

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600086
(For candidates admitted during the academic year 2019-2020 & thereafter)
SUBJECT CODE : 19PH/PE/MU15
M.Sc. DEGREE EXAMINATION, APRIL 2023
PHYSICS
SECOND SEMESTER

COURSE : ELECTIVE
PAPER : MEDICAL PHYSICS AND ULTRASONICS
TIME : 3 HOURS

MAX MARKS: 100
(10 x 3 = 30)

SECTION A

Answer all the questions

1. Define systolic blood pressure.
2. What is an EMG signal?
3. Distinguish single chamber pacemaker and dual chamber pacemaker.
4. Briefly describe the anesthesia machine.
5. What is the principle of fluorescence?
6. How are lasers used in diagnosis?
7. Write the formula for mole fraction of the multicomponent liquid mixtures?
8. Define ultrasonic velocity.
9. Why do we use ultrasonic microscopy?
10. Mention any two advantages of ultrasonic cleaning.

SECTION B

(5 x 5 = 25)

Answer any Five Questions

11. Discuss EEG and its characteristics in detail.
12. Distinguish Haemodialysis and Peritoneal Dialysis.
13. Describe the principle of laser based blood cell counting using a schematic diagram.
14. Explain three different methods to estimate volume fraction of the multicomponent mixtures.
15. Discuss the experimental arrangements of transmission acoustic holography with a neat diagram.
16. With a neat diagram, write a brief note about microprocessor-based ventilators.
17. Obtain Van der Waal's constant using Collision factor theory.

SECTION C

(3 x 15 = 45)

Answer any Three Questions

18. Draw the block diagram of ECG recording setup and explains the different part in it.
19. Describe the working of synchronised DC Defibrillator with a suitable block diagram.
20. Write a brief note on blood flow meter. Discuss laser Doppler blood flow meter with a neat block diagram.
21. Discuss various acoustical parameters in detail.
22. Explain the working principle and applications of ultrasonic welding. Also mention its merits and demerits.