



**MAU-003-001302**

Seat No. \_\_\_\_\_

**B. Sc. (Sem. III) (CBCS) Examination**

**October / November – 2016**

**Physics : Paper - 301**

*(Thermodynamics, Electricity, Magnetic Electricity  
& Modern Phy.)*

*(New Course)*

**Faculty Code : 003**

**Subject Code : 001302**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

- Instructions :** (1) Write answers of all questions in main answer book.  
(2) All questions are compulsory.  
(3) Symbols have their usual meanings.  
(4) Figures on right side indicate full marks.

**1** Fill in the blanks with proper answer : **20**

- (1) SI unit of co-efficient of viscosity is \_\_\_\_\_.
- (2) The ideal gas equation  $PV =$  \_\_\_\_\_.
- (3)  $C_p - C_v =$  \_\_\_\_\_
- (4) SI unit of Stefan's constant is \_\_\_\_\_.
- (5) The relation between capacity C, potential V and charge Q is \_\_\_\_\_.
- (6) The quantities B, H and M are related as \_\_\_\_\_.
- (7) According to Michelson-Morley experimental data the change in fringe shift produced was \_\_\_\_\_ fringe.
- (8) An electron has a rest mass  $9.11 \times 10^{-31}$  kg when its speed is  $0.9C$ , its mass will be \_\_\_\_\_ kg.

- (9) An ideal value of stability factor is \_\_\_\_\_.
- (10) The phase difference between input voltage and output voltage of a CE amplifier is \_\_\_\_\_.
- (11) A horizontal beam supported at one end and loaded at the other end is called \_\_\_\_\_.
- (12) SI unit of stress is \_\_\_\_\_.
- (13) The relation of intensity  $I$  of heat radiation with distance  $R$  is \_\_\_\_\_.
- (14) Relation between electric field intensity  $E$  and potential  $V$  is \_\_\_\_\_.
- (15) Equation of mass and energy equivalence is \_\_\_\_\_.
- (16) For highest power gain, the configuration should be used is \_\_\_\_\_.
- (17) Work done during expansion of a gas at constant pressure due to heating from temperature  $T_1$  to  $T_2$  is \_\_\_\_\_.
- (18) Stefan's law for heat energy  $E =$  \_\_\_\_\_.
- (19) The unit of capacity of a capacitor is \_\_\_\_\_.
- (20) SI unit of work is \_\_\_\_\_.

**2** (a) Answer the following questions in short : (any three) **6**

- (1) Explain the terms Streamline and Turbulent flow.
- (2) Write Max Plank and Kelvin's statement for second law of thermodynamics.
- (3) What is Reynold's number ?
- (4) Explain : electric flux density.
- (5) Define potential and potential difference.
- (6) Write first law of thermodynamics.

- (b) Answer the following questions : (any three) **9**
- (1) Explain Newton's law of viscous flow.
  - (2) Explain the work done during expansion of a gas at constant pressure.
  - (3) Discuss about entropy.
  - (4) State and explain Stefan's law.
  - (5) Explain Wein's law for radiant energy.
  - (6) Calculate the electric intensity required to just support an ion of mass  $10^{-4}$  g and having a charge of 1.44 coulomb in air.
- (c) Answer the following questions in detail : (any two) **10**
- (1) Derive an expression of bending moment of the beam.
  - (2) What is Carnot cycle ? State and prove the Carnot theorem.
  - (3) Explain the energy distribution of black body radiation.
  - (4) State and prove Gauss' theorem.
  - (5) Derive Poiseuille formula for the rate of flow of a liquid through a capillary tube.
- 3** (a) Write answers in short : (any three) **6**
- (1) Define self induction and mutual induction.
  - (2) Write Einstein's postulates of the special theory of relativity.
  - (3) Define : inertial reference frame
  - (4) What is stabilization ?
  - (5) What are the basic conditions to satisfy the faithful amplification ?
  - (6) Define d.c. and a.c. load lines.

(b) Answer the following questions in brief : (any three) **9**

- (1) Explain : Hall effect
- (2) Write a note on Newtonian relativity.
- (3) Explain : Length contraction.
- (4) Derive the general expression of stability factor for CE configuration.
- (5) Explain frequency response curve of an amplifier.
- (6) What is the energy equivalence of 1 gram of a substance in joules ?

(c) Answer the following questions in detail : (any two) **10**

- (1) Explain hysteresis loop in detail.
  - (2) Derive the Lorentz transformation equations.
  - (3) Explain biasing with feedback resistor.
  - (4) Explain 180° phase reversal with the help of graphical representation in CE configuration.
  - (5) Obtain the equation of self inductance and mutual inductance of coil.
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