RK VISION ACADEMY

PHYSICS

XII – ELECTROMAGNETIC WAVES

SECTION A

- 1. Which of the following wave cannot travel in vacuum?
 - (1) X-rays
 - (2) Infrasonic waves
 - (3) Ultraviolet rays
 - (4) Radio waves
- 2. Energy of electromagnetic waves is due to their
 - (1) wavelength
 - (2) frequency
 - (3) electric and magnetic fields
 - (4) None of the above

3. Which of the following represents an infrared wavelength?

- (1) 10^{-4} cm
- (2) 10^{-5} cm
- (3) 10^{-6} cm
- (4) 10^{-7} cm

4. Which of the following has the shortest wavelength?

- (1) X-rays
- (2) g-rays
- (3) Microwaves
- (4) Radio waves
- 5. The frequency of visible light is of the order of
 - (1) 10^{14} Hz
 - (2) 10^{10} Hz
 - (3) 10^6 Hz
 - (4) 10^4 Hz

6. The structure of solids is investigated by using

- (1) cosmic rays
- (2) X-rays
- (3) g-rays
- (4) infrared radiations

- 7. Energy stored in electromagnetic oscillations is in the form of
 - (1) electrical energy
 - (2) magnetic energy
 - (3) Both (1) and (2)
 - (4) None of these

8. The range of wavelength of the visible light is

- (1) 10 Å to 100 Å
- (2) 4000 Å to 7000 Å
- (3) 7000 Å to 10000 Å
- (4) 10000 Å to 15000 Å
- 9. Which of the following electromagnetic waves have the longest wavelength?
 - (1) Heat waves
 - (2) Light waves
 - (3) Radio waves
 - (4) Microwaves
- 10. Radio waves diffract around building although light waves do not. The reason is that radio waves
 - (1) travel with speed larger than c
 - (2) have longer wavelength than light
 - (3) carry news
 - (4) are not electromagnetic waves
- 11. Frequency of wave is 6×10^{15} Hz. The wave is
 - (1) radio wave
 - (2) microwave
 - (3) X-ray
 - (4) ultraviolet rays
- 12. The frequency 1057 MHz of radiation arising from two close energy levels in hydrogen belongs to
 - (1) radio waves
 - (2) infrared waves
 - (3) microwaves
 - (4) g-rays
- 13. The part of the spectrum of the electromagnetic radiation used to cook food is
 - (1) ultraviolet rays
 - (2) cosmic rays

- (3) X-rays
- (4) microwaves

14. Which of the following shows greenhouse effect?

- (1) Ultraviolet rays
- (2) Infrared rays
- (3) X-rays
- (4) Visible rays
- 15. Which of the following waves are used in RADAR systems for aircraft navigation?
 - (1) X-rays
 - (2) Infrared rays
 - (3) Ultraviolet rays
 - (4) Microwaves

16. Electromagnetic radiation of highest frequency is

- (a) Infrared radiations
- (b) Visible radiation
- (c) Radio waves
- (d) *γ*-rays

17. The ozone layer absorbs

- (1) Infrared radiations
- (2) Ultraviolet radiations
- (3) X-rays
- (4) *γ*-rays

18. Which of the following waves have the maximum wavelength

- (1) X-rays
- (2) I.R. rays
- (3) UV rays
- (4) Radio waves

19. Electromagnetic waves are transverse in nature is evident by

- (1) Polarization
- (2) Interference
- (3) Reflection
- (4) Diffraction
- 20. If \vec{E} and \vec{B} are the electric and magnetic field vectors of E.M. waves then the

direction of propagation of E.M. wave is along the direction of

- (1) \vec{E}
- (2) \vec{B}
- (3) $\vec{E} \times \vec{B}$
- (4) None of these

21. Biological importance of Ozone layer is

- (1) It stops ultraviolet rays
- (2) Ozone rays reduce green house effect
- (3) Ozone layer reflects radio waves
- (4) Ozone layer controls O_2/H_2 radio in atmosphere

