

# Engineering Science

Energy

Class Test

## Allocation of Marks

National 4 : KU—15  
RNA—16

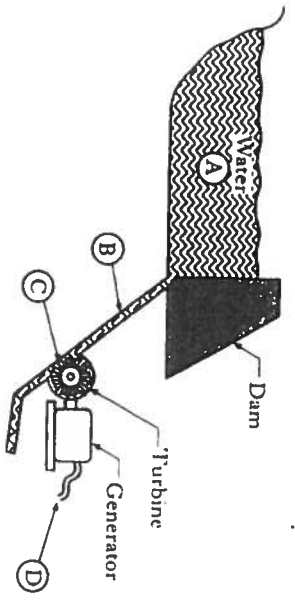
National 5 : KU—17  
RNA—16

Name:-.....

Class Teacher:-.....

Date:-.....

1. A Hydro electric power station is shown below



a) State the type of energy at A, B, C, and D.

A (water stored in the dam).....

B (water flowing down the pipe).....

C (turbine rotating).....

D (cables from generator).....

KU-4

b) Calculate the energy of 80kg of water stored at a height of 370m.

c) (i) State one form of energy loss from the system

RNA-3

(ii) State where this energy loss occurs.

KU-2

2. (continued)

Oil is a non-renewable fuel source.

(d) State two other examples of non-renewable fuel.

KU-2

The engine is cooled by water.

(e) Calculate the heat energy gained by 3kg of water as it passes through the engine if its temperature rises from 20°C to 80°C.

Specific Heat Capacity for water = 4190 J/kg K

RNA-3

The generator provides emergency lighting.

(f) State two ways you can conserve energy in lighting systems.

KU-2

4. 6.5 litres of water is pumped into a swimming pool each hour ( 1 litre of water = 1kg ). The water has to be added at a temperature of 35°C.

(a) If the water's original temperature is 16°C, calculate the heat energy given to the water.

RNA-2

(b) If the input power required by the heater is 220W and it takes 1 hour to heat the water, calculate the efficiency of the heating system.

RNA-4

(c) Electrical energy can be generated in a number of ways, including nuclear and fossil fuel sources.

(i) State one environmental concern with the use of nuclear energy.

(ii) State two disadvantages of using fossil fuels

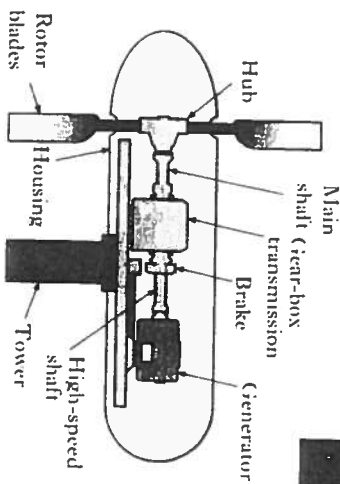
KU-1

(iii) State two examples of renewable energy sources.

KU-2

6. A common method of generating electricity is by using wind turbines.

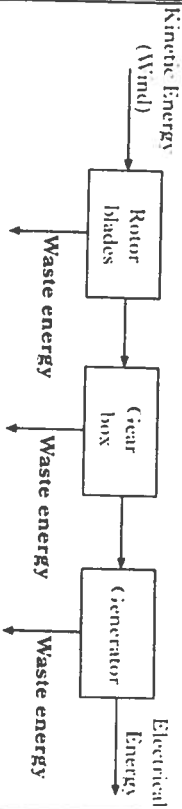
A wind turbine is shown below.



(a) State two methods which could be used to reduce friction in the wind turbine.

KU-2

The wind turbine is simplified in the block diagram below.



The wind turbine produces 6MJ of electrical energy and is 24% efficient.

(b) (i) Calculate the input energy to the system.

RNA-2