


SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

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QUESTION BANK (DESCRIPTIVE)
Subject with Code : EDS(13A02701)
Course & Branch: B.Tech - EEE
Year & Sem: IV-B.Tech & I-Sem
Regulation: R13
UNIT – I
LOAD MODELING AND CHARACTERISTICS

1. Discuss the relationship between load factor and loss factor for different load cases? 10M
2. The annual peak load input to a primary feeder is 2000kW. The total copper loss at the time of peak load is 100kW. The total annual energy supplied to the sending end of the feeder is 6.7×10^6 kWh. Then:
 - i. Determine the annual loss factor
 - ii. Calculate the total annual copper loss energy and its value at Rs. 2.5/kWh. 10M
3. (a). A 50 MW hydro generator delivers 320 million KWH during the year. Calculate the plant load factor? 5M
- (b). Explain the load characteristics of distribution system? 5M
4. Discuss different types of loads present in distribution system and explain their characteristics? 10M
5. Write short notes on load modeling and its characteristics? 10M
6. (a) A 120 MW substation delivers 120 MW for 4 Hrs, 60 MW for 10 Hrs and shut down for rest of each day. It is also shut down for the maintenance for 30 days each year. Calculate its annual load factor? 5M
- (b) A generation station has a connected load of 43 MW and a maximum demand 20MW, the units generated being 61.5×10^6 kw per annum. Calculate (i) demand factor and (ii) load factor? 5M
7. (a) A feeder supplies 2 MW to an area the total losses at peak load are 100KW and units supplied to that area during a year are 5.61 million units calculate loss factor? 5M
- (b) Discuss about Diversity factor and Coincedence factor? 5M
8. Discuss the characteristics of the following categories of loads 10M
 - (i) Residential
 - (ii) Agriculture
 - (iii) Commercial
 - (iv) Industrial
9. A generating station has a maximum demand of 25MW a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72% find
 - (i) reserve capacity of the load
 - (ii) the daily energy produced and
 - (iii) maximum energy that could be produced daily if the plant while running as per schedule were fully loaded? 10M
10.
 - a) Define Load factor . 2M
 - b) What is plant capacity factor. 2M
 - c) Define Average load and Connected load. 2M
 - d) Define (i) loss factor (ii) Utilization factor 2M
 - e) Define Demand factor . 2M

UNIT –II**CLASSIFICATION OF DISTRIBUTION SYSTEMS**

1. (a) Briefly discuss different types of distribution systems? 5M
(b) Compare AC and DC distribution systems? 5M
2. (a) Compare overhead and underground distribution systems? 5M
(b) Explain requirements and design features of distribution systems? 5M
3. Explain Radial and Ring main and interconnected systems? 10M
4. A 2 wires dc distributor cable AB is 2km long and supplies loads of 100A,150A,200A and 50A situated 500m,1000m,1600m and 2000m from the feeding point A. Each conductor has a resistance of 0.01ohm per 1000m.calculate potential difference at each load point if a potential difference of 300V is maintained at point A. 10M
5. A 2 wire dc ring distributor is 300m long and is fed at 240V at point A. At point B 150m from A, a load of 120A is taken and at C, 100m in the opposite direction, a load of 80A is taken. If the resistance per 100m of single conductor is 0.03Ω. Find
(i) Current in each section of distributor (ii).Voltage at points B and C 10M
6. A two-wire d.c distributor AB, 600 meters long is loaded as under:
Distance from A(meters): 150 300 350 450
Loads in Amperes : 100 200 250 300
The feeding point A is maintained at 440V and that of B at 430V. If each conductor has a resistance of 0.01Ω per 100 meter, calculate
(i) The current supplied from A to B (ii). The power dissipated in the distributor. 10M
7. (a) Compare the radial and loop type primary feeders? 5M
(b) Explain the basic design practice of secondary distribution system? 5M
8. Derive the equations for voltage drop and power loss in a radial feeder with uniformly distributed load fed at one end? 10M
9. A single phase ac distributor AB 300m long is fed from end A and is loaded as under (i) 100A at 0.707 p.f lagging 200m from point A (ii) 200A at 0.8 p.f lagging 300m from point A. The load resistance of distributor is 0.2Ω and 0.1Ω/km. Calculate the total voltage drop in the distributor. The load p.f Refer to the voltage at the far end? 10M
10. a) Define the term Feeder. 2M
b) What is a service main in distributed systems 2M
c) Define the term Distributor. 2M
d) Draw the neat sketch of ring main distributed system? 2M
e) What are the advantages of ring main distributed system? 2M

UNIT –III
SUBSTATIONS

1. (a) Explain the various factors to be considered to decide the ideal location of substation? 5M
(b) Explain how to decide the rating of a distribution a substation? 5M
2. Explain different busbar arrangements with neat sketch? 10M
3. Show that if the voltage drops are limited, six feeders can carry only 1.25 times as much load as the four feeders? 10M
4. Explain the classification of Substations? 10M
5. Draw the Substation layout by showing the location of all substation equipments? 10M
6. Derive the relationship for power loss and voltage drop for substation service area with 'n' primary feeders? 10M
7. Explain (a) Air insulated substation (b) Indoor and outdoor substation 10M
8. Explain the single bus bar arrangement in substation? 10M
9. Explain how do you analyze a substation service area with 'n' primary feeders? 10M
10. a) Define the term Bus-bar. 2M
b) Explain switching substation 2M
c) Define the term circuit breaker. 2M
d) Draw the neat sketch of single busbar arrangement? 2M
e) Define Substation 2M

UNIT –IV
POWER FACTOR IMPROVEMENT

1. (a) Write the causes for low power factor in power system? 5M
(b) Explain (i). Phase advancers (ii). Static capacitors 5M
2. A 3-phase transformer rated 7000kva and has a over load capability of 125% of the rating. If the connected load is 1150 KVA with a 0.8 p.f (lag), determine the following
(a). The KVAR rating of shunt capacitor bank required to decrease the KVA load of the transformer to its capability level.
(b). The p.f of the corrective level. (c) The KVAR rating of the shunt capacitