Problem-8

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What is the power output of $_{92}U^{235}$ reactor if it takes 30 days to use up 2 kg of fuel and if each fission gives 185 MeV of usable energy?

Solution:-

Time = 30 days

fuel required = 2Kg = 2×1000 g

Mass of fuel consumed per day

$$= \frac{2 \times 1000}{30 \times 24 \times 60 \times 60}$$

No. of atoms undergoing fission

$$= \frac{6.023 \times 10^{23} \times 2 \times 1000}{235 \times 30 \times 24 \times 60 \times 60}$$

$$= 1.97 \times 10^{18}.$$

Power = Energy released per sec.

$$= 1.97 \times 10^{18} \times 185$$

$$= 364.45 \times 10^{18} \times 1.6 \times 10^{-13} \text{ Watt}$$

$$= 58.3 \times 10^{6} \text{ watt}.$$

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