Answer to the question no – 3

ⓐ Given, $X = 10\textcircled{6} = 6$

$(95 + 6)$ MW   for 2 hour

 50 MW for 7 hour

Total power delivered by the reactor

$= (101 \times 10^6 \times 2 + 50 \times 10^6 \times 7)$ kw

$= 552 \times 10^6$ W

$= 552 \times 10^6$ J/s   in a day.

∴ As mass required of uranium.

per fission per hour $= 552 \times 10^6 \times 3600 \times 24$

$ = 4.76 \times 10^{+3}$ J/day.

Energy released per atom fission $= 200$ ev

We know, $ = 200 \times 10^6 \times 1.6 \times 10^{-19}$

$1\, ev = 1.6 \times 10^{-19}$ $ = 3.2 \times 10^{-11}$ J

For 3.2×10^{-11} J energy, required 1 atom

$\therefore$ 1 J $=$ " $\dfrac{1}{3.2 \times 10^{-11}}$

$\therefore 4.76 \times 10^{13}$ J $=$ " $\dfrac{4.76 \times 10^{13}}{3.2 \times 10^{-11}}$

$= 1.4875 \times 10^{24}$ atom

per day.

6.023×10^{23} atoms $=$ 235 g of U_P

$\therefore$ 1 $=$ " $\dfrac{235}{6.023 \times 10^{23}}$ g "

$\therefore 1.4875 \times 10^{24}$ $=$ $\dfrac{235 \times 1.9875 \times 10^{24}}{6.023 \times 10^{23}}$ g U_P

