



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : EADSM(13A02705)

Course & Branch: B.Tech -EEE

Year & Sem: IV-B.Tech & I-Sem

Regulation: R13

UNIT – I

Introduction to Energy auditing

1. (a) Explain concept of energy audit? types of energy audit 5M
(b) Consider a company using 3 energy forms- oil, gas, and electricity. the annual energy Consumption is tabulated below in various energy units. 5M

<u>Energy type</u>	<u>consumption</u>
Oil	10×10^3 gal
Gas	5×10^3 therms
Electricity	995×10^3 KWh

Compute percentage energy balance.

2. Explain the energy conservation schemes 10M
3. Explain brief about electrical energy consumption and conservation in India and world 10M
4. Explain the representation of energy forms? Explain their Significance in energy audit with suitable example. 10M
5. Write short notes on the following 10M
(a) energy index with example (b) detail energy audit(DEA)
6. Explain about the energy impedance and security act of 2007 and energy policy act of 1992 10M
7. (a) Explain about codes and standards 5M
(b) Write short notes on the following 5M
(a) pie chart (b) sankey diagram
8. Write short notes on the following 10M
(a) cost index with example (b) preliminary energy audit
9. (a). What is meant by the term 'energy audit' and what are its objectives? 5M
(b). Explain about energy conservation schemes
10. (a) Define Energy audit 2M
(b) Explain types of energy audit 2M
(c) Define cost index and energy index 2M
(d) Discuss about pie chart and bar chart 2M
(e) Discuss about energy conservation methods 2M

UNIT – II**Energy Efficient Motors and Power Factor Improvement**

1. a) Explain the factors affecting of energy efficient motors. 5M
 b) A 40 Hp motor is having the following duty cycle. 5M
 40 Hp - 15 minutes 20 Hp - 20 minutes
 10 Hp - 5 minutes stop - 5 minutes.
 Is this motor is efficient for its operation? Discuss the recommendations.
2. a) Explain in detail about the loss distribution and constructional details of a motor. 5M
 b) Explain about RMS hp, voltage unbalance with suitable examples 5M
3. Explain power factor improvement methods 10M
4. What Are Energy Efficient Motors (EEMS).What factor effecting the energy Efficient motors? 10M
5. Define voltage Unbalance. What are the causes and consequences of voltage unbalance 5M
6. (a)Explain the loss distribution in energy efficient motors 5M
 (b) Explain about the over motoring and motor energy audit 5M
7. Discuss how capacitors can be employed for improvement of power factor of an electrical system. 10M
8. Explain about the location of capacitors for power factor improvement. 10M
9. (a) Explain about effect of harmonics on P.f 5M
 (b) A motor is having the following duty cycle. 5M

STEP	H.P	DURATION(Seconds)
1	3	3
2	7.5	10
3	2.5	12
4	12.5	3

which motor is efficient for its operation? Discuss the recommendations.

- 10.(a) Explain the difference between energy efficient motors and standard motors. 2M
 (b) The Line Voltages are $V_{ab}=462V, V_{bc}=463V, V_{ac}=455V$
 Determine the % voltage Unbalance 2M
 (c) Explain about RMS Hp Loading 2M
 (d) Define power factor 2M
 (e) Define harmonics 2M

UNIT – III**Lighting and Energy instruments for Audit**

1. Write a short notes on the following:
 - (a)Lighting energy audit 5M
 - (b)Applications of Plc 5M
2. Write a short notes on the following:
 - (a)Lighting energy audit 5M
 - (b)Tongue tester 5M
3. Write a short notes on the following: 10M
 - (a)Lighting control
 - (b)Data logger
 - (c) Lux meter
4. Explain about Energy Instruments- Watt Meter & Tongue Tester. 10M
5. Explain about Energy Instruments- Watt Meter & Thermocouple. 10M
6. Explain about Energy Instruments- Lux meter & Thermocouple. 10M
7. Explain about Energy Instruments- Pyrometers & Applications of Plc. 10M
8. Explain about Good lighting system design and practice. 10M
9. Explain the working of following instruments 10M
 - (i) Thermocouples
 - (ii) lux meters
 - (iii) pyrometer
 - (iv) data logger
- 10.(a) write Applications of lux meter 2M
 - (b)Discuss about PLC 2M
 - (c)Explain about thermocouple 2M
 - (d) Explain about data logger 2M
 - (e) Explain about Tongue tester

