JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May/June - 2017
APPLIED PHYSICS
(Common to CE, ME, MCT, MMT, MIE, 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)	Define stress and mention its types.	[2]
b)	What is young's modulus?	[3]
c)	What is meant by acoustics of building?	[2]
d)	What are the factors affecting the acoustics quality of the building?	[3]
e)	Distinguish between audible, infrasonic and ultrasonic waves.	[2]
f)	Define piezoelectric effect.	[3]
g)	What is meant by polarization in a dielectric material?	[2]
h)	What is meant by dielectric loss?	[3]
i)	Define magnetic dipole and magnetic flux density.	[2]
j)	What are different types of magnetic materials?	[3]

PART-B
(50 Marks)

2.a)   Explain various kinds of modulii of elasticity.
  b)   Find the amount of work done in twisting the steel wire of radius 2mm and
       length 50cm through an angle 45^0. The rigidity modulus of steel is $8 \times 10^8 \, Nm^{-2}$.   [5+5]

OR

3.a)   Derive the rigidity modulus of the wire using Torsional pendulum.
  b)   How much force is required to stretch a steel wire to double its length when its area of
       cross section is 2 sq cm and Young's modulus is $2 \times 10^{11} \, N/m^2$.   [5+5]

4.a)   What are the basic requirements of an acoustically good hall?
  b)   Explain the various factors that affect architectural acoustics and suggest their
       remedies?   [5+5]

OR

5.a)   Define and explain the sound absorption coefficient of materials.
  b)   Derive Sabine's mathematical relation for reverberation time.   [5+5]

6.a) Explain the construction and production of ultrasonic waves using magnetostriction method.

b) Write notes on applications of ultrasonic waves. [5+5]

OR

7.a) Explain the construction and production of ultrasonic waves using piezoelectric method.

b) How are ultrasonic waves used in non-destructive testing of materials? [5+5]

8.a) What is orientation polarization? Derive an expression for the mean dipole moment when a polar material is subjected to an external field.

b) The dielectric constant of helium, measured at 0^0C and 1 atmosphere is $\varepsilon_r = 1.0000684$. Under these conditions the gas contains 2.7×10^{25} atoms/m^3. Calculate the radius of the electron cloud. Also calculate the displacement when a helium atom is subjected to an electric field of 10^6 V/m? [5+5]

OR

9.a) Discuss in detail the origin of ferroelectricity in barium titanate.

b) If the relative permittivity of sulphur is 4.0. Calculate its atomic polarizability. [Given that sulphur in cubic form has a density of 2.08×10^3 kg/m^3 and its atomic weight is 32]. [5+5]

10.a) Explain in detail domain theory of ferromagnetism.

b) The saturation magnetic induction of nickel is 0.65wb/m^2. If the density of nickel is 8906 kg/m^3 and its atomic weight is 58.7, calculate the magnetic moment of the nickel atom in Bohr magneton. [5+5]

OR

11.a) What is Meissner effect? Explain.

b) Write applications of superconductivity. [5+5]

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