17202

21314

2 Hours/50 Marks

Seat No. | | | | | | | | |

Instructions *: (1)* ***All*** *questions are* ***compulsory****.*
(2) ***Illustrate*** *your answers with neat sketches* ***wherever*** *necessary.*
(3) Figures to the ***right*** *indicate* ***full*** *marks.*
(4) ***Assume*** *suitable data, if* ***necessary****.*

MARKS

1. Attempt **any nine** : **18**

a) Define : **2**
   i) Uniform velocity
   ii) Uniform acceleration.

b) Write any two points to distinguish between work and energy. **2**

c) State any two different NDT methods that are used in industries. **2**

d) Define range of projectile. State formula with symbol meaning. **2**

e) State any two properties of ultrasonic waves. **2**

f) State any two points of difference between Seebeck's effect and peltier effect. **2**

g) How can you increase thermo emf using different metals in thermoelectric series ? Give one example. **2**

h) State two properties of photon. **2**

i) The photo electric work function of a photo sensitive material is 3×10^{-19} J. Calculate its threshold wavelength. **2**

j) Write two properties of X-rays. **2**

k) Draw neat labelled diagram of Coolidge X-ray tube. **2**

l) State two remarkable properties of LASER. **2**

P.T.O.

MARKS

2. Attempt **any four** : **16**

a) A vehicle covers 60 m in the 3rd second and 100 m in 7th second during its motion. Calculate the acceleration and distance travelled in 10th second. **4**

b) A bullet of weight 0.98 N is fired with a velocity of 400 m/s horizontally in a wooden block weighing 50 N resting on horizontal surface. If the bullet remains embedded in the block, calculate velocity of block after impact. **4**

c) Distinguish between centripetal and centrifugal force. **4**

d) Compare between LPT and UT method on the basis of principle of working, advantages, disadvantages and probing medium. **4**

e) Explain the production of ultrasonic waves using piezoelectric method. **4**

f) State four limitations of NDT. **4**

3. Attempt **any four** : **16**

a) i) State Joule's law. Give its equation.

ii) Calculate the amount of heat generated when a current of 2A flows for 5 minutes through a resistance of 5.2 Ω (f = 4200 J/Kcal). **4**

b) Explain variation of thermo emf with temperature of junctions. Define neutral temperature and inversion temperature. **4**

c) Define :

i) Threshold frequency

ii) Threshold wavelength

iii) Work function

iv) Stopping potential. **4**

d) State engineering and scientific applications of X-rays. **4**

e) What is population inversion ? State four methods of pumping. **4**

f) A fly wheel rotating at 800 r.p.m. accelerates to 2000 r.p.m. in 10 minutes. Calculate the uniform acceleration and the angular displacement within the given period. **4**