UNIT – IV**INTRODUCTION TO DEMANDSIDE MANAGEMENT**

- | | |
|--|-----|
| 1. (a) What is meant by demand side management and list out its benefits? | 5M |
| (b) Discuss about multi-utility power exchange model in detail. | 5M |
| 2. (a) Define DSM and explain the benefits of DSM | 5M |
| (b) Explain about the concept of ‘time of day pricing’ | 5M |
| 3. Explain in detail about the different techniques of DSM with necessary examples | 10M |
| 4. Explain detail about the following | 10M |
| (a) Load priority technique | |
| (b) strategic conservation | |
| 5. (a) Define load management and explain its importance | 5M |
| (b) Discuss in brief about peak clipping and peak shifting | 5M |
| 6. Explain briefly about Energy efficient equipments | 10M |
| 7. (a)What is load management? Explain its importance | 5M |
| (b)Write short notes on load priority techniques. | 5M |
| 8. (a) Write short notes on strategic conservation | 5M |
| (b) Explain the significance of load management in detail | 5M |
| 9. (a) Explain concept and features of DSM | 5M |
| (b) Write short notes on | 5M |
| (i) valley filling (ii)load shifting (iii)strategic load growth | |
| 10. (a) Define DSM | 2M |
| (b) write benefits of DSM | 2M |
| (c) Define load management | 2M |
| (d) Discuss about valley filling | 2M |
| (e) discuss about peak clipping | 2M |

UNIT – V**ECONOMICS AND COST EFFECTIVENESS TESTS OF DSM PROGRAMS**

- | | |
|---|-----|
| 1.Explain in detail about | 10M |
| (a) The time value of money concept | |
| (b) Taxes and tax credit | |
| 2. Explain in detail about | 10M |
| (a) pay back analysis | |
| (b) Depreciation | |
| 3. (a)Explain the methods available for determining the annual rate | 5M |
| (b)For a system, salvage value =0,life of equipment =5years,first cost=1,50,000.calculate
The depreciation rate using sum of years digits method | 5M |
| 4. Explain in detail about the Time value of money concept payback analysis | 10M |
| 5. Explain the concept of depreciation in energy economic analysis | 10M |
| 6. (a) Discuss about net present value calculations | 5M |
| (b) pay back analysis | 5M |
| 7. Explain about the following depreciation methods with example | 10M |
| (a) straight line method (b) diminishing method | |
| 8. Explain the following cost effectiveness test for following DSM programs | 10M |
| (a) participant cost test (b) Rate payer impact measure test | |
| 9. Explain the following cost effectiveness test for following DSM programs | 10M |
| (a) program Administrator cost test (b) total resource cost test | |
| 10.(a) Define payback method | 2M |
| (b) Discuss about depreciation | 2M |
| (c) Discuss about net present value | 2M |
| (d) Discuss about taxes | 2M |
| (e)write short notes on participant cost test | 2M |

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UNIT – I

Introduction to Energy auditing

1. The main purpose of energy audit is []
 - A) to increase the energy efficiency (B) reduce the energy related cost (C) both (D) None
2. The objective of energy audit is to []
 - A) characterize and quantify energy usage B) implement conservation program
 - C) reduce losses (D) none
3. PEA is done in []
 - A) 10-20DAYS (B) 10-30days C) 2-5days (D) 5-12days
4. ----- offers a means to conserve the energy & quantify its consumption []
 - A) working environment (B) measurement
 - C) energy consumption indices (D) none
5. One joule is ----- []
 - A) 2.7855×10^{-7} kWh (B) 2.7855×10^{-7} wh (C) 2.7855×10^{-5} kWh (D) None
6. The ratio of energy consumption to the product output is ----- []
 - A) cost index (B) energy index (C) both (D) None
7. ----- is used to represent energy consumption in terms of bandwidth []
 - A) sankey diagram (B) load profile (C) bar chart (D) None
8. Frequent implementation of new techniques & new technologies is needed in []
 - A) longterm (B) short term (C) medium (D) None
9. The utility sponsored incentives came into existence as a result of []
 - (A) EP Act 1992 (B) EP Act 2005 (C) EP Act 1998 (D) Energy security act 2007
10. The ASHRAE standard 90.1 is specified for []
 - (A) residential (B) commercial building (C) both A & B (D) none
11. The goal of Kyoto protocol is to []
 - (A) stabilize green house gases (B) increase equipment efficiency
 - (C) increase profits for utilities (D) none
12. The standards and codes have impact on []
 - (A) energy policy (B) energy usage
 - (C) building laws for corporate (D) all the above

13. Which of the following is used to represent energy balance of a system []
 A) Sankey Diagram B) Flow Chart C) Single line Diagram D) Block Diagram
14. Watt hour is the unit of []
 A) Electric power. (B) Electric capacity. (C) Electric energy. (D) Electric charge.
15. Energy is a fundamental part of an _____ In controlling energy costs. []
 A). Energy Maintenance Programme (EMP) B). Energy Monitoring Programme (EMP)
 C). Energy Management Programme (EMP) D). Energy Conservation Programme (ECP)
16. B.E.E works under _____. []
 A). MINISTRY OF POWER, GOVT OF INDIA B). MINISTRY OF POWER, GOVT OF A.P
 C). MINISTRY OF POWER, GOVT OF T.N D). MINISTRY OF POWER, GOVT OF U.P
17. B.E.E logo is []
- A).  B).  C).  D). 
18. count the stars with in the coloured strip is. []
- A). MORE STARS, LESS SAVNGS
 B). MORE STARS, MORE SAVNGS
 C). LESS STARS, MORE SAVNGS
 D). LESS STARS, LESS SAVNGS
19. Schemes for Promoting Energy Efficiency in India during _____. []
 A). 2007-2013 B). 2007-2011 C). 2007-2014 D). 2007-2012
20. The Energy Conservation Act, ___ came into force with effect from _____. []
 A). 2001, 1st March, 2002 B). 2001, 1st March, 2001
 C). 2002, 1st March, 2001 D). 2002, 1st March, 2002
21. Develop and recommend to the Central Government the norms for processes and _____ []
 A). Energy Standards B). Energy consumption Standards
 C). Consumption Standards D). Energy conservation Standards
22. Specify energy consumption standards for notified _____. []
 A). Equipment And Bill B). Bill And Appliance
 C). Equipment And Appliance D). Both A And
23. _____ targets high energy end use equipments and appliances to lay down minimum energy performance standards. []
 A). Standards & Rating Scheme B). Standards & Billing Scheme
 C). Standards & Labeling Scheme D). Both a and b

