POKHARA UNIVERSITY

Level: Bachelor	Semester – Spring	Year: 2020
Program: BE		Full Marks: 70
Course: Physics		Pass Marks: 31.5
		Time: **2** hrs.

Candidates are required to answer in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

Section - A: (5×10=50)

Q. N. 1 Point out the differences between simple and compound pendulum. Suppose, a meter stick suspended from one end swings as a compound pendulum; (a) what is the period of oscillation, (b) what would be the length of the simple pendulum that would have the same period and show that the point of oscillation lies beyond center of gravity.   2+8

OR

What is wave function? Derive the expression for Schrodinger time dependent and time independent wave equations.

Q. N. 2 What are coherent sources? Can the interference patterns be formed due to two independent sources? Define thin film and explain the phenomenon of interference in thin film due to reflected rays.   1+2+7

Q. N. 3 An inductor of inductance 40 mH is placed in series with a resistor of resistance 3 Ω and a charged capacitor of capacitance 4.8 μF. Show that this current will oscillate and find the frequency of oscillation. What is the interval of time required for the charge amplitude to drop half of its starting value?   3+3+4

Q. N. 4 Define electric quadrupole? Derive the expression for electric potential across the axial line and show that electric potential due to quadrupole along axis is double than that of electric potential along equatorial line in magnitude at equal distance "r" from the center of quadrupole?   10

Q. N. 5 Write down Maxwell's equations. Derive the differential forms of Maxwell's equations starting from integral form and also mention their physical significance.   10

Section - B: (1×20=20)

Q. N. 6 Present the importance of Hall-effect in different types of materials. Theoretically derive the expressions for Hall coefficient, Hall voltage and also establish the relation between Hall mobility of charge carriers and conductivity of the material. If a current of (20+ y) A (y is the number of letters in your first name) is passed through a long foil of silver, which is 0.1 mm thick and 4 m long. Calculate the Hall voltage produces across the width by a flux of 1.4 Wb/m2. If the conduction of silver is 6.8 x 107 mho/m. Estimate the number density, Hall coefficient and Hall mobility.   10+10