Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2022
Sixth and Seventh Semester

18EEO306T – ENERGY CONVERSATION
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

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. Which of the following is commercial energy source? (A) Electricity (B) Coal (C) Oil (D) Diamond	1	1	1	1
2. Indian per capita energy consumption is _____ of world average. (A) 4% (B) 20% (C) 1% (D) 10%	1	1	1	1
3. Energy consumption per unit of GDP is called as (A) Energy ratio (B) Energy intensity (C) Per capita consumption (D) Net capita energy	1	1	1	1
4. Lux meter is used to measure _____ (A) Illumination level (B) Sound intensity (C) Harmonics (D) Speed	1	1	1	1
5. 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	1	1	1
6. Power factor is the ratio of _____ and apparent power. (A) Reactive power (B) Active power (C) Load factor (D) Maximum demand	1	1	2	1
7. Turns ratio is a term generally used in one of the following electrical equipment (A) Transformer (B) Capacitor (C) Battery (D) Resistor	1	1	2	1
8. The synchronous speed of a motor with 6 poles and operating at 50 Hz frequency is _____ (A) 1500 (B) 1000 (C) 750 (D) 3000	1	2	2	1

9. The ratio of luminous flux emitted by a lamp to the power consumed by the lamp is _____ 1 1 2 1

(A) Illuminance (B) Lux
(C) Luminous efficacy (D) CRI

10. Colour rendering index is measured in the scale of 1 1 2 1

(A) 1-100 (B) 500-1000
(C) 1100-1400 (D) 0-0.1

11. One ton of refrigeration (TR) is equal to 1 1 3 1

(A) 6000 kcal/h (B) 3024 kcal/h
(C) 1024 kcal/h (D) 10000 kcal/h

12. The power requirement of DG set is determined by 1 1 3 1

(A) Base load (B) Maximum load
(C) Partial load (D) No load

13. In _____, air enters and leaves the fan with change in direction. 1 1 3 1

(A) Centrifugal flow (B) Axial flow
(C) Power flow (D) Jet flow

14. Cooling tower effectiveness is the ratio of _____ 1 1 3 1

(A) Range /(range+approach) (B) Approach (range + approach)
(C) Range / approach (D) Approach/range

15. Normally the guaranteed best approach a cooling tower can achieve is _____ 1 1 3 1

(A) 5°C (B) 12°C
(C) 8°C (D) 2.8°C

16. The type of energy possed by the charged capacitor is _____ 1 1 4 1

(A) Kinetic energy (B) Electrostatic
(C) Potential (D) Magnetic

17. kVA is also called as 1 1 4 1

(A) Reactive power (B) Active power
(C) Apparent power (D) Captive power

18. The support for energy management is expressed in a formal written declaration of commitment. This is called 1 1 4 1

(A) Company policy (B) Management policy
(C) Energy efficiency policy (D) Energy policy

19. The location energy manager in a large organization could be 1 1 4 1

(A) Marketing division (B) Plant maintenance unit
(C) Corporate management services department (D) Finance division

20. Providing information to BEE is the role of energy manager as per 1 1 4 1

(A) Energy conservation act 2003 (B) Energy conservation act 2004
(C) Energy conservation act 2002 (D) Energy conservation act 2001

21.	Simple payback period for an energy efficient motor that costs ₹ 1.8 lakh to purchase and install and expected to save ₹ 0.75 lakh per annum is (A) 1.1 years (B) 2.4 years (C) 2 years (D) 1.9 years	1	2	5	2
22.	The NPV of equipment is ₹ 10,000 and interest on discount rate is 10%. The future value of the cash flow at the end of 2 years is (A) ₹ 12100 (B) ₹ 8100 (C) ₹ 10000 (D) ₹ 8264	1	2	5	2
23.	The ratio of annual net cash flow to capital cost is (A) Net present value (B) Internal rate of return (C) Return on investment (D) Discount factor	1	1	5	1
24.	CUSUM means (A) Cumbersome (B) Cumulative sum (C) Calculated sum (D) Customer sum	1	1	5	1
25.	What is specific energy consumption? (A) Energy consumption per month (B) Energy consumed per unit of production (C) Energy consumption per year (D) Energy consumption per day	1	1	5	1

PART – B (5 × 10 = 50 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
26. a.	Distinguish in detail about 'Preliminary energy audit' and 'detailed energy audit'.	10	1	1	1
	(OR)				
b.	Write down the various steps involved in the process of 'energy management strategy'.	10	1	1	1
27. a.	During July 2022, a plant has recorded a maximum demand of 7700 kVA and average Power Factor (PF) is observed to be 0.85 lag, the minimum average PF to be maintained is 0.95 lag as per the rules of independent utility supplier and every 1% dip in PF attracts a penalty of ₹ 15000/ in each month.				
	(i) Calculate the improvement in PF for August 2022 by installing 100 kVAR capacitors.	7	2	2	2
	(ii) Calculate penalty paid if any during August 2022.	3	2	2	2
	(OR)				
b.	List out all the general energy saving opportunities in lighting system.	10	1	2	2
28. a.	What are the possible energy efficiency measures that can be done in buildings according to Energy Conversation Building Code (ECBC).	10	1	3	2
	(OR)				

b.i.	Explain about the basic components of a cooling tower.	7	1	3	1
ii.	Estimate cooling tower capacity (TR) with following parameters water flow rate through CT = 120 m^3 / h , Specific heat of water = $1 K.cal / kg°C$, inlet water temperature = 36°C, outlet water temperature = 32°C, ambient WBT = 29°C.	3	2	3	2
29. a.	Discuss in detail about need for an energy policy.	10	2	4	1
	(OR)				
b.	Explain PAT scheme and why it is a market based mechanism.	10	2	4	1
30. a.	Write Ten key steps in "Monitoring and targeting" that you will undertake as an energy manager in your plant.	10	1	5	1
	(OR)				
b.	An energy auditor recommended to replace an old air fan and incompetently designed air delivery duct system causing ₹ 23 lakhs 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 reduction cost is 5%. Considering over 15 years sustained savings calculate 'IRR'.	10	2	5	2

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