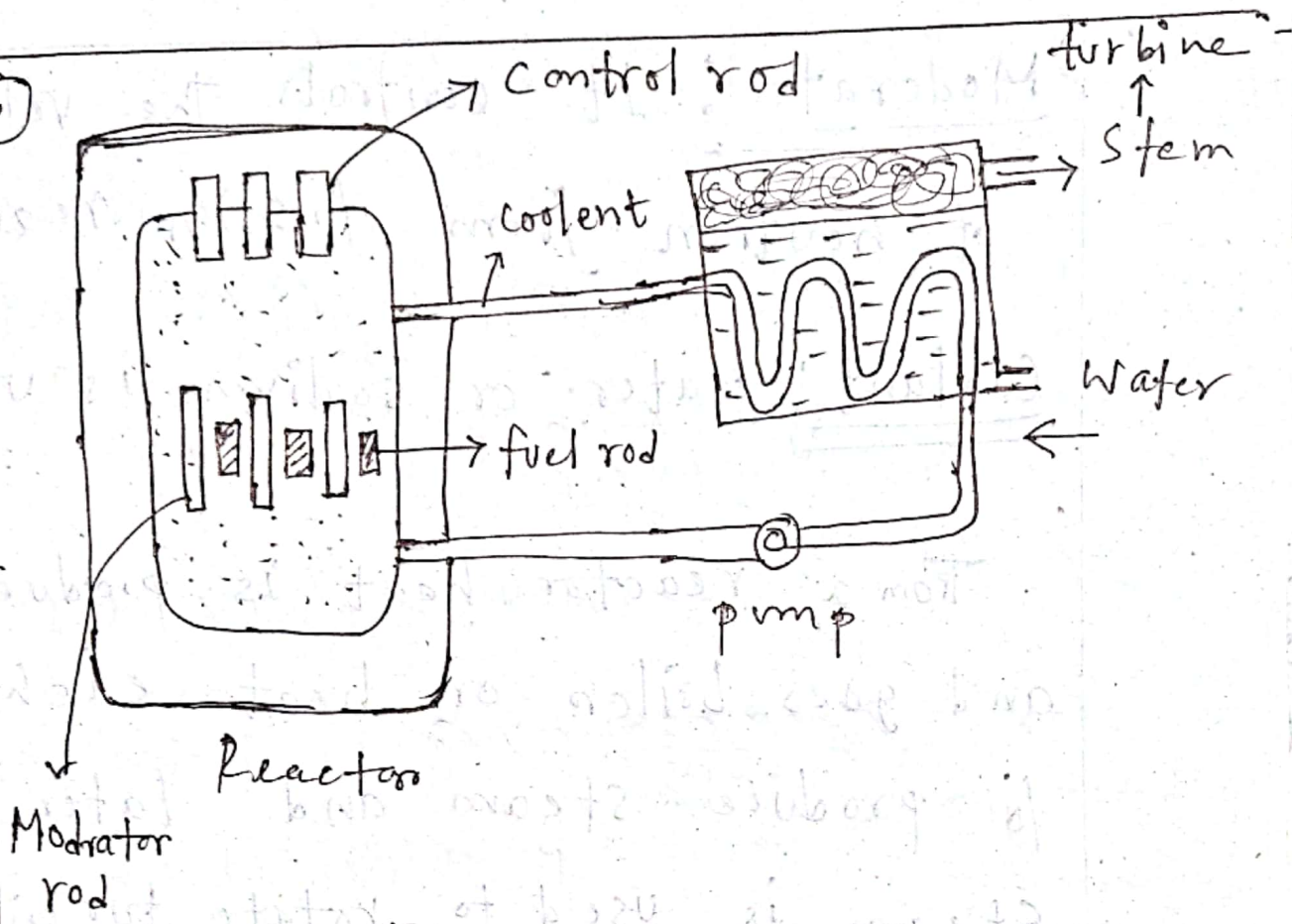$= 580.38$ g

$= 0.58$ kg

(Answer)

⑥

Fig: Nuclear reactor

Above given figure contain few things to operate. They are:

Reactor rod/fuel rod: Main components of nuclear power plant. Usually Uranium or. Thorium is used.

Control rod: absorbs electron when demand is reduced (energy controlling rod). Cadmium is generally used.

Moderator : It controls the velocity of neutron from fission reaction.

Coolant : water or sodium is used.

From a reactor heat is produced and goes boiler or heat enchanger to produce steam and later on steam is used to rotate turbine of generator and electrical energy is produced.

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Answer to the question no - 5

Given,

Plant capacity $= (50 + 6) = 56$ MW

$L.f = 40\% = 0.4$

Capital cost $= 12 \times 10^6$ Tk.

Annual wages, taxes $= $ Tk 40×10^3

Cost of fuel, lubrication $= $ Tk. 1.752×10^6
maintenance

Annual interest and depreciation $= 10\%$ of Capital Cost

$$= 0.1 \times 12 \times 10^6 \text{ Tk}$$

$$= 1.2 \times 10^6 \text{ Tk.}$$

$\therefore$ Plant capacity can be considered as

Maximum demand, Max demand $= 56$ MW,

$$= 56 \times 10^3 \text{ kw}$$

Units generated/annum $= 56 \times 10^3 \times 0.4 \times 8760$

$$= 196.224 \times 10^6 \text{ kwh}$$

$$\text{Total Cost} = (40 \times 10^3 + 1.752 \times 10^6 + 1.2 \times 10^6)$$

$$= 2.99 \times 10^6 \text{ Tk}.$$

$$\approx 3 \times 10^6 \text{ Tk}.$$

For, generating 196.224×10^6 kwh $- 3 \times 10^6$ Tk

$$1 \text{ kwh} = \frac{3 \times 10^6}{196.2 \times 10^6} \text{ Tk}$$

$$= 0.0152 \text{ Tk}$$

$$= 1.52 \text{ paisa}$$

(Ans)

⑯ For calculating cost of electrical energy interest plays important role when applying tariff to the consumers. Because for every powerplant a huge amount money is invested into construction. Without interest powerplant

may face huge loss. Because interest is something which can be charged by the bank for their investments. It depends on the market position and other factors.

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<u>Answer to the qestion no - 1</u>

My powerplant tariff for the customers is :

First 200 Kwh = 6 taka

Second 100 kwh = 8 taka

More than 400 kwh = 16 taka

[It is an block rate tarriff]

Tk 5000 per KW plus maximum demand plus 0.50 taka per Kwh.

According to my tariff,

Consumers total consumption daily,

$$= 210 \times 10^3 \times 1 + 150 \times 10^3 \times 7$$

$$+ 60 \times 10^3 \times 8 + 2 \times 10^3 \times 8$$

$$= 1.756 \times 10^6 \text{ Kwh} = 1756000 \text{ w/h}$$

His annual consumption $= 1.756 \times 10^6 \times 8760$

$$= 1.53 \times 10^{10} \text{ KW/h}$$

Annual bill $= 1.53 \times 10^{10} \times 0.50$

$$= 7.65 \times 10^9 \text{ Th.}$$

∴ Consumer will chose my plan because it has low kwh cost.

Answer to the qustion no – 2.

(a) There is many renewable power plant. I chose wind power plant.

For wind power plant we need a turbine. When wind blows wind turbine rotates and an generator is connected with it. which produce electricity and supplies to the grid or any home system. Few of them contains a battery to store energy for later use.

Although wind power plant is very impractical regarding Bangladesh. Solar is mostly preferable for country like Bangladesh which situated in

tropical climatic zone.

6) Diesel power plant has four System. One of them is Cooling System. It contains oil cooler condenser. Oil cooler cools the oil which later on supplies to the lubricating oil tank. Cooling water pump supplies cool water to cool the hot lubricatant which already used in the diesel engine. Cooling system improves the lubricatant efficiency and as well as the diesel power plant.

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