# 17202

**16172**

**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****.*
*(5)* ***Use*** *of Non-programmable Electronic Pocket Calculator is* ***permissible****.*
*(6) Mobile Phone, Pager and any other Electronic Communication devices are* ***not*** *permissible in Examination Hall.*

**Marks**

**1.** Attempt **any nine** of the following : **18**

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

b) State Newton's third law of motion. Give one example.

c) Calculate the work done when a 50 kg bag is lifted from the ground and kept on table with height 95 cm.

d) Define :
   i) Centripetal force.
   ii) Centrifugal force.

e) State Piezo-electric effect.

f) Define :
   i) Neutral temperature.
   ii) Inversion temperature.

g) State seebeck effect.

h) Define :
   i) Threshold wavelength.
   ii) Threshold frequency.

**P.T.O.**

**Marks**

i) State Einstein's photoelectric equation with usual meaning of symbols.

j) State any two scientific applications of X-rays.

k) State any two properties of X-rays.

l) Explain population inversion.

**2.** Attempt **any four** of the following : **16**

a) A bullet of mass 450 gm leaves the barrel of a gun with muzzle velocity of 700 m/s. If the length of barrel is 80 cm, find the impulse and the impulsive force.

b) Define :

i) Trajectory.

ii) Angle of projection.

iii) Maximum height of projectile.

iv) Time of flight.

c) With neat labelled diagram, explain piezo-electric method to produce ultrasonic waves.

d) Write properties of ultrasonic waves.

e) State the criteria for selection of NDT method.

f) The speed of automobile reduces from 45 km/hr to 30 km/hr in a distance 264 m. Calculate magnitude of acceleration and time required to bring automobile to rest.

**3.** Attempt **any four** of the following : **16**

a) Explain variation of thermo emf. with temperature using characteristics curve.

b) Compare Peltier effect and Joule's effect.

c) Threshold wavelength of silver is 3200 Å. Calculate the maximum energy in eV of photoelectrons emitted when it is exposed to ultra-violet light of wavelength 2200 Å.

d) State engineering and medical applications of X-rays.

e) Write properties of LASER.

f) A Pulley starring from rest with acceleration 0.5 rad/$s^2$. What will be its speed in r.p.m. at the end of 2 minutes ? If the pulley is retarded after this and comes to rest in 3 minutes, find the retardation.

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