

2017

OPTION—B

Paper : 60420

(SPACE AND ATMOSPHERIC PHYSICS)

1. (a) Choose the correct answer : 1

The layer from the stratopause to about 85–90 km, in which the temperature falls with altitude is called

- (i) stratosphere
- (ii) troposphere
- (iii) mesosphere
- (iv) ionosphere

- (b) Choose the correct answer : 1

Which of the following absorbs ultraviolet solar radiation, thereby protecting the biosphere from potentially damaging effects?

- (i) Water vapour
- (ii) Ozone layer
- (iii) Mesosphere
- (iv) None of the above

- (c) Fill in the blank : 1

Virtual height in summer ranges from 300 km to 400 km whereas in winter it goes down to 225 km, this ionospheric layer is called _____.

(d) Choose the correct answer : 1

In the ionosphere, recombination coefficient (cm^3/sec) for F_1 region is

- (i) 4×10^{-9}
- (ii) 4×10^{-10}
- (iii) 4×10^{-11}
- (iv) None of the above

(e) Choose the correct answer : 1

Solar wind flowing out from the sun consist of

- (i) electrons
- (ii) protons
- (iii) both electrons and protons
- (iv) None of the above

(f) Choose the correct answer : 1

The solar photosphere is

- (i) cooler than the solar corona
- (ii) less dense than the solar corona
- (iii) hotter than the solar corona
- (iv) None of the above

2. Answer the following questions : $2 \times 6 = 12$

- (a) What is the difference between heat and internal energy?
- (b) Define geopotential.

- (c) When air is pumped into the tube of a bicycle, the temperature of air in the tube increases. Why?
- (d) Explain briefly the characteristics of various regions in the ionosphere.
- (e) How does electron number density vary with zenith angle of the sun?
- (f) What is solar wind? How is it produced?

3. Answer the following questions :

- (a) Define thermodynamical parameters. 4

Or

What do you mean by dry air and moist air? Explain briefly thermal stress. 2+2=4

- (b) Why are sun spots important to the sun? 3
- (c) What is potential temperature? How is it related to entropy? 2+3=5
- (d) What type of star is the sun? Explain the physical significance of stars of this type. 2+3=5

4. Answer the following questions :

- (a) Describe the structure of ionosphere. Discuss the theory which explains the formation of ionosphere. 2+5=7

(b) Discuss briefly the limitations of first law of thermodynamics. 3

(c) What is the basic theory of photo-ionization? 3

5. Write short notes on any *three* of the following : 4×3=12

(a) Temperature structure

(b) Coronal heating

(c) Balance of ionization

(d) Solar activity