24. The Ministry of Power and BEE have taken up an innovative scheme to target____. []
 A). Children B). Parents C).Both A And B D).employes
25. The Government has launched a National Campaign on _____. []
 A). Energy Conservation 2001 B). Energy Conservation 2005
 C). Energy Conservation 2002 D). Energy Conservation 2004
26. The objective of energy management includes. []
 A).Minimising Energy Costs B).MinimisingEnvironmental Degradation
 C).MinimisingEnergy wasteD).Minimising Environmental,Energy Costs&waste
27. One unit of electricity is equivalent to ___ kcal heat units. []
 A). 860 B).800 C). 680 D).806
28. The benchmarking parameter for air conditioning equipment is . []
 A). Kcal/M³ Of Chilled Water B). Differential Temperature Across Chiller
 C).Kw/Ton Of Refrigeration D). Kw/ Kg Of Refrigerant Handled
29. Sankey diagram is an useful tool to represent _____. []
 A) Financial Strength Of The Company B) Management Philosophy
 C) Input And Output Energy Flow D) Human Resource Strength Of The Company
30. The duration of preliminary energy audit(PEA) is_____. []
 A)Long Time B) Short Time C)Medium Time D)Normal time
31. The duration of detailed energy audit(DEA) is _____. []
 A).Long Time B).Short Time C).Medium Time D).Normal time
32. Sankey diagram shows in graphics _____. []
 A). energy input B).energy output
 C). energy balance D).energy input,energy input&energy balance
- 33.A _____ is circular chart divided into sectors. []
 A) Pie chart B) Flow Chart C) Bar chart D) none
- 34.BEE Stands for ----- []
 A) BUREAU OF ENERGY EFFICIENCY B) BUREAU OF ELECTRICAL EFFICIENCY
 C) BRITISH ELECTRICAL ENERGY D) none
35. “The judicious and effective use of energy to maximise profits and enhance competitive positions”
 This can be the definition of: []
 A) Energy conservation B) Energy management
 C) Energy policy D) Energy Audit
36. Energy Audit is fundamental part of energy management program(EMP) it will identify the areas
 of wasteful & inefficient use of ----- []
 A) power B) Energy C) reactive power D) none

37. In one company addition insulation permitted to increase temperature with additional cost Rs 25000 Savings per annum are Rs 60000 pay back period is []
A) 8 months B) 10 months C) 5 months D) none
38. One BTU is ----- joules []
A) 1059 joules B) 1050 joules C) 1060 joules D) none
39. ----- is a parameter to monitor and compare energy consumption of specific products manufactured by industry []
A) cost index B) energy index C) power index D) none
40. ----- is a parameter can be used to monitor and assess energy []
A) cost index B) energy index C) power index D) none

UNIT – II**Energy Efficient Motors and Power Factor Improvement**

1. Mounting dimensions are mentioned as []
A) IS1213 B) IS1321 (C) IS1312 (D) IS1231
2. Intrinsic motor losses are reduced by []
A) design improvements B) retrofit C) both A&B (D) none
3. Stray load losses are reduced by []
A) reducing air gap B) laminating the core C) using silicon steel (D) None
4. Cooling fans are used to reduce ----losses in EEM []
A) frictional losses B) stray load losses C) cu losses D) windage losses
5. EEMs are ---% more efficiency than SMs []
A) 9-6% (B) 4-7% (C) 10-16% D) 22%
6. Core losses and stray load losses combined account for ----of total losses []
(A) 42% (B) 56% (C) 48% (D) 54%
7. The recommended value at the voltage unbalance at the motor terminals is []
(A) 10% (B) 1% (C) 20% (D) 2%
8. The process of upgrading the existing equipment is called []
A) replacement (B) recalling (C) retrofit (D) process innovation
9. The Percentage share of different energy consumption in an industry can be best shown by a []
A) Pie Chart B) Bar Chart C) Line Diagram D) None
10. The synchronous speed of a motor with 6 poles and operating at 50 Hz frequency is []
(A) 1000 (B) 750 (C) 1500 (D) 3000
11. The efficiency figures for energy efficient motors (in comparison with standard efficiency motor can be generally higher by____%. []
(A) 1% (B) 8-10% (C) 3-7% (D) Above 10%
12. Unbalanced voltages at motor terminals should not be more than _____ percent to avoid derating of the motor. []
(A) 1% (B) 2% (C) 1.5% (D) 0.5%
13. The power consumption, in case of centrifugal loads (like pump, fan, blower etc.), proportional to []
(A) speed (B) square of speed (C) cube of speed (D) not applicable
14. What determines the thermal loading on the motor? []
(A) Duty/Load cycle (B) Temperature of the winding
(C) Age of the motor (D) Ambient conditions
15. Which of the following is not a Primary Energy Source? []
(A) Oil (B) Natural Gas (C) Electricity (D) Wood
16. The major source of electrical power generation in India is []
(A) thermal (B) Hydel (C) Nuclear (D) Wind

