

QUESTION ONE (COMPULSORY) (30 Marks)

- a. Define the following terms:s
 - i. Energy planning and policy. (2 Marks)
 - ii. Sustainable energy planning. (1 Mark)
- b. Demonstrate how energy planning denotes a series of procedures by which myriad of interactions are involved in the production and use of all forms of energy. (5 Marks)
- c. Calculate the total amount to be paid to Kenya Power Limited as accrued by domestic - lifeline consumer: End-user tariff for A0 customers is kes. 10/kwh. (10 Marks)

| Consumption type | Previous reading (kwh) | Current reading (kwh) | Consumption | Billing concept | Amount in kshs. |
|------------------|------------------------|-----------------------|-------------|--------------------------------|-----------------|
| Active (A0) | 0.70 | 200.70 | | Consumption | |
| | | | | Fuel cost charge 250 cents/kwh | |
| | | | | FERFA.1.49 cents/kwh | |
| | | | | WARMA 2.22 cents/kwh | |
| | | | | Inflation Adj. 10 cents/kwh | |
| | | | | EPRA levy 3.0 cents/kwh | |
| | | | | REREC levy 5% | |
| | | | | VAT 16.00% | |

- d. Examine three possible uncertainties arising in energy planning and policy formulation in Kenya and their possible solutions. (3 Marks)
- e. Demonstrate how energy policy in Kenya has been formulated over time to date. Clearly specify the relevant Acts (3 Marks)
- f. Demonstrate three fundamental steps in the tariff design by Energy and Petroleum Regulatory Authority (EPRA). (6 Marks)

QUESTION TWO (20 Marks)

- a. Apply the regulatory principles in the theoretical tariff design in Kenya. (10 Marks)

- b. Compare and contrast energy planning for electricity and renewable energy and petroleum in Kenya. (4 Marks)
- c. Apply the three goals of energy planning to national energy plans in Kenya. (6 Marks)

QUESTION THREE (20 Marks)

- a. Calculate the total amount to be paid to Kenya Power as accrued by commercial/industrial consumer: End-user tariff for CI2 (commercial, 11kV) customers: peak kes. 10.90/kwh & off-peak kes. 5.45/kwh. Customer B has peak and off-peak consumption of 50 kwh and 55 kwh, respectively, with demand consumption of 50 KVA (chargeable at kes. 800/KVA). Other billing concepts apply as Question 1C. (10 Marks)
- b. Long range Energy Alternatives Planning (LEAP), is a scenario based energy-environment modelling tool. Demonstrate using examples how LEAP model can be used by Ministry of Energy and Petroleum to develop national strategies and conduct greenhouse mitigation assessments. (10 Marks)

QUESTION FOUR (20 Marks)

- a. Demonstrate how evaluation and assessment of planning methods are applicable to current energy situation in Kenya. (10 Marks)
- b. Using examples, apply the following planning methods to formulating future energy plans in Bondo County:
 - i. Econometrics model method. (5 Marks)
 - ii. Macro-economics. (5 Marks)

QUESTION FIVE (20 Marks)

- a. State three possible sources of uncertainty during future energy planning in Kenya and suggest solutions. (6 Marks)
- b. The development of a comprehensive energy strategy is imperative for Kenya not as an isolated exercise but as integral part of the general economic management. Discuss (4 Marks)
- c. Using examples, demonstrate how KENGEN uses the following planning methods in formulating future energy plans and policy:
 - i. Analogue/Analogy method. (5 Marks)
 - ii. Economic equilibrium. (5 Marks)