

## Quiz-1

**T: True, F: False, See the bold text for correct answers**

1. Lithophile elements prefer to be in the metallic state. **F**
2.  $^{53}\text{Mn}$  is a short-lived radioactive isotope. **T**
3. Moon was formed by a great impact of Martian type body with the Earth at 5.5 Ga before. **F**
4. Uranus does not follow the Bode-Titius law. **F**
5. The main conjecture of the solar system is the distribution of angular momentum. **T**
6. **Reduced heat flow mainly arises from the cooling of the Earth's crust. F**
7. The mean surface heat flow for the ocean is  $101 \text{ mWm}^{-2}$ . **T**
8. Thermal diffusivity expresses the ability of a material to loss heat by radiation. **F**
9. Erosion and deposition do not affect the equilibrium geotherm. **F**
10. The abundance of  $U^{238}$  is more than  $U^{235}$  in natural uranium. **T**
11. Kepler's first law of planetary motion follows directly from the
  - (a) **Conservation of energy** (b) Conservation of angular momentum (c) Balance between gravitation force and centrifugal force (d) None of these
12. **The oceanic lithosphere consists of upper, lower crust and uppermost part of mantle. F**
13. Advection heat flow is caused by
  - i) **Pressure difference**, (ii) Temperature difference, (iii) Density difference, (iv) none of the above.
14. The volumetric heat-generation rate is  $1.5 \times 10^{-6} \text{ Wm}^{-3}$  in the crust of thickness 10 km. The heat is produced in the crust at a rate of:
  - (a)  $1.5 \text{ mWm}^{-2}$ , (b)  **$15 \text{ mWm}^{-2}$** , (c)  $150 \text{ mWm}^{-2}$ , (d) None of these
15. The dimension of heat flow is given by
  - (a)  $\text{MT}^{-2}$ , (b)  $\text{ML}^{-1}\text{T}^{-1}$ , (c)  $\text{ML}^{-1}\text{T}$ , (d) **None of these**
16. The capture hypothesis of the evolution of Moon was proposed by
  - (a) **Harold C. Urey** (b) Pierre-Simon, marquis de Laplace (c) Immanuel Kant (d) None of the above.
17. Jovian planets have less number of Moons than terrestrial planet. **F**
18. The adiabatic temperature gradient at the lower mantle is (for  $g = 9.9 \text{ m/s}^2$ ,  $c_p = 1200 \text{ J kg}^{-1}\text{K}^{-1}$ ,  $\alpha = 14 \times 10^6 \text{ K}^{-1}$ , and Temperature  $T = 2400 \text{ K}$ , terms are usual).
  - a)  $0.4 \text{ K/km}$  (b)  $0.5 \text{ K/km}$  (c)  $0.8 \text{ K/km}$  (d)  **$0.3 \text{ K/km}$**
19. **If the concentration of  $^{235}\text{U}$  and  $^{232}\text{Th}$  in a granite block are 4 ppm and 17 ppm, respectively, and the respective values of heat production are  $5.7 \times 10^{-4} \text{ Wkg}^{-1}$  and  $2.7 \times 10^{-5} \text{ Wkg}^{-1}$ . The heat flow by the granite column of  $1 \text{ m}^2$  cross-section and 30 km thickness is (assume heat flow is only operative in the vertical direction and the density of granite is  $2.65 \text{ gm/cc}$ )**
  - a)  **$217.75 \text{ mWm}^{-2}$**  (b)  $0.217 \text{ mWm}^{-2}$  (c)  $181.26 \text{ mWm}^{-2}$  (d)  $36.49 \text{ mWm}^{-2}$
20. According to Bode's law, what is the predicted distance between Mars and the Sun? (1 A. U. =  $149597871 \text{ km}$ )
  - a) 220 million-km (b) 248 million-km (c) **239 million-km** (d) 418 million-km