

# END TERM EXAMINATION

FIRST SEMESTER [BCA] DECEMBER-2015

Paper Code: BCA 109

Title : Physics

Time : 3 Hours

(Batch;2011 onwards)

Maximum Marks :75

Note: Attempt any five questions including Q.No1 which is compulsory.

- Q1. a) State ohm's law. Derive the laws of resistances when they are connected in a) Series b) parallel .  
b) What is capacitor? Explain its principle.  
c) State and explain Newton's second law of motion. Explain some of its consequences.  
d) State and explain the laws of limiting friction. How are they verified experimentally?  
e) What is meant by weight? Discuss the apparent weight of a man in a lift/elevator. **(5x5=25)**

- Q2. a) Discuss the inelastic collision of two bodies in one dimension. Calculate the velocities of bodies after the collision. Discuss different cases. **(7)**  
b) A cyclist speeding at 18 km/h on level road takes a sharp circular turn of radius 3m without reducing the speed. The coefficient of static friction is 0.1 will the cyclist slip while taking the turn. **(5.5)**

- Q3. a) What is a spherical capacitor? Derive an expression for its capacitance. **(7)**  
b) Three capacitors of capacitance 5,4 and 3  $\mu\text{F}$  are connected so that the first and second are in series and the third are in parallel with them. Calculate the capacitance of the combination. **(5.5)**

- Q4. a) With the help of circuit diagram explain the action of a N-P-N transistors. What are the advantages of transistors? **(7)**  
b) Describe Rutherford's alpha scattering experiment. **(5.5)**

- Q5. a) Obtain the condition for balancing of a Wheatstone bridge using Kirchhoff's laws. **(7)**  
b) A body of mass 5kg initially at arrest is subjected a force of 20N. What is the Kinetic energy acquired by the body at the end of 10 sec.? **(5.5)**

- Q6. a) What is meant by banking of roads? Obtain an expression for the maximum speed which a vehicle can safely negotiate a curved road banked at an angle  $\theta$ . **(7)**  
b) How does the weight of man standing in a lift changes when the lift accelerates . **(5.5)**  
i) upwords ii) downwords with an acceleration a.

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