17. Which of the following States in India does not have proven coal reserve? []
(A) Andhra Pradesh (B) Madhya Pradesh (C) Kerala (D) West Bengal
18. When the reactive power compensation exceeds 800kvar the capacitor is installed on []
(A) LV side (B) HV side (C) either HV or LV (D) None
19. Harmonics are caused due to []
(A) Non-linear loads (B) sudden change in load
(C) linear loads (D) none
20. Effect of harmonics depends on []
(A) harmonic source (B) harmonic source location
(C) network characteristics (D) all the above
21. Power factor can be improved by installing a device in parallel with load which draws []
(A) lagging reactive power (B) leading reactive power (C) active power (D) None
22. Synchronous condenser is a []
(A) over excited synchronous motor on no load (B) under excited synchronous motor
(C) over excited synchronous motor on load (D) None
23. The most economical power factor for a consumer is generally []
(A) 0.9 lag (B) 0.95 lag (C) unity (D) 0.8 lag
24. Phase advancers are used to improve power factor for []
(A) synchronous motor (B) transmission line (C) induction motor (D) None
25. Capacitors improve only []
(A) distortion p.f (B) displacement p.f (C) true p.f (D) all the above
26. Reactive Power is required for []
(A) Inductive load (B) Resistive load (C) Capacitive load (D) All of the above
27. The most economical power factor for a consumer is generally []
(A) 0.9 lag (B) 0.95 lag (C) unity (D) 0.8 lag
28. Phase advancers are used to improve power factor for []
(A) synchronous motor (B) transmission line (C) induction motor (D) None
29. Static capacitors are rated in terms of []
(A) KVAR (B) KW
(C) KVA (D) KWH
30. _____ are the most commonly used prime mover for various equipments in industrial applications. []
(A). Induction Motors (B). Synchronous Motors
(C). A.C Motors (D). D.C Motors
31. The two parameters of importance in a motor are _____ and _____. []
(A). Efficiency, Voltage (B). Power Factor, Load
(C). Efficiency, Power Factor (D). Efficiency, Speed
32. The efficiencies of induction motors remain almost constant between ___ loading. []
(A). 50% to 90% (B). 60% to 80% (C). 20% to 70% (D). 50% to 100%

33. _____ connected in parallel with the motor are typically used to improve the power factor. []
A).Regulator B).Inductors C).Resistors D). Capacitors
34. Use of thinner gauge, lower loss core steel reduces eddy current losses. Longer core adds more steel to the design, which reduces losses due to lower operating flux densities. We can reduce _____ []
A).Core Losses B).Cu Losses C).Friction &Windage Losses D).Total loss
35. Use of more copper and larger conductors increases cross sectional area of windings. This lowers resistance (R) of the windings and reduces losses due to current flow (I). We can reduce _____. []
A).Core Losses B).Cu Losses C).Friction &Windage Losses D).Total loss
36. _____penalty or bonus rates, as levied by most utilities, are to contain reactive power drawn from grid. []
A). Power Factor B).Apparent Power C).Real Power D).Reactive Power
37. In all industrial electrical distribution systems, the major loads are []
A). Resistive And Capacitive. B). Capacitive And Inductive.
C). Capacitive. D). Resistive And Inductive.
38. The solution to improve the power factor is to _____ power factor correction capacitors to the plant power distribution system. []
A).Subtract B).Multiply C). Add D). Divide
39. The advantages of PF improvement by capacitor addition Reactive component of the network is_____and Voltage level at the load end is _____. []
A)Reduced, Reduced B) Reduced, Increased
C) Increased, Increased D) Increased, Reduced
40. Cost benefits of PF improvement_____ KVA (Maximum demand) charges in utility bill and _____ distribution losses (KWH) within the plant network. []
A)Reduced, Reduced B) Reduced ,Increased
C) Increased, Increased D) Increased, Reduced

