

DIGITAL ASSIGNMENT I

Problem Sheet

Course Code: **BPHY101P**

Course Title: **ENGINEERING PHYSICS**

Class Nbr: **VL2023240105832**

Due Date: **07 September 2023**

Max. Marks **25**

Slot : **E1**

Faculty: **Dr. S. Balakrishnan**

1. The assignment contains **5 questions** from **Module 1- Introduction to Waves**
2. **Each question** carries **5 marks** and hence the total is **25 marks** which will be scaled down to **10 marks**.
3. You can write down **solution by hand and take a snap shot** of it. However, you should only **insert image in the word document** but **DONOT upload image files**.
4. **Template for word document** in which images of the solutions should be inserted is given at the end.
5. After completing the assignment in a word document, convert it into one **single PDF file** with your **registration number as a filename**.

For example: 23MIS0001_PhysicsDA1
6. **Only one PDF file** in your registration number **should be uploaded. (I will discard image files, Word files, Google drive link etc.)**
7. Submit the Assignment only through VTOP.
8. Due date for submission: **07 September 2023**
9. **Any reason for late submission will not be considered.**

All the very best

ASSIGNMENT Questions

Wave equation

1. A uniform rope of length 12 m and mass 6 kg hangs vertically from a rigid support. A block of mass 2 kg is attached to the free end of the rope. A transverse pulse of wavelength 0.06 m is produced at the lower end of the rope. What is the wavelength of the pulse when it reaches the top of the rope?
2. A wave travelling on a string at a speed of 10 ms^{-1} causes each particle of the string to oscillate with a time period of 20 ms . (a) What is the wavelength of the wave (b) If the displacement of the particle is 1.5 mm at a certain instant, what will be the displacement of a particle 10 cm away from it at the same instant?

Standing Waves

3. A Sonometer wire has a total length of 1 m between the two fixed ends. Where the two bridges should be placed below the wire so that the three segments of the wire have their fundamental frequencies in the ratio $1:2:3$?
4. (a) A piano string of length 0.6 m is under a tension of 300 N and vibrates with a fundamental frequency of 660 Hz . What is the mass density of the string? (b) What are the frequencies of the first two harmonics? (c) A flute organ pipe (opened at both ends) also plays a note of 660 Hz . What is the length of the pipe? Take the speed of sound as 340 ms^{-1} .
5. A wire, fixed at both ends is seen to vibrate at a resonant frequency of 240 Hz and also at 320 Hz . (a) What could be the maximum value of the fundamental frequency? (b) If transverse waves can travel on this string at a speed of 40 ms^{-1} , what is its length?

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Solutions to Problem Sheet

Course Code: **BPHY101P**

Course Title: **ENGINEERING PHYSICS**

Posted on **29 August 2023**

Due Date: **07 September 2023**

Max. Marks **30**

Slot : **E1**

Faculty: **Dr. S. Balakrishnan**

Reg. No.:

Name: