QP CODE: 25024921

25024921

Reg No : .....

Name : .....

M.Sc DEGREE (CSS) EXAMINATION, APRIL 2025

Fourth Semester

MSC Space Science

ELECTIVE - PH880403 - INSTRUMENTATION IN SPACE PHYSICS AND ASTROPHYSICS

2020 ADMISSION ONWARDS

15E8B6F5

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is the significance of threshold energy of photoemission?
2. Why metals are not likely to be good photoemitters?
3. What is the function of dynodes in a photomultiplier tube?
4. What is passive pixel sensor scheme in CMOS?
5. What is dynamic range in photodetector?Why is dynamic range important?
6. What you meant by the energy resolution of a photo detector?
7. Define Plasma frequency. How is it related to electron density?
8. What are the two approximations used in the modes of propagation of wave? Explain.
9. What are the types of sensors used in remote sensing?
10. Why is LIDAR a popular remote sensing method?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Distinguish between the photoemissive materials AgOCs and Na_2KSbCs.
12. Explain the mechanism of negative electron affinity and also mention its merits and demerits.
13. Distinguish between grating tuned and high field enhancement of photocathodes.
14. Explain the method for the measurement of electron temperature.

15. Explain microwave sensing and it's applications

16. Explain the principles of telescope optics.

17. Briefly explain about the unfilled aperture radio telescopes.

18. Explain about X ray detectors used in astronomy.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain the basic principle of operation of photo detector. Explain the working of PIN diode and APD as photo detector, also compare their performance.

20. What is SLAR? Explain the geometry of the Radar image?

21. State and prove the van Cittert–Zernike theorem. Explain various assumptions used in this theorem. How these assumptions can be made useful in observational astronomy.

22. Describe equatorial and alt-az mounts used in telescopes. What are the merits and demerits of these mountings. What are advantage of making polar alignment in equtorial mount telescope?

(2×5=10 weightage)