UNIT – III**Lighting and Energy instruments for Audit**

1. The standard colour temperature for calibration of lux meter []
(A) 2856 kelivins B) 2856°C C) 2000°C D) None
2. Which meters are used in field of cinematography in order to determine optimum light level []
A) clamp meter B) lux meter C) watt meter (D) None
3. power consumption by the industries lighting varies from []
(A) 1 to 5% of total power consumption (B) 2 to 10% of total power consumption
(C) 2 to 5% of total power consumption (D) none
4. EMF produced thermocouple is []
(A) inversely proportional to temperature (B) directly proportional to temperature
(C) directly proportional to power (D) none
5. ----- is an electronic device that records data over time []
(A) data logger (B) thermocouple
(C) PLC (D) all the above
6. _____ is an essential service in all the industries. []
A) Lighting B) Motoring C) Auditing D) Monitoring.
7. _____ is a device that distributes, filters or transforms the light emitted from one or more lamps. []
A) Lumen B) Luminaire C) Lux D). Circuit Watt
8. _____ is a unit of light flow or luminous flux. []
A). Lumen B) Luminaire C) Lux D). Circuit Watt
4. _____ is the metric unit of measure for illuminance of a surface. []
A) Lumen B) Luminaire C) Lux D) Circuit Watt
5. _____ is the total power drawn by lamps and ballasts in a lighting circuit under assessment []
A) Lumen B) Luminaire C) Lux D) Circuit Watt
6. _____ is a measure of the effect of light on the perceived color of objects. []
A) Rendering Index (RI) B. Light Rendering Index (LRI)
C) Meter Rendering Index (CRI) D) Color Rendering Index (CRI)
7. _____ are used for starting high intensity Metal Halide and Sodium vapour lamps. []
A) Igniters B) Switch C) Starter D) Generator

8. Retrofit by replacing incandescent lamps with ____ lamps, which use one-tenth the electricity of incandescent lamps and have a lifespan of more than 100,000 hours. []
 A) CFL B) LED C) FL D) INCANDESCENT
9. Calculate the Room Index: $RI = \frac{L \times W}{Hm(L+W)}$. []
 A) $\frac{L \times H}{Hm(L+W)}$ B) $\frac{M \times W}{Hm(L+W)}$ C) $\frac{L \times W}{Hm(L+W)}$ D) $\frac{H \times W}{Hm(L+W)}$
10. Installation _____ electronic ballasts in place of conventional ballasts. []
 A). Low frequency (LF) B). Frequency C). High frequency (HF) D). No Frequency
11. Which of the following will need the highest level of illumination ? []
 (A) Proof reading (B) Bed rooms (C) Hospital wards (D) Railway platforms
12. Which of the following will need lowest level of illumination ? []
 (A) Displays (B) Fine engraving (C) Railway platform (D) Auditoriums.
13. One lumen per square meter is the same as []
 (A) One lux (B) One candela (C) One foot candle (D) One lumen meter
14. Light waves travel with a velocity of []
 (A) 3×10^{10} cm/s (B) 3×10^{12} cm/s (C) 3×10^{15} cm/s (D) 3×10^{18} cm/s.
15. Radiant efficiency of the luminous source depends on []
 (A) shape of the source (B) temperature of the source
 (C) wavelength of light rays (D) all of the above.
16. The unit of luminous flux is []
 (A) steradian (B) candela (C) lumen (D) lux.
17. What device is similar to an RTD but has a negative temperature coefficient? []
 A) Strain gauge. B) Thermistor.
 C) Negative-type RTD D) Thermocouple
18. The output voltage of a typical thermocouple is []
 A) Less than 100 mV B) Greater than 1 V
 C) Thermocouples vary resistance, not voltage. D) None of the above
19. The connections to a thermocouple []
 A) Can produce an unwanted thermocouple effect, which must be compensated for
 B) Produce an extra desirable thermocouple effect
 C) Must be protected, since high voltages are present
 D) Produce an extra desirable thermocouple effect and must be protected, since high voltages are present
20. What is the zero-voltage switch used for? []
 A) To reduce radiation of high frequencies during turn-on of a high current to a load
 B) To control low-voltage circuits
 C) To provide power to a circuit when power is lost
 D) For extremely low-voltage applications

21. Temperature sensing can be achieved by the use of []
 A) Thermocouples B) RTDs C) thermistors D) All of the above
22. The purpose of compensation for a thermocouple is []
 A) to decrease temperature sensitivity B) to increase voltage output
 C) to cancel unwanted voltage output of a thermocouple D) used for high-temperature circuits
23. The change in value of an analog signal during the conversion process produces what is called the []
 A) quantization error B) resolution error C) nyquist error D) sampling error
24. The resistance in the circuit of the moving coil of a dynamometer wattmeter should be []
 A) almost zero B) low C) high D) none of the above
25. A dynamometer wattmeter can be used for []
 A) both D.C. and A.C. B) D.C. only C) A.C. only D) any of the above
26. An induction wattmeter can be used for []
 A) both D.C. and A.C. B) D.C. only
 C) A.C. only D) any of the above
27. The pressure coil of a wattmeter should be connected on the supply side of the current coil When []
 A) load impedance is high B) load impedance is low
 C) supply voltage is low D) none of the above
28. In a low power factor wattmeter the pressure coil is connected []
 A) to the supply side of the current coil B) to the load side of the current coil
 C) in any of the two meters at connection D) none of the above
29. In a low power factor wattmeter the compensating coil is connected []
 A) in series with current coil B) in parallel with current coil
 C) in series with pressure coil D) in parallel with pressure coil
30. In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was []
 A) unity B) 0.8 lagging C) 0.8 leading D) zero
31. In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be []
 A) unity B) 0.5 C) 0.3 D) zero
32. PLCs are _____ designed for use in the control of a wide variety of manufacturing machines and systems. []
 A) special-purpose industrial computers B) personal computers
 C) electromechanical systems D) All of the above
33. The PLC was invented by _____. []
 A) Bill Gates B) Dick Morley C) Bill Landis D) Tod Cunningham

