VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

**School of Advanced Sciences**
DEPARTMENT OF PHYSICS

Mid Term Test (MTT)

**B.Tech – Fall Semester-2020-21**

**Course: PHY1701- Engineering Physics**

**Time : 90 mins** **Max Marks: 60**

**Part – A (10x 6 = 60)**

**Answer all Questions**

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|---|---|---|
| 1 | What is a blackbody? Does a blackbody actually exist? | CO1 |
| 2 | Arrive at the equation for de Broglie matter waves using Einstein and Planck's equations. | CO1 |
| 3 | The speed of an electron is measured to be $5 \times 10^3$ m/s to an accuracy of 0.006%. Find the uncertainty in determining the position of this electron. | CO1 |
| 4 | What is the physical significance of zero-point energy? | CO2 |
| 5 | Calculate the energy difference between the first and second quantum states for a free electron in a solid 1 meter cube. If the energy of the electron in the second energy level is equal to average energy of the molecules of the perfect gas, find the temperature of that electron. | CO2 |
| 6 | What is the principle behind the transmission of light in an optical fibre? | CO6 |
| 7 | Differentiate between material dispersion and intermodal dispersion in an optical fiber? | CO6 |
| 8 | A continuous 12 km long optical fibre link has a loss of 1.5 dB/km. What is the minimum optical power level that must be launched into the fibre to maintain an optical power level of 0.3 microwatt at the receiving end? | CO6 |
| 9 | How do you know if a band gap is direct or indirect? | CO7 |
| 10 | A GaAs LED radiates at 900 nm. If the forward current in the LED is 60 mA, calculate the power output, assuming an internal quantum efficiency of 2%. | CO7 |