Code No: 132AF

**R16**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.Tech I Year II Semester Examinations, August - 2018**
**APPLIED PHYSICS**
**(Common to CE, ME, MCT, MMT, AE, MIE, PTM, CEE, MSNT)**

Time: 3 hours                                                                                    Max. Marks: 75

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.  Each
question carries 10 marks and may have a, b, c as sub questions.

## PART- A

(25 Marks)

1.a)   What is shear modulus?                                                                [2]
  b)   Derive an expression for work done in stretching a wire.                  [3]
  c)   How to control reverberation in a hall?                                          [2]
  d)   What is Echelon effect?                                                               [3]
  e)   What is inverse piezoelectric effect?                                             [2]
  f)   What are the advantages of Non -Destructive Testing method?           [3]
  g)   What is electronic polarization?                                                     [2]
  h)   What is an internal field in dielectrics? Explain.                             [3]
  i)   Explain Meissner effect.                                                              [2]
  j)   Distinguish soft and hard magnetic materials.                               [3]

## PART-B

(50 Marks)

2.   State Hooke's law of elasticity. Draw stress - strain diagram and discuss the
     behavior of the ductile material under loading.                              [10]
                                        **OR**
3.   Describe in detail factors affecting the elasticity of a materials          [10]

4.a)   Describe the method of measurement of sound absorption coefficient.
  b)   Explain the Sabine formula of reverberation time                        [6+4]
                                        **OR**
5.   What are the basic requirements of acoustically good hall?              [10]

6.   Explain   the   construction   and   production   of   ultrasonic   waves   using
     Magnetostriction method                                                             [10]
                                        **OR**
7.   How ultrasonic waves are used in Non- destructive testing for materials.   [10]

8. What is Orientational polarization? Derive an expression for Electronic Polarizability of dielectric materials? [10]

**OR**

9.a) Derive an expression for Clausius - Mossotti relation

b) Write a short note on piezoelectricity [6+4]

10.a) Explain in detail the classification of magnetic materials.

b) The magnetic susceptibility of Aluminium is $2.3 \times 10^{-5}$. Find its permeability and relative permeability. [8+2]

**OR**

11.a) Explain in detail the type – I and type – II superconductors.

b) A superconducting tin has a critical temperature of 3.7K at zero magnetic field and a critical field of 0.0306 Tesla at OK. Find the critical field at 2K. [8+2]

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