34. The _____ is moved toward the relay electromagnet when the relay is on. []
A) Armature B) Coil C) NO contact D) NC contact
35. When a relay is NOT energized: []
A) There is an electrical path through the NO contacts
B) There is an electrical path through the NC contacts
C) Neither the NO or the NC contacts have an electrical path
D) Both the NO and the NC contacts have an electrical path
36. The first company to build PLCs was _____. []
A) General Motors B) Allen Bradley C) Square D D) Modicon
37. Current flows into the _____. []
A) Input terminal of a sinking DC input module
B) Input terminal of a sinking output field device
C) Output terminal of a sinking input field device
D) All of the above
38. In a current sinking DC input module _____. []
A) The current flows out of the input field device
B) Requires that a AC sources be used with mechanical switches
C) The current flows out of the input module
D) Currents can flow in either direction at the input module
39. AC output field devices can interface to _____. []
A) AC output modules B) Relay output modules
C) Both a and b D) Neither a or b
40. Which of the following RLL applications is not normally performed in early automation systems? []
A) On/off control of field devices
B) Logical control of discrete devices
C) On/off control of motor starters
D) Proportional control of field devices

UNIT – IV**INTRODUCTION TO DEMANDSIDE MANAGEMENT**

1. _____ promises immense opportunity in reducing the overall power consumption, improving efficiencies of ground water extraction and reducing the subsidy burden of the states without sacrificing the service obligation to this sector. []

A) AG DSM B) MU DSM C) SG DSM D) IG DSM
2. The need to implement ___ in the Country, especially in Agriculture Sector, Municipal Sector and Small & Medium Enterprises was also emphasized upon. []

A) GSM B)DSM C) ASM D) MSM
3. ___ awareness in consumers, needs to be inculcated at child hood level. []

A) GSM B) ASM C) DSM D) MSM
4. Usually industrial customers are billed according to _____ rates. []

A) Year-Of-Use B) Month-Of-Use C) Day-Of-Use D) Time-Of-Use
5. _____ also assumes significance given that the Municipalities consume 10% of energy overall and the cost input of energy is as high as 60% of the costs incurred by the municipalities[]

A) AG DSM B)MU DSM C.SG DSM D) IG DSM
6. Energy costs constitute up to _____ percent of an Indian municipality's total cost of pumping water to its residents. []

A) 50-70 B)40-70 C) 60-70 D) 20-70
7. The electricity bills of the municipalities accounts for a significant part of its expenditure, given that an estimated 10%of electricity is consumed for urban water pumping. []

A) 10% B)20% C)30% D) 40%
8. ___ is a concept in which a power utility, such as an vertically integrated SEB or an unbundled distribution utility, manages the demand for power among some or all its customers to meet its current or future needs. []

A) GSM B)DSM C) ASM D) MSM
9. _____ are an effective part of Demand Side Management. []

A) Generation Response Programs B)Energy Response Programs
C) Demand Response Programs D) Load Response Programs
10. In India, _____ can be achieved through energy efficiency, which is the reduction of kilowatt hours (kWh) of energy consumption or demand load management, which is the reduction of kilowatts (kW) of power demand or the displacement of demand to off-peak times. []

- A) GSM B).ASM C)DSM D)MSM
11. Operationalising EC Act by Strengthening Institutional Capacity of_____. []
 A) State Designated Agencies (SDAS). B) National Designated Agencies (NDAS).
 C)India Designated Agencies(IDAS). D) System Designated Agencies (SDAS).
12. The government of India launched Energy Conservation Building Code (ECBC) on ____to set minimum energy standards for commercial buildings. []
 A)27th May, 2001 B) 27th May, 2007 C)27th May, 2002 D) 27th May, 2005
13. There is a huge scope of _____ in the existing buildings. []
 A) energy wasting B)energy consuming C)energy savings D) all
14. _____ are statutory bodies set up by states to implement energy conservation measures at state level. []
 A) State Designated Agencies (SDAS). B) National Designated Agencies (NDAS).
 C) India Designated Agencies(IDAS). D) System Designated Agencies (SDAS).
15. In terms of electricity saved, given that most of the pilot projects as well as other studies project potential savings of 45-50% by mere replacement of _____,the overall electricity savings (from 20 million pumps) is estimated at 62.1 billion units annually. []
 A) Sufficient Pumps B) Efficient Motors C) Efficient Pumps D) Inefficient Pumps
16. Promotion of _____ particularly for existing buildings. []
 A) Energy system Companies (ESCOs) B) Energy Service Companies (ESCOs)
 C) Efficient Service Companies (ESCOs) D) Energy Saving Companies (ESCOs)
17. Peak clipping is_____ . []
 A) Use Time Of Day Tariffs B) Use Interruptible Rates
 C) Direct Load Control & Load Shedding D) All
18. Time of day rates,off-peak rates, seasonal rates, thermal storage, etc.,comes under___ []
 A) Peak Clipping B)Valley Filling C)Load Shifting D) Strategic Conservation
19. Encourage energy audits and offer low interest loans comes under_____. []
 A) Peak Clipping B) Valley Filling C) Strategic Conservation D) Load Shifting
20. _____ effects significant saving for transmission and distribution. []
 A) DSM B) GSM C) ASM D) ISM
- 21.From the combination below, which is not a key element of a successful energy management program? []
 A) Technical Ability B) Monitoring System & A Strategy Plan
 C) Security Of Plant D) Top Management Support

