PHYSICS

11. If λ_V, λ_X and λ_m represent the wavelengths of visible light, X-ray and microwaves respectively, then
(1) $\lambda_m > \lambda_X > \lambda_V$ (2) $\lambda_V > \lambda_m > \lambda_X$
(3) $\lambda_V > \lambda_X > \lambda_m$ (4) $\lambda_m > \lambda_V > \lambda_X$

12. The velocity of electromagnetic radiation in a medium of permittivity ε_0 and permeability μ_0 is given by
(1) $\frac{1}{\sqrt{\mu_0\varepsilon_0}}$ (2) $\sqrt{\frac{\mu_0}{\varepsilon_0}}$
(3) $\sqrt{\frac{\varepsilon_0}{\mu_0}}$ (4) $\sqrt{\mu_0\varepsilon_0}$

13. A 100 Ω resistance and a capacitor of 100 Ω reactance are connected in series across a 220 V source. When the capacitor is 50% charged, the peak value of the displacement current is
(1) 4.4 A (2) $11\sqrt{2}$ A
(3) 2.2 A (4) 11 A

14. In an electromagnetic wave the rms value of electric field is 100 V m^{-1}. Find intensity of the wave.
(1) 30.2 W m^{-2} (2) 15.3 W m^{-2}
(3) 26.5 W m^{-2} (4) 15.7 W m^{-2}

15. In free space, the energy of electromagnetic wave in electric field is U_E and in magnetic field is U_B. Then
(1) $U_E = U_B$ (2) $U_E > U_B$
(3) $U_E < U_B$ (4) $U_E = \frac{U_B}{2}$

16. Arrange the following electromagnetic radiations per quantum in the order of increasing energy.
A. Blue light B. Yellow light
C. X-ray D. Radio wave
(1) D, B, A, C (2) A, B, D, C
(3) C, A, B, D (4) B, A, D, C

17. Match List I (Electromagnetic wave type) with List II (Its association/application) and select the correct option from the choices given below the lists.

List - I		List - II	
A.	Infrared waves	1.	To treat muscular strain
B.	Radio waves	2.	For broadcasting
C.	X-rays	3.	To detect fracture of bones
D.	Ultraviolet	4.	Absorbed by the ozone layer of the atmosphere

Codes

	A	B	C	D
(1)	4	3	2	1
(2)	3	2	1	4
(3)	1	2	4	3
(4)	1	2	3	4

18. An electromagnetic wave of frequency ν = 3.0 MHz passes from vacuum into a dielectric medium with permittivity ε = 4.0. Then,
(1) wavelength is doubled and the frequency remains unchanged
(2) wavelength is doubled and frequency becomes half
(3) wavelength is halved and frequency remains unchanged
(4) wavelength and frequency both remain unchanged

19. Which of the following radiations has the least wavelength?
(1) γ-rays (2) β-rays
(3) α-rays (4) X-rays

20. When current in a coil changes from 5 A to 2 A in 0.1 s, average voltage of 50 V is produced. The self-inductance of the coil is
(1) 6 H (2) 0.67 H
(3) 3 H (4) 1.67 H