22. What is ozone hole

- (1) Hole in the ozone layer
- (2) Formation of ozone layer
- (3) Thinning of ozone layer in troposphere
- (4) Reduction in ozone thickness in stratosphere

23. Which rays are not the portion of electromagnetic spectrum

- (1) X-rays
- (2) Microwaves
- (3) α -rays
- (4) Radio waves

24. Radio wave diffract around building although light waves do not. The reason is that radio waves

- (1) Travel with speed larger than c
- (2) Have much larger wavelength than light
- (3) Carry news
- (4) Are not electromagnetic waves
- 25. The frequencies of X-rays, γ -rays and ultraviolet rays are respectively a, b and c. Then

- (1) a < b, b > c
- (2) a > b, b > c
- $(3) \quad a > b, b < c$
- $(4) \quad a < b, b < c$
- 26. Radio waves and visible light in vacuum have
 - (1) Same velocity but different wavelength
 - (2) Continuous emission spectrum
 - (3) Band absorption spectrum
 - (4) Line emission spectrum
- 27. Energy stored in electromagnetic oscillations is in the form of
 - (1) Electrical energy
 - (2) Magnetic energy
 - (3) Both (1) and (2)
 - (4) None of these
- 28. Heat radiations propagate with the speed of
 - (1) α -rays
 - (2) β -rays
 - (3) Light waves
 - (4) Sound waves
- 29. If a source is transmitting electromagnetic wave of frequency $8.2 \times 10^6 Hz$, then wavelength of the electromagnetic waves transmitted from the source will be
 - (1) 36.6 m
 - (2) 40.5 *m*
 - (3) 42.3 *m*
 - (4) 50.9 m
- 30. In an apparatus, the electric field was found to oscillate with an amplitude of 18 V/m. The magnitude of the oscillating magnetic field will be
 - (1) $4 \times 10^{-6}T$

(3) $9 \times 10^{-9}T$

- (4) $11 \times 10^{-11}T$
- **31.** According to Maxwell's hypothesis, a changing electric field gives rise to
 - (1) An e.m.f.
 - (2) Electric current
 - (3) Magnetic field
 - (4) Pressure radiant
- 32. In an electromagnetic wave, the electric and magnetising fields are $100Vm^{-1}$ and $0.265Am^{-1}$. The maximum energy flow is
 - (1) **26**. $5W/m^2$
 - (2) $36.5W/m^2$
 - (3) $46.7W/m^2$
 - (4) $765W/m^2$
- 33. The 21 *cm* radio wave emitted by hydrogen in interstellar space is due to the interaction called the hyperfine interaction is atomic hydrogen. the energy of the emitted wave is nearly
 - (1) 10^{-17} *Joule*
 - (2) 1 *Joule*
 - (3) 7×10^{-8} *Joule*
 - (4) 10^{-24} *Joule*
- 34. TV waves have a wavelength range of 1-10 *meter*. Their frequency range in *MHz* is
 - (1) 30-300
 - (2) 3-30
 - (3) 300-3000
 - (4) 3-3000

35. Maxwell's equations describe the fundamental laws of

- (1) Electricity only
- (2) Magnetism only
- (3) Mechanics only
- (4) Both (1) and (2)

SECTION B

- 36. The oscillating electric and magnetic vectors of an electromagnetic wave are oriented along
 - The same direction but differ in phase by 90°
 - (2) The same direction and are in phase
 - (3) Mutually perpendicular directions and are in phase
 - (4) Mutually perpendicular directions and differ in phase by 90°
- **37.** In which one of the following regions of the electromagnetic spectrum will the vibrational motion of molecules give rise to absorption
 - (1) Ultraviolet
 - (2) Microwaves
 - (3) Infrared
 - (4) Radio waves
- **38.** An electromagnetic wave travels along *z*axis. Which of the following pairs of space and time varying fields would generate such a wave
 - (1) $\boldsymbol{E}_{\boldsymbol{x}}, \boldsymbol{B}_{\boldsymbol{y}}$
 - (2) E_y, B_x
 - (3) E_z, B_x
 - (4) E_y, B_z
- **39.** Which of the following rays has the maximum frequency
 - (1) Gamma rays
 - (2) Blue light
 - (3) Infrared rays
 - (4) Ultraviolet rays
- 40. A signal emitted by an antenna from a certain point can be received at another point of the surface in the form of

