient of friction between tyres and road, show that minimum stopping distance for car is $s = v^2 / \mu g$. **(6)**

UNIT-II

Q4 (a) The energy equivalent to a mass m is given by the relation $E=mc^2$. Discuss the experimental confirmation/justification for this relation. **(3.5)**
(b) Define the coefficient of restitution. What is its physical significance? **(5)**
(c) A block of mass m moving at a speed v collides with another block of mass 2m at rest. The lighter block comes to rest after the collision. Find the coefficient of restitution. **(4)**

Q5 (a) Show that in a perfect elastic collision of two bodies of equal mass m they interchange their velocities. **(6)**
(b) A vessel at rest explodes, breaking into three pieces. Two pieces, having equal mass, fly off perpendicular to one another with the same speed of 30 m/s. The third piece has three times the mass of each other piece. What are the direction and magnitude of its velocity immediately after explosion? **(6.5)**

UNIT-III

Q6 State Gauss's theorem. Derive expression for elastic field intensity (E) due to a non-conducting charged solid sphere of radius ® at a point (a) inside the sphere, (b) on the surface of the sphere, (c) outside this sphere. Show graphically the variation of E with distance from the center of the sphere. **(12.5)**

Q7 (a) Are Kirchhoff's laws applicable to both ac and dc circuits? **(4)**
(b) Define resistivity (ρ). Discuss the temperature dependence of resistivity in the context of conductor, semiconductor and insulators. **(8.5)**

UNIT-IV

Q8 (a) State the Joule's law of heating effects of electric current. Is it reversible or not? **(4)**
(b) State and explain the Lenz's law. **(4.5)**
(c) Compare the properties of a normal conductor and a semiconductor. **(4)**

Q9 (a) Define neutral temperature and temperature of inversion for a thermocouple and set up a relation between the two. **(6)**
(b) State the Peltier effect. Discuss in brief how it is complimentary to the Seaback effect. **(6.5)**

****

StudentSuvidha.com

Download Study Material from StudentSuvidha.com

END TERM EXAMINATION

FIRST SEMESTER [BCA] DECEMBER-2009

Paper Code: BCA109 | Subject: Basics of Physics
Paper Id-20109

Time : 3 Hours | Maximum Marks :75

Note: Q.1 is compulsory. Attempt one question from each unit.

Q1 (a) Why is Newton's first law of motion called law of inertia?
(b) Give two examples each for conservative and non-conservative force.
(c) Define angle of friction.
(d) Define an expression of power in terms of velocity and force.
(e) Explain the physical significance of coefficient of restitution.
(f) Give one example when work done by a force is (i) positive (ii) negative (iii) zero.
(g) Give four properties of electric charge.
(h) Define resistivity and state its S.I. unit.
(i) State Faraday's laws of electromagnetic induction.
(j) What are majority carriers (charge) in semiconductors? **(10x2.5=25)**

UNIT-I

Q2 (a) What do you understand by the term 'friction'? State laws of friction. **(7.5)**
(b) A woman pushes a box of mass 20kg on a horizontal surface with a horizontal force of F. The coefficients of static and kinetic friction are μ_s=0.6 and μ_K=0.5. **(5)**
(i) What must F be in order that she can make the box start to slide?
(ii) If she maintains the same force once the block starts to slide, what will be its acceleration?

Q3 (a) State Newton's second law of motion and derive the equation of motion, F=ma. **(6)**
(b) State and prove principle of conservation of linear momentum. **(6.5)**

UNIT-II

Q4 (a) Show that in a perfect elastic collision of two bodies of equal mass m they interchange their velocities. **(7)**
(b) State the principle of conservation of energy. Prove it for the freely falling bodies. **(5.5)**

Q5 (a) Define coefficient of restitution. What is its physical significance? **(6)**
(b) A metal ball of mass 2kg moving with a speed of 36km/h has a head-on collision with a stationary ball of mass 3kg. If after collision, both the balls move together, then find the loss in kinetic energy due to collision. **(6.5)**

UNIT-III

Q6 State Gauss's theorem. Derive an expression for electric field intensity (E) due to a metallic hollow sphere of radius R at a point (a) inside the sphere (b) on the surface of the sphere (c) outside this sphere. Show graphically the variation of E with distance form the centre of the sphere. **(12.5)**

Q7 (a) Two cell's of emf 6V and 12V and internal resistances 1Ω and 2Ω respectively are connected in parallel so as to send current in the same direction through an external resistance of 15Ω. **(8)**
(i) Draw the circuit diagram
(ii) Using Kirchoff's law calculate (A) current through each branch of the circuit.
(B) Potential difference across the 15Ω resistance.
(b) Define resistivity and discuss its temperature dependence. **(4.5)**

UNIT-IV

Q8 (a) State and explain Lenz's law. **(5)**
(b) Explain the properties of semiconductors. **(4)**
(c) State Ampere's circuital law. **(3.5)**

Q9 What is induced e.m.f.? Show that Lenz's law follows from the principle of conservation of energy. Explain magnetic lorentz force and its applications. **(12.5)**

****

StudentSuvidha.com

Download Study Material from StudentSuvidha.com