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DA-003-001302 Seat No. _____

B. Sc. (Sem. III) Examination

March – 2022

Physics - 301

(Thermodynamics, Magnetism, Electronics)

(Old Course)

Faculty Code : 003

Subject Code : 001302

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Symbols have their usual meanings.
(2) Figures to the right indicates marks.
(3) Non-programmable scientific calculator is allowed.
(4) Attempt all questions.

1 Answer the following in short : **20**

(1) A horizontal beam supported at one end and loaded at the other end is called _____ (fill the blanks)
(2) The property of a fluid which opposes relative motion between different layers is called _____
(3) The entropy is known as the _____
(4) Efficiency of an ideal heat engine is _____
(5) The radiant heat is _____ waves.
(6) _____ introduced quantum concepts for the explanation of black body radiation.
(7) The electric flux density depends upon the _____.
(8) Potential energy store in the conductor _____.
(9) _____ is the unit of magnetic field.
(10) Name one paramagnetic substance.
(11) The ether is _____ medium.
(12) What is the energy equivalence of one micro gram of substance?

(13) Transistor biasing represents _____ conditions.

(14) For faithful amplifications by germanium transistor, the value of V_{BE} should be _____.

(15) The stability factor of base resistor bias circuit is _____ that of collector feedback bias circuit.

(16) The collector current is changed by $0.05mA$ in a biasing circuit. If due to temp. change, I_{cbo} changes by $10\mu A$. The stability factor $S =$ _____

(17) The phase difference between the o/p and i/p voltage of CB transistor amplifier is _____.

(18) In practice, the voltage gain of a transistor amplifier is expressed _____.

(19) A CE transistor amplifier is also called _____. circuit.

(20) The point of intersection of DC & AC load line is called _____

2 (A) Answer the following : (Any **Three**) **6**

(1) What is electric dipole?

(2) Write any four assumptions for theory of bending of beam.

(3) Write any two imp. points from Energy distribution Vs. Wavelength curve.

(4) Explain : Absorbing power of heat radiation.

(5) Write Clausis statement for second law of thermodynamics.

(6) What is Reynold's number.

(B) Answer the following in detail : (Any **Three**) **9**

(1) Discuss in short : Laminar flow, Turbulent flow

(2) Define electric flux density

(3) Explain: work done during expansion of gas at constant pressure.

(4) What is efficiency of heat engine?

(5) First law of thermodynamics.

(6) Discuss entropy.

(C) Answer the following questions : (Any **Two**) **10**

(1) What is linear charge density ? Obtain the formula of electric field strength for charged straight conductor.

(2) Explain Wein's Law and Rayleigh's Jeans law for radiant energy.

(3) Derive Poiseulle's formula for the rate of flow of liquid through a capillary tube.

(4) Derive an equation for work done by a gas in isothermal expansion.

(5) Derive general expression for change in entropy for an ideal gas.

3 (A) Answer the following in detail : (Any **Three**) **6**

(1) Derive an expression for voltage gain of a transistor amplifier from its a.c. equivalent circuit.

(2) Define stability factor

(3) Calculate self inductance of a solenoid.

(4) Write a note on time dilation.

(5) Explain inherent variations of transistor parameters.

(6) Drawing frequency response curve of RC coupled transistor amplifier; explain it.

(B) Answer the following : (Any **Three**) **9**

(1) Define reklatin $\mu_r = 1 + x_m$

(2) What is the necessity of transistor biasing ?

(3) Describe ac loadline

(4) What is single stage transistor amplifier?

(5) Derive mass energy relation, $E = mc^2$

(6) Explain: DC load line.

(C) Answer the following : (any two) **10**

(1) Explain Hall effect, Hall coefficient, Hall mobility

(2) Derive Lorentz transformation equation.

(3) Explain voltage divider method for transistor biasing

(4) What is phase reversal ? Explain it with graphical demonstration

(5) Classification of amplifiers.