22. In force field analysis of energy action-planning, one of the actions below do not fall under positive force? []
A) High Price Of Energy B) Energy Efficient Technology Available
C) Top Management Commitment D) Lack Of Awareness
23. To assess the existing situation of a plant, good energy saving strategy plan starts with_____. []
A) Energy Audit B) Training C) Seminar D) Planning
24. The results of the energy audit would depend on. []
A). Experience Of The Auditor B). Availability And Completeness Of Data.
C). Only A D).Both A And B
25. Publishing a formal statement of energy policy that can be used to define company activities in energy matters is the role of _____. []
A) Top Management B) Middle Management
C) Energy Auditor D) Energy Manager
26. The energy manager has to perform the function of _____. []
1) Organizer 2)Planner 3)Decision Maker 4)Team leader
A) 1,2& 3 B) 1 & 2 Only
C) 1,2& 4 D) All The Four Above
27. “Publicizing the energy conservation program” includes the following []
A) Signs And Posters Displayed In The Factory Or Office
B) Progress Charts Showing Targets And Achievements
C) Energy Conservation Stickers On Light Switches And Thermostats
D) All The Above
28. “A public expression of organisation's commitment to energy conservation and environmental protection” is called as . []
A) Company Policy B) Energy Policy
C) Management Philosophy D) Corporate Plan
29. Under Energy Conservation of Act 2001, data on energy consumed & action on recommendations of accredited energy auditor should be reported to. []
A) Bee And State Level Agency Once A Year B) Bee And State Level Agency Twice Year
C) Bee Only D) State Level Designated Agency Only
30. Which one of them is a positive force towards achieving goal of reduced energy consumption? []
A) Insufficient Financial Resources To fund B) Competing Corporate Priorities
C) Tax On Energy Consumption D) Absence Of Corporate Energy Policy
31. When an energy efficient programe is carried out as a part of a strategy to manage electricity is called []

- A) need based energy management B) demand side management
C) environmental management D) none
32. Valley filling can be accomplished by []
A) directed load control B) by adding new thermal energy storage
C) by increasing appliance efficiency D) by use of fossil fuels
33. Strategic load growth can be defined as []
A) change in load shape that refers to a general increase in sales
B) shifting load from on peak to off peak periods
C) change in load shape resulting from utility simulated programs D) none
34. Which of the following falls under DSM []
A) generator maintenance B) installation of transmission line
C) power flow D) scheduling of load
35. Maximum demand controller is used to _____ []
A) switch off essential loads in a logical sequence
B) exceed the demand of the plant
C) switch off non-essential loads in a logical sequence
D) controls the power factor of the plant
36. During resistance welding heat produced at the joint is proportional to []
A) I^2R B) KVA C) Current D) Voltage
37. Current rating is not necessary in case of []
A) circuit breaker B) load peak switches C) both A and B D) isolator
38. Graphite is used in nuclear power plant as a []
A) fuel B) coolant C) moderator D) electrode
39. Spinning reserve is required for []
A) Economic operation of power systems B) Reliable operation of power systems
C) discontinue operation of power systems D) none
40. Improving p.f []
A) Reduce the current for a given power B) increases losses in line
C) increases cost of the station equipment D) none

