

End-Term Examination, December - 2023

Programme : B. Tech. (Mechanical) **Year/Semester** : 4th / 7th
Course Name : Energy Resources, Economics, and Environment **Course Code** : ME1221
Time : 3:00 Hours **Maximum Marks** : 60

Important Notes:

- The candidates, before starting to write the solutions, should check the question paper for any discrepancies and also ensure that they have delivered the question paper with the correct course code.
- All symbols, unless stated, have their usual meaning in the context of the course.
- **Be specific (to the point) in your answers.** Do not elaborate on things unnecessarily.
- If any additional data is required, *assume suitably and state clearly*.
- **All your answers, wherever possible, MUST be supported with references (standard reports, journals, government policy documents, opinions, etc.).** However, you are free to provide the reference details in the answer sheet or email the cited references in a Word/pdf file at maresh.yadav@jkl.edu.in using your official email ID only.
- This is an **OPEN NOTEBOOK, OPEN INTERNET EXAMINATION**. Students are allowed to use any kind of material.

Q. No.	Question	Marks/ COs
Q 1.	Discuss energy transition and future that responds to the followings: a. Ideal energy socio-economy-technical scenario. b. Transitions that should be occurring now to achieve the ideal scenario. c. Would there be undesired effects to achieve the ideal scenario and how could we avoid/suppress them? d. Energy inequality and security in the proposed ideal scenario.	4×3 ME1221.2 ME1221.3 ME1221.4
Q 2.	Consider a (i) non-renewable (say oil), and (ii) renewable (say solar) energy source, and provide your recommendations for fulfilling the energy requirement with proper justifications for the followings: a. Short-term energy demand and supply. b. Long-term energy demand and supply. c. Peak oil situation and Kuznet's curve for materials. d. Trade-offs among energy market, utility, and social choices.	4×3 ME1221.1 ME1221.2 ME1221.3

Q 3.	i. Can externalities for the energy generated from conventional energy sources have positive impact on environment, economics, and society? Yes/No, and why? ii. Is externalities for the energy generated from the renewable energy sources always having positive impact? Yes/No, and why?	6×2 ME1221.2 ME1221.4
Q 4.	Develop an energy financing roadmap (considering reasonable prices, all the risks, and expected returns) for a 200 MW solar energy plant and suggest the break-even time (no profit - no loss situation). Assume that the plant installations have been technically approved from the regulatory body.	12 ME1221.3
Q 5.	What is sustainable development? Is energy transition necessary to achieve the sustainability? Yes/No, and why? How centralized/decentralized energy transmission and distribution is helpful in achieving the energy transition. Discuss in detail.	2+4+6 ME1221.3 ME1221.4