- (1) Sky wave
- (2) Ground wave
- (3) Sea wave
- (4) Both (1) and (2)
- 41. Approximate height of ozone layer above the ground is
 - (1) 60 to 70 km
 - (2) 59 km to 80 km
 - (3) 70 km to 100 km
 - (4) 100 km to 200 km
- 42. The electromagnetic waves do not transport
 - (1) Energy
 - (2) Charge
 - (3) Momentum
 - (4) Information
- 43. A plane electromagnetic wave is incident on a material surface. If the wave delivers momentum *p* and energy *E*, then
 - (1) p = 0, E = 0
 - (2) $p \neq 0, E \neq 0$
 - (3) $p \neq 0, E = 0$
 - (4) $p = 0, E \neq 0$
- 44. An electromagnetic wave, going through vacuum is described by $E = E_0 sin(kx - \omega t)$. Which of the following is independent of wavelength
 - (1) k
 - (2) *ω*
 - (3) k/ω
 - (4) *k*ω
- 45. An electromagnetic wave going through vacuum is described by $E = E_0 sin(kx - \omega t)$; $B = B_0 sin(kx - \omega t)$. Which of the following equation is true

- (1) $E_0 k = B_0 \omega$
- (2) $E_0\omega = B_0k$
- (3) $E_0B_0 = \omega k$
- (4) None of these
- 46. An *LC* resonant circuit contains a 400 pFcapacitor and a 100 μ H inductor. It is set into oscillation coupled to an antenna. The wavelength of the radiated electromagnetic waves is
 - (1) 377 mm
 - (2) 377 *metre*
 - (3) 377 *cm*
 - (4) 3.77 *cm*
- 47. A radio receiver antenna that is 2 *m* long is oriented along the direction of the electromagnetic wave and receives a signal of intensity $5 \times 10^{-16} W/m^2$. The maximum instantaneous potential difference across the two ends of the antenna is
 - (1) 1.23 μV
 - (2) 1.23 mV
 - (3) 1.23 *V*
 - (4) 12.3 *mV*
- 48. Television signals broadcast from the moon can be received on the earth while the TV broadcast from Delhi cannot be received at places about 100 km distant from Delhi. This is because
 - (1) There is no atmosphere around the moon
 - (2) Of strong gravity effect on TV signals
 - (3) TV signals travel straight and cannot follow the curvature of the earth
 - (4) There is atmosphere around the earth
- 49. A TV tower has a height of 100 m. The average population density around the tower is 1000 per km^2 . The radius of the

earth is $6.4 \times 10^6 m$. the population covered by the tower is

- (1) 2×10^{6}
- (2) 3×10^6
- (3) 4×10^{6}
- (4) 6×10^6
- 50. The wavelength 21 *cm* emitted by atomic hydrogen in interstellar space belongs to
 - (1) Radio waves
 - (2) Infrared waves
 - (3) Microwaves
 - (4) *γ*-rays



RK VISION ACADEMY

PHYSICS

XII – ALTERNATING CURRENT

SECTION A

1.	2	
2.	3	
3.	1	
4.	2	
5.	1	
6.	2	
7.	3	
8.	2	
9.	3	
10.	2	
11.	4	
12.	1	
13.	4	
14.	2	
15.	4	
16.	4	
<mark>17.</mark>	2	
18.	4	
19.	1	
20.	3	
21.	1	
22.	4	
23.	3	
24.	2	
25.	1	
26.	1	
27.	3	
28.	3	
29.	1	
30.	2	
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34.	1	
35.	4	
SECTION B		
36.	3	
37.	2	
38.	1	

39. 1	
40. 4	
41. 1	
42. 2	
43. 2	
44. 3	
45. 1	
46. 2	4
47. 1	
48. 3	
49. 3	
50. 1	