28. a. Explain in detail about energy saving measures for DG sets. 10 2 3 1

(OR)

b. Describe in detail about specific differences between fan, blower and air compressor. 10 2 3 1

29. a. Explain demand side management and the various techniques used benefits of DSM to customers and utilities distribution companies. 10 2 4 2

(OR)

b. Describe in detail about PAT scheme and why it is a market based mechanism. 10 3 4 2

30. a. An energy auditor recommended to replace an old air fan and incompetently designed air delivery duct system causing ₹ 23 lakh a year in electricity cost by changing the system with a modern backward curved fan with adequately designed duct system for total investment costs of ₹ 2.2 lakh. Expected electricity cost reduction is 5%. Considering over 15 years sustained savings, calculate "IRR". 10 3 6 2

(OR)

b. Use cusum technique calculate energy savings for 6 months period of 2003. For calculating total energy savings, average production can be taken as 4000 MT/month. Refer data given in table below. 10 3 5 2

2003 month	Actual-SEC kWh/MT	Predicted –SEC kWh/MT
Jan	242	265
Fed	238	265
Mar	287	265
April	237	265
May	295	265
Jun	246	265

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Reg. No.														

B.Tech. DEGREE EXAMINATION, DECEMBER 2022
Fourth and Fifth Semester

18EEO306T – ENERGY CONVERSATION
(For the candidates admitted from the academic year 2020-2021 and 2021 -2022)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

	Marks	BL	CO	PO
1. India's energy intensity is _____ times of world average. (A) 1.5 (B) 2.5 (C) 3.6 (D) 10	1	1	1	1
2. Which of the following is highest contributor to the air pollution? (A) Carbon monoxide (B) Hydro carbons (C) Sulphur oxide (D) Particulates	1	1	1	1
3. Which country emits maximum CO_2? (A) Australia (B) Ice land (C) Norway (D) USA	1	1	1	1
4. The ozone layer in the stratosphere acts as an efficient filter for _____ (A) Solar UV-B rays (B) X-rays (C) Gamma rays (D) UV-A rays	1	2	1	1
5. An energy policy does not include (A) Target energy consumption reduction (B) Time period for reduction (C) Declaration of top management commitment (D) Future production projection	1	1	1	1
6. If distribution of power is raised from 11 kV to 66 kV, the voltage drop would lower by a factor (A) 6 times (B) $\frac{1}{6}$ times (C) 36 times (D) $\frac{1}{36}$ times	1	2	2	1
7. Presenting the load demand of a consumer against time of the day is known as _____ (A) Time curve (B) Load curve (C) Demand curve (D) Energy curve	1	2	2	1

8. One lux is equal to _____ 1 1 4 7
(A) One lumen per meter (B) One lumen per m^3
(C) One lumen per m^2 (D) One lumen per feet

9. The synchronous speed of a motor with 6 poles and operating at 50 Hz frequency is _____ 1 1 3 1
(A) 1500 (B) 1000
(C) 3000 (D) 750

10. The efficiency figures for energy efficient motors (in comparison with standard efficiency motor) can be generally higher by _____% 1 2 3 8
(A) 1% (B) 3-7%
(C) 10% and above (D) 8 to 10%

11. One ton of refrigeration (TR) is equal to _____ 1 1 4 8
(A) 3.51 kW (B) 2.51 kW
(C) 6.51 kW (D) 1.51 kW

12. COP is absorption refrigeration systems 1 1 4 1
(A) Between 4-5 (B) Less than 1.1
(C) Above 1.1 (D) Always 2.5

13. The parameters used by ASME to defined fans blowers and compressor is _____ 1 1 4 7
(A) Fan ratio (B) Specific ratio
(C) Blade ratio (D) Twist factor

14. Generally water pipe lines are designed with water velocity of 1 2 3 1
(A) <1 m/s (B) Up to 2.0 m/s
(C) >2 m/s (D) 10 m/s

15. Approximate percentage reduction in power consumption with i_c rise in evaporator temperature in refrigerating system is _____ 1 2 4 7
(A) 2% (B) 3%
(C) 1% (D) 4%

16. The support for energy management is expressed in a formal written declaration of commitment. This is called 1 2 4 8
(A) Company policy (B) Management policy
(C) Energy policy (D) Energy efficiency policy

17. The location of energy manager in a large organization could be 1 1 5 1
(A) Marketing division (B) Plant maintenance unit
(C) Corporate management services department (D) Finance division

18. Providing information to BEE is the role of energy manager as per _____ 1 1 4 8
(A) Energy conservation act 2003 (B) Energy conservation act 2004
(C) Energy conservation act 2002 (D) Energy conservation act 2001

19. Environmental protection is called as 1 1 4 8
(A) Company policy (B) Energy policy
(C) Management philosophy (D) Corporate plan

20. To assess the existing situation of a plant, good energy saving strategy plant starts with 1 1 5 7
(A) Energy audit (B) Training
(C) Seminar (D) Infrastructure

21. What is CUSUM? 1 1 5 8
(A) Cumbersome (B) Cumulative sum
(C) Calculated sum (D) Calculated summary report

22. Simple payback period for an energy efficient motor that costs ₹ 1.5 lakh to purchase and install and is expected to save ₹ 0.75 lakh per annum is 1 2 5 7
(A) 1.1 years (B) 2 years
(C) 0.75 years (D) 2.25 years

23. The ratio of annual net cash flow to capital cost is _____ 1 1 6 1
(A) Net present value (B) Internal rate of return
(C) Return on investment (D) Discount factor

24. For all expenditures in the plant, the value of cash flow at the end of the year will be 1 1 6 1
(A) Positive (B) Negative
(C) Nil (D) Either positive or zero

25. The key to the successful involvement of an ESCO in performance contracting is 1 1 6 1
(A) Monitoring only (B) Verification only
(C) Both monitoring and verification (D) Security check

PART – B (5 × 10 = 50 Marks) Marks BL CO PO
Answer **ALL** Questions

26. a. Explain in detail about how energy pricing is done in India. 10 1 1 1

(OR)

b. How do an industry, nation and globe would benefit from energy efficiency programs? 10 1 1 1

27. a. Describe in detail about various factors to be considered while selecting a motor. 10 1 2 1

(OR)

b.i. Briefly discuss the merits of "LED lamps" over filament lamps. 10 2 2 1

ii. List down problems that can arise due to harmonics in a system. 10 2 2 1