Test on

Sustainable Energy Planning and Policy Analysis

Master of Science in Energy for Sustainable Social Development

Department of Architecture and Urban Planning, IOE/TU

Variant A

Marks are allocated in the brackets.

Time : 1 hr Date: 17 Aug 2016

1. An urban household consisting of 5 members on average consumes the following fuel quantities. The capital costs and service life of the cooking stoves are given in the table. (7)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy carriers | Kerosene stoves | LPG stoves | Electric hot plates | Induction heaters |
| Capital costs for 2 stoves and others | 1,000 | 7,200 | 4,000 | 6,000 |
| Service life | 5 | 10 | 10 | 10 |
| Monthly fuel consumption | 17 liters | 10 kg | 100 kWh | 90 kWh |
| Cost/unit Rs | 73 | 1,375 /cyl (14.2 kg) | 9 | 9 |
| Discount rate | 10% | 10% | 10% | 10% |

Calculate the monthly annualized cost of cooking for each kind of cooking stoves and determine which type of cooking on energy carriers and stoves are economically efficient.

1. A solar home system (SHS) for a house has a capacity of 500 Wp. In moderate climate (e.g. Western Europe) it is used for 850 hours per year. Calculate the load factor for this SHS. If at the same LF, the monthly consumption of electricity is around 170 kWh, what size of the SHS should be installed? (3)

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Variant B

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Time : 1 hr Date: 17 Aug 2016

1. An urban household consisting of 5 members on average consumes the following fuel quantities. The capital costs and service life of the cooking stoves are given in the table. (7)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy carriers | Kerosene stoves | LPG stoves | Electric hot plates | Induction heaters |
| Capital costs for 2 stoves and others | 1,000 | 7,200 | 4,000 | 6,000 |
| Service life | 5 | 10 | 10 | 10 |
| Monthly fuel consumption | 17 liters | 10 kg | 100 kWh | 90 kWh |
| Cost/unit Rs | 85 | 1,700 /cyl (14.2 kg) | 11 | 11 |
| Discount rate | 12% | 12% | 12% | 12% |

Calculate the monthly annualized cost of cooking for each kind of cooking stoves and determine which type of cooking on energy carriers and stoves are economically efficient.

1. A solar home system (SHS) for a house has a capacity of 500 Wp. In moderate climate (e.g. Western Europe) it is used for 850 hours per year. Calculate the load factor for this SHS. If at the same LF, the monthly consumption of electricity is around 200 kWh, what size of the SHS should be installed? (3)