

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS)

THIRD SEMESTER EXAMINATION

(2024 ADMISSION ONWARDS)

Discipline Specific Elective (DSE) -MG3DSEPHYA00 – Introduction to Medical Physics

Duration: 2 hrs

Maximum Marks: 50

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C), Skill(S), Interest(I) and
Appreciation(An)*

*Students should attempt at least one question from each course outcome to enhance their overall
outcome attainability.*

Part A

Short Answer Type Questions

Answer any **10** questions

Each question carries **2** Mark

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|----|---|----------|
| 1 | What is the function of the retina in the eye? | [K][CO1] |
| 2 | Explain the difference between emission and absorption spectra. | [U][CO1] |
| 3 | Name two medical applications of OCT. | [K][CO2] |
| 4 | Describe the role of CMOS or CCD sensors in modern endoscopes. | [U][CO2] |
| 5 | Differentiate between specular and diffuse reflection. | [U][CO3] |
| 6 | State the relation between wavelength, frequency, and speed of sound. | [K][CO3] |
| 7 | Mention any two applications of ultrasound in medical diagnosis. | [K][CO3] |
| 8 | What is the basic principle of Doppler ultrasound? | [K][CO4] |
| 9 | Describe the role of a speech audiometer. | [U][CO4] |
| 10 | Explain how a PN junction behaves under forward bias. | [U][CO5] |
| 11 | Differentiate between CB and CE configuration of a transistor. | [U][CO5] |
| 12 | Name the three types of bioelectric signals commonly used in diagnostics. | [K][CO6] |
| 13 | Describe the difference between photoelectric effect and Compton effect. | [U][CO6] |
| 14 | A patient with metal implants needs imaging—would you recommend MRI? Justify. | [A][CO6] |

(10x2=20)

Short Essay Type Questions
Answer any **6** questions
Each question carries **5** marks

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|----|---|----------|
| 15 | Explain the working principle of a semiconductor laser. | [U][CO1] |
| 16 | A surgeon needs to perform precise eye surgery. Which laser should be used and why? | [A][CO1] |
| 17 | Compare the structure of a standard flexible gastroscope and a modern endoscope. | [U][CO2] |
| 18 | Explain the Doppler effect in ultrasound imaging. | [K][CO3] |
| 19 | Discuss the applications of Doppler ultrasound in fetal and cardiac assessments. | [A][CO4] |
| 20 | Differentiate between inverting and non-inverting op-amp configurations. | [U][CO5] |
| 21 | Define ECG, EEG, and EMG. What are their primary uses in clinical diagnosis? | [K][CO6] |
| 22 | Explain the basic principle of MRI and the role of magnetic resonance in imaging. | [U][CO6] |

(6x5=30)