Jon. 6629-11.

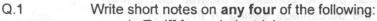
## (REVISED COURSE)

(3 Hours)

[ Total Marks : 100

N.	B.	:	(1)	Question	No.	1	is	com	pulso	ry
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- (2) Answer any four questions from the remaining six questions.
- (3) Assumptions made, if any, should be justified.
- (4) Use illustrative diagrams where possible.
- (5) You may use **steam** table, if **required**.



- a) Tariff for an industrial consumer
- b) Pressurized fluidized bed combustion
- c) Multiplication factor in a nuclear reactor
- d) Uses of diesel power plant
- e) Causes and effects of global warming

Q.2

- Briefly discuss current energy scenario in Maharashtra. Answer should 10 highlight power scenario in Mumbai.
- A reactor is fuelled with 50 tonnes of natural uranium (atomic mass: 238.05) 10 in which the average thermal neutron flux is 2×10<sup>13</sup> n/cm<sup>2</sup>.s. The thermal neutron cross-sections of U-235 (atomic mass: 235.04) are σ<sub>c</sub>: 101 barns, σ<sub>f</sub>:

Calculate (i) the power of the reactor and

(ii) the fraction of U-235 consumed in one year of operation.

Q.3.

A) Describe the various methods of flue gas desulfurization.

579 barns. The natural uranium contains 0.715% of U-235.

10

10

The following are the observations made for a 30 minutes trial of a two stroke diesel engine:

Net brake load: 700 N; Pmep: 3 bar; N: 400 rpm

Total fuel consumption: 2 kg. Cooling water : 200kg | hall SiVE & admoss@

Water inlet temperature: 32°C; Water outlet temperature: 57°C

Air used/ kg of fuel: 30kg; Room temperature: 27°C

Exhaust gas temperature: 310°C

Cylinder dimensions: 210mm × 290mm stroke

Brake diameter: 1m

Calorific value of fuel: 40MJ/kg

Steam formed per kg of fuel in the exhaust: 1.3kg

Sp. heat of steam in the exhaust: 2.093kJ/kgK

Sp. heat of dry exhaust gases: 1.01kJ/kgK

Calculate the indicated power, the brake power and the energy balance of the engine.

20

32.6kJ/kg

Outlet from the condenser: