

9. (a) Why do you need simulation and models?
- (b) Calculate the heat content of steam generated from a boiler at 96% dryness fraction [given sensible heat at 170<sup>o</sup>c saturation temperature is 171 kcal/kg and latent heat =489.6kcal/kg].

6 + 6 = 12

**ENERGY TRADING AND PRICING  
(REEN 6142)**

Time Allotted : 3 hrs

Full Marks : 70

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Levelized Cost of Electricity (LCOE) is calculated over the design lifetime of a plant, which are usually \_\_\_\_\_ years.  
 (a) 10 to 20 (b) 10 to 30  
 (c) 20 to 30 (d) 20 to 40.
- (ii) As per Industry experts, Energy Sector accounts for more than \_\_\_\_\_% of total green house gases emission in India.  
 (a) 40 (b) 60  
 (c) 80 (d) 90.
- (iii) In India, Crude oil is traded on the \_\_\_\_\_ and transaction is settled in cash.  
 (a) NSE (b) BSE  
 (c) MCX (d) ICEX.
- (iv) If the sale price of diesel is Rs. 70/litre, the oil bond issued by Govt. is Rs. 5/ litre and the estimated under recovery for the OMC on diesel is Rs. 12/litre, then the 'refinery gate' price of diesel is \_\_\_\_\_.  
 (a) Rs. 77/litre (b) Rs. 63/litre  
 (c) Rs. 53/litre (d) Rs. 87/litre.
- (v) The 'power purchase agreement' (PPA) financing is a \_\_\_\_\_ ownership model, which requires a separate system owner to procure, install and operate the Solar PV cells on a consumer premise.  
 (a) Proprietary (b) Multi-party  
 (c) Third party (d) Singular.

- (vi) The inter-state energy market where buyers and sellers directly transact or transact through an electricity trader is called \_\_\_\_\_.
- (a) Power Exchange Market (b) National Stock Exchange  
(c) Indian Commodity Exchange (d) Over the Counter Market.
- (vii) Depending on application and its corresponding time scale, the solar power forecasting approach primarily used based on on-site measurements is called \_\_\_\_\_ model.
- (a) Application Scale (b) On-site Application  
(c) Time Series (d) Short Term Scale.
- (viii) Govt. of India has undertaken an ambitious plan to convert 60 % of the country's electricity capacity from fossil fuel to renewable energy by \_\_\_\_.
- (a) 2022 (b) 2025  
(c) 2027 (d) 2030.
- (ix) Net metering is a feature of \_\_\_\_\_ model of Renewable Energy support mechanisms in India.
- (a) FIT (b) REC  
(c) RPO (d) CERC.
- (x) International Energy Agency (IEA) has predicted that India would achieve a \_\_\_\_\_ Giga Watt installed capacity of renewable energy by 2022.
- (a) 50 (b) 175  
(c) 180 (d) 200.

**Group - B**

2. Discuss 'The Environment Protection Act, 1986' in view of the empowerment of the Central Government towards the protection and improvement of the environment. **12**
3. The energy sector globally is undergoing significant disruption and India is no different. Discuss the key trends that are re-defining the energy sector landscape in India. **12**

**Group - C**

4. (a) What is 'Levelized Cost of Electricity'? Explain briefly.

- (b) Enumerate 3 major costs considered in evaluating the break-even point over the life time of a Renewable Energy project. **6 + 6 = 12**
5. (a) How does investors' risk perception of the renewable energy and fossil fuel power sectors differ?  
(b) Highlight the 3 main risk factors driving the risk-perception of the investors in India, for both renewable energy and fossil fuels. **6 + 6 = 12**
- Group - D**
6. (a) What is Power Wheeling?  
(b) Explain the principles to be followed while designing Transmission Pricing schemes in India.  
(c) What are the basic cost components to be taken into account for providing power transmission services in India? **2 + 6 + 4 = 12**
7. Explain why it is prudent for Indian Energy Sector to keep energy prices at par with international rates. **12**

**Group - E**

8. Describe the role of 'National Action Plan on Climate Change' (NAPCC) from its inception in 2008 until 2017 towards achieving a sustainable development path that enhanced both India's economy and environment alike. **12**
9. (a) In the context of transforming Indian Power Sector at present, explain the concept of 'Smart Grid' in India.  
(b) Highlight the basic features of Smart Grid towards better understanding of power transmission and distribution network in India. **6 + 6 = 12**