UNIT – V**ECONOMICS AND COST EFFECTIVENESS TESTS OF DSM PROGRAMS**

1. In which depreciation method is not applicable for salvage value is zero []
A) sinking fund method B) declining balance method C) straight line method (D) None
2. The value of an asset at the end of its life period is known as []
A) scrap value B) depreciate value C) both A&B (D) none
3. Which of the following is not a source power []
(A) solar cell (B) thermocouple C) fuel cell D) photo-voltaic cell
4. Load factor of a power station is defined as []
A) maximum demand/average load
B) average load x maximum demand
C) average load/maximum demand
D) (average load x maximum demand)¹⁷²
5. Load factor of a power station is generally []
A) equal to unity
B) less than unity
C) more than unity
D) equal to zero Diversity factor is always
6. The load factor of domestic load is usually []
A) 10 to 15% B) 30 to 40% C) 50 to 60% D) 60 to 70%
7. Annual depreciation cost is calculated by []
A) sinking fund method B) straight line method
C) both (a) and (b) D) none of the above
8. Depreciation charges are high in case of []
A) thermal plant B) diesel plant C) hydroelectric plant D) None
9. Demand factor is defined as []
A) average load/maximum load B) maximum demand/connected load
C) connected load/maximum demand D) average load x maximum load
10. High load factor indicates []
A) cost of generation per unit power is increased
B) total plant capacity is utilised for most of the time
C) total plant capacity is not properly utilised for most of the time
D) none of the above
11. Annual depreciation as per straight line method, is calculated by []
A) the capital cost divided by number of year of life
B) the capital cost minus the salvage value, is divided by the number of years of life
C) increasing a uniform sum of money per annum at stipulated rate of interest
D) none of the above

12. A consumer has to pay lesser fixed charges in []
A) flat rate tariff B) two part tariff
C) maximum demand tariff D) any of the above
13. A power transformer is usually rated in []
A) kW B) Kvar C) kWh D) Kva
14. Public sector undertaking is associated with erection and sometimes running of thermal power plants []
A) NTPC B) SAIL C) BEL D) BHEL
15. In India production and distribution of electrical energy is confined to []
A) private sector B) public sector
C) government sectors D) none of the above
16. The primary reason for low power factor in supply system is due to installation of []
A) induction motors B) synchronous motors
C) single phase motors D) d.c. motors
17. The effect of electric shock on human body depends on which of the following []
A) current B) voltage
C) duration of contact D) all of the above
18. If an induction machine is run at above synchronous speed, it acts as []
A) a synchronous motor B) an induction generator
C) an inductor motor D) none of the above
19. Relays can be designed to respond to changes in []
A) resistance, reactance or impedance B) voltage and current
C) light intensity D) temperature
20. Which of the following statements is incorrect ? []
A) Lightning arrestors are used before the switchgear
B) Shunt reactors are used as compensation reactors
C) The peak short current is $(1.8 \times V^2)$ times the A.C. component
D) The MVA at fault is equal to base MVA divided by per unit equivalent fault reactance
21. Net initial investment is divided by uniform increasing in future cash flows to calculate []
A) discounting period B) investment period
C) payback period D) earning period
22. Method which calculates time to recoup initial investment of project in form of expected cash flows is classified as []
A) net value cash flow method B) payback method
C) single cash flow method D) lean cash flows methods
23. Annual operating cost of a generating plant consists of []
A) Fixed charges B) Semi-fixed charges
C) operating or running charges D) All the above

24. For a power plant the expenditure on which of the following items is expected to be almost Negligible []
A) Fixed charges B) Taxes C) Insurance D) Maintenance
25. In a steam power station which of the following is not a fixed cost []
A) Interest on capital cost of land and buildings B) Salaries of high officials
C) fuel and lubricating oil cost D) Insurance charges
26. In which of the following power plants the depreciation charges are high []
A) Steam power plant B) Hydro power plant
C) Nuclear power plant D) diesel power plant
27. Salvage Value of a plant []
A) is always positive B) is always zero
C) is always negative D) None
28. Annual installment towards depreciation increases with the decrease in interest rate in case []
A) straight line depreciation B) sinking fund depreciation
C) Reducing balance depreciation D) All the above
29. Annual depreciation of the plant is proportion to the earning capacity of the plant in case []
A) straight line depreciation B) sinking fund depreciation
C) Reducing balance depreciation D) All the above
30. Annual estimated depreciation charges for a plant are heavy during early years in case []
A) Diminishing value method B) sinking fund depreciation
C) straight line depreciation D) None
31. Company can raise funds through []
A) Fixed deposits B) shares
C) Bonds D) Any of the above
32. Annual operating expenditure of a power plant consists of []
A) fixed charges B) semi-fixed charges
C) running charges D) all of the above
33. In _____ fuel transportation cost is least. []
A) nuclear power plants B) diesel generating plants
C) steam power stations D) None
34. is the reserved generating capacity available for service under emergency conditions which is not kept in operation but in working order, []
A) Hot reserve B) Cold reserve C) Spinning reserve D) Firm power
35. _____ industry has the least power consumption per tonne of product. []
A) Soap B) Sugar C) Vegetable oil D) Caustic soda
36. With reference to a power station which of the following is not a fixed cost ? []
A) Fuel cost B) Interest on capital
C) Insurance charges D) Depreciation
37. _____ is invariably used as base load plant. []
A) Diesel engine plant B) Nuclear power plant
C) Gas turbine plant D) Pumped storage plant

38. In case of _____ fuel transportation is the major problem. []
A) diesel power plants B) nuclear power plants
C) hydro-electric power plants D) thermal power plants
39. Which of the following power plants need the least period for installation ? []
A) Thermal power plant B) Diesel power plant
C) Nuclear power plant D) Hydro-electric power plant
40. In which of the following power plants the maintenance cost is usually high ? []
A) Nuclear power plant B) Hydro-electric power plants
C) Thermal power plants D) Diesel engine power plants

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