Prabhleen Kaur.

(Please write your Enrolment No.) *Enrolment No.* 01/21402074

END TERM EXAMINATION

FIRST SEMESTER [BCA] DEC.2014 – JAN.2015

Paper Code: BCA109 ***Subject: Physics (Batch: 2011 onwards)***

Time : 3 Hours ***Maximum Marks :75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 (a) State Lemi's Theorem.
(b) Does friction decrease by smoothing the surfaces in contact? If no, why? Explain briefly.
(c) The common sense idea that *a force is required to sustain motion is incorrect.* Justify this statement.
(d) State and explain briefly *work-energy theorem.*
(e) Write two important properties of electric charge.
(f) What do you understand by electric lines of force? Why two lines cannot intersect?
(g) Explain briefly the effect of a dielectric in a capacitor.
(h) Explain Kirchoff's first and second rules.
(i) Explain briefly the concept of stationary orbits.
(j) What are minority and majority carriers in semi-conductors? Give examples. **(2.5x10=25)**

UNIT-I

Q2 (a) Name the basic forces in nature. **(3)**
(b) Newton's laws are valid in Inertial frames only. What are these reference frames? Explain briefly. **(3)**
(c) Explain the concept of banking the roads. Calculate the angle of banking so that a vehicle of mass m can go with maximum velocity v on a curved road of radius r without skidding. **(6.5)**

Q3 (a) Is a body moving with constant speed on a circular path accelerated? If yes – what is the special name of this acceleration? Explain briefly. **(5)**
(b) State the *laws of friction.* **(3)**
(c) Calculate the apparent weight of a body of mass m in a lift moving upwards with acceleration 'a'. Also, find the apparent weight when the lift is moving downward with acceleration 'a'. **(4.5)**

UNIT-II

Q4 (a) Define *conservative force.* What are its important properties? Prove that gravitational force is a conservative force. **(5)**
(b) What do you understand by *negative work down* by a force? Give an example. **(2.5)**
(c) A force of 20N moves a body of mass 1kg on a rough surface (horizontal) through a distance of 2m. If the coefficient of friction is 0.2, find the work done by the applied force and the force of friction. Take $g=10ms^{-2}$. **(5)**

Q5 (a) Derive an expression for the elastic potential energy of a compressed spring. **(3.5)**

P.T.O.

BCA-109
P1/2

(b) What are elastic and inelastic collisions? Explain briefly. **(3)**

(c) A body of mass 1kg moves along X-axis with speed 5m/s. It collides head-on with another body of mass 2kg lying at rest. Find the velocities of the two bodies after the collision. Consider that the collision is perfectly elastic. **(6)**

UNIT-III

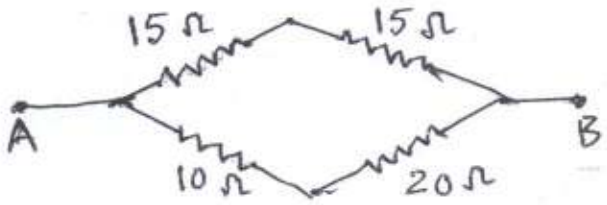
Q6 (a) Define Coulomb's law. Using this law, show, how will the force between two charges change when the distance between the charges is doubled? **(3.5)**

(b) Explain briefly line integral of electric field. **(3.5)**

(c) Define electrostatic potential at a point. How much work is required to move a charge of 2C through potential difference of 10V? **(5.5)**

Q7 (a) What is the principle of capacitor? Find the capacitance of a parallel plate capacitor having plate area 'A' and the distance between the plates 'd'. **(7)**

(b) In the figure find the net resistance between points A and B. **(3)**



(c) What is a wheatstone bridge? Draw a circuit diagram and explain it. **(2.5)**

UNIT-IV

Q8 (a) State the postulates of Bohr's atomic model. **(4.5)**

(b) Explain Rutherford's α–particle scattering experiment. What were the conclusions of the experiment? **(5)**

(c) Differentiate between conductors, insulators and semiconductors. **(3)**

Q9 (a) What are intrinsic and extrinsic semiconductors? Explain p-type and n-type semiconductors. **(3)**

(b) Draw circuit diagrams to show forward biased and reversed biased p-n junctions. **(3)**

(c) Explain the action of a p-n transistor. **(6.5)**

****