



## DPP - 2 (EM Waves)

Video Solution on Website:-

https://physicsaholics.com/home/courseDetails/45

Video Solution on YouTube:-

https://youtu.be/6wxjHktfL0o

Written Solution on Website:-

https://physicsaholics.com/note/notesDetalis/67

- Q 1. The sun delivers  $10^4 \text{W/}m^2$  of electromagnetic flux to earth's surface. The total power that is incident on a roof dimensions  $(10 \times 10)m^2$  will be:
  - (a)  $10^4 \text{ W}$

(b)  $10^5 \text{ W}$ 

(c)  $10^6 \text{ W}$ 

- $(d) \ 10^7 \ W$
- Q 2. The sun delivers about 1.4 KW $m^{-2}$  of electromagnetic flux to the earth's surface. Calculate the solar energy in joules incident on the roof of dimensions 8m×20m in 1 hour
  - (a) 205.6 MJ
- (b) 806.4 MJ

(c) 122 J

- (d) 102.3 MJ
- Q 3. The sun delivers  $10^3 \text{W/}m^2$  of electromagnetic flux to the earth's surface. The total power that is incident on a roof of dimensions  $8\text{m}\times20\text{m}$  is  $1.6\times10^5\text{W}$ , the radiation force on the roof will be- (The whole incident electromagnetic flux is absorbed by the earth)
  - (a) 53 N

(b) 5.3 N

(c)  $5.3 \times 10^{-4}$  N

- (d)  $5.3 \times 10^{-6}$  N
- Q 4. Electromagnetic radiation with energy flux  $50 \text{ W} \text{cm}^{-2}$  is incident on a totally absorbing surface normally for 1 hour. If the surface has an area of  $0.05 \text{ m}^2$ , then the average force due to the radiation pressure, on it is,
  - (a)  $8.3 \times 10^{-7}$  N

(b)  $8.3 \times 10^{-5}$  N

(c)  $1.2 \times 10^{-7}$  N

- (d)  $1.2 \times 10^{-5} \text{ N}$
- Q 5. Light with an energy flux of  $25 \times 10^4$  Wm<sup>-2</sup> falls on a perfectly reflecting surface at normal incidence. If the surface area is  $15 \text{ cm}^2$ , the average force exerted on the surface is
  - (a)  $1.25 \times 10^{-6} \text{ N}$

(b)  $2.5 \times 10^{-6} \text{ N}$ 

(c)  $1.20 \times 10^{-6} \text{ N}$ 

- (d)  $3 \times 10^{-6} \text{ N}$
- Q 6. Light with energy flux of  $18 \text{ W/}cm^2$  falls on a non reflecting surface of area  $20 \text{ cm}^2$  at normal incidence the momentum delivered in 30 minutes is
  - (a)  $1.2 \times 10^{-6}$  Kg-m/s

(b)  $2.16 \times 10^{-3} \text{ Kg-m/s}$ 

(c)  $1.18 \times 10^{-3} \text{ Kg-m/s}$ 

- (d)  $3.2 \times 10^{-3}$  Kg-m/s
- Q 7. Light with energy flux  $18 \text{ W} \text{cm}^{-2}$  is incident on a mirror of size  $2\text{cm} \times 2\text{cm}$  normally. The momentum delivered in one minute is
  - (a) 28.8  $\mu$ Kg-m/s

(b)  $2.88 \mu \text{Kg-m/s}$ 

(c)  $4.8 \mu \text{Kg-m/s}$ 

(d)  $48 \mu \text{Kg-m/s}$ 



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- Q 8. Light with energy flux of  $24 \text{ W}m^{-2}$  is incident on a well polished disc of radius 3.5 cm for one hour. The momentum transferred to the disc is
  - (a) 1.1  $\mu$ Kg-m/s

(b)  $2.2 \mu \text{Kg-m/s}$ 

(c)  $3.3 \mu \text{Kg-m/s}$ 

- (d)  $4.4 \mu \text{Kg-m/s}$
- Q 9. Find the amplitude of the electric field in a parallel beam of light of intensity 8.0  $W/m^2$ 
  - (a) 77.7 N/C

(b) 33.3 N/C

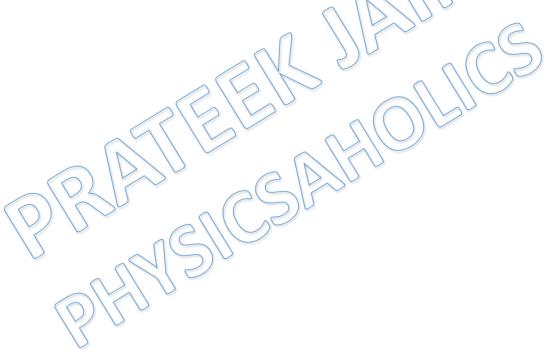
(c) 28.8 N/C

- (d) 83.6 N/C
- Q 10. Find the amplitude of magnetic field in parallel beam of light of intensity  $4.0 \text{W}/m^2$ 
  - (a)  $18.3 \times 10^{-5}$  T

(b)  $1.83 \times 10^{-6}$  T

(c)  $28.3 \times 10^{-7}$  T

(d)  $1.83 \times 10^{-7}$  T



## **Answer Key**

Q.1	c	Q.2	b	Q.3	c	Q.4	b	Q.5 b
Q.6	b	Q.7	a	Q.8	b	Q.9	a	Q.10 d