Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

1. Coupled Pendulum : $L = 47\ cm; \quad m = 1317\ grams$

A	Couple the pendulums & determine ω_1 and ω_2 for **three** spring positions.	35
B	Plot the graph between ω_2^2/ω_1^2 vs ℓ^2 and then obtain the value of the spring constant.	25

You can use following formula, $\omega_2 = \omega_1\sqrt{1 + 2k\ell^2/(mgL)}$. Where, symbols have their regular meanings.

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

2. Coupled Pendulum : $L = 47\ cm; \quad m = 1317\ grams$

A	Couple the pendulums & determine ω_1 and ω_2 for **three** spring positions.	35
B	Plot the graph between ω_2^2/ω_1^2 vs ℓ^2 and then obtain the value of the spring constant.	25

You can use following formula, $\omega_2 = \omega_1\sqrt{1 + 2k\ell^2/(mgL)}$. Where, symbols have their regular meanings.

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

3. LCR Series Circuit :

A	Draw and connect a series-LCR circuit	15
B	For fixed L & C, plot the power as a function of frequency for R = 100 Ω. (L= 0.1 H, C=0.1 μF).	30
C	Calculate Q value of the circuit from the graph	15

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

4. LCR Parallel Circuit :

A	Draw and connect a parallel-LCR circuit	15
B	For fixed L & C, plot the power as a function of frequency for R = 100 Ω. (L= 0.1 H, C=0.1 μF).	30
C	Find resonance frequency from the graph.	15

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

5. EMI : EMF and Faraday's Law

A	Circuit diagram and connections	20
B	Take observations of EMF for five initial angular displacements (θs) and calculate the maximum velocity, v_{max}, for these θs.	30
C	Plot the graph of EMF vs v_{max}	10

You may use a formula: $V_{max} = \frac{4\pi R}{T}\sin(\theta_0/2)$ **and arc radius R = 40 cm**

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

6. EMI : EMF and Faraday's Law

A	Circuit diagram and connections	20
B	For $R = 2\ k\Omega$ and $C = 100\mu F$, measure the voltage across the capacitor after *n* swings for a release from 40^0.	30
C	Plot the graph of q vs *n*	10

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

7. Planck's Constant :

A	Draw and set up the filament and the photocell circuits	10
B	Record the photocell current (I_{ph}) for eight different voltages for Red filter ($\lambda = 6500\mathring{A}$).	25
C	Using the given R vs T plot, determine T for these voltages and calculate the Planck's constant by plotting the graph between ln I_{ph} and 1/T using $\ln I_{ph} = -h\nu/kT + \text{const}$	25

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

8. Planck's Constant :

A	Draw and set up the filament and the photocell circuits	10
B	Record the photocell current (I_{ph}) for eight different voltages for Green filter ($\lambda = 5460\mathring{A}$).	25
C	Using the given R vs T plot, determine T for these voltages and calculate the Planck's constant by plotting the graph between ln I_{ph} and 1/T using $\ln I_{ph} = -h\nu/kT + \text{const}$	25

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

9. Newton's Ring :

A	Obtain Newton's rings	20
B	Measure the diameter of the third and fifth order of dark ring and hence obtain **the radius of curvature** of the lens using the given formula: $\mathbf{r_m} = \sqrt{(m+1/2)\lambda R}$ where R is radius of curvature of of the lens and r_m is m^{th} order dark ring. $\lambda = 5893\mathring{A}$ for Na.	40

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

10. Newton's Ring :

A	Obtain Newton's rings	20
B	Measure the diameter of the sixth and nineth order of dark ring and hence obtain **the radius of curvature** of the lens using the given formula: $\mathbf{r_m} = \sqrt{(m+1/2)\lambda R}$ where R is radius of curvature of of the lens and r_m is m^{th} order dark ring. $\lambda = 5893\mathring{A}$ for Na.	40

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

11. Single Slit Diffraction : (wavelength = 632.8 nm)

A	Setup the diffraction experiment for single slit.	20
B	Obtain the diffraction pattern	20
C	Plot the diffraction pattern.	20

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

12. Double Slit Diffraction : (wavelength = 632.8 nm)

A	Setup the diffraction experiment for double slit.	20
B	Obtain the diffraction pattern	20
C	Plot the diffraction pattern.	20

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

13. Diffraction Grating :

$Violet - I : 4047\mathring{A} \quad Blue : 4358\mathring{A} \quad Green : 5461\mathring{A}$

A	Setup a spectrometer for observing Hg spectrum using a grating. (*number of lines in a grating,* 600 *lines/mm*).	20
B	Take first order readings of Hg for the standard lines mentioned above.	25
C	Plot an appropriate graph between $\sin\theta$ **vs.** λ	15

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017

Duration : 1 hour **Max Marks : 60**

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

14. Diffraction Grating :

$Violet - II : 4078\mathring{A} \quad Blue : 4358\mathring{A} \quad Yellow - I : 5770\mathring{A}$

A	Setup a spectrometer for observing Hg spectrum using a grating. (*number of lines in a grating,* 600 *lines/mm*).	20
B	Take first order readings of Hg for the standard lines mentioned above.	25
C	Plot an appropriate graph between $\sin\theta$ **vs.** λ	15

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

15. Young's Modulus : b = 5 cm ; d = 0.2 cm; M = 100 grams

A	Measure the depression z of the Brass plate with three different knife edge lengths ℓ.	25
B	Obtain the value of the Young's modulus Y by plotting the graph between z vs ℓ^3.	35

You may use the formula: $Y = Mg\ell^3/(4zbd^3)$ where symbols have their usual meaning.

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.

Physics Laboratory (PHY F110) : Physics Lab Test – 2017
Duration : 1 hour Max Marks : 60

Perform the following experiment. Report to the instructor whenever you complete the circuit diagram/connections/ setting-up of the apparatus.

16. Young's Modulus : b = 5 cm ; d = 0.6 cm; M = 100 grams

A	Measure the depression z of the Acrylic plate with three different knife edge lengths ℓ.	25
B	Obtain the value of the Young's modulus Y by plotting the graph between z vs ℓ^3.	35

You may use the formula: $Y = Mg\ell^3/(4zbd^3)$ where symbols have their usual meaning.

Note: Get your day to day performance marks out of 120 and test marks out of 60 from your Instructor before you leave the lab. No discrepancy of marks will be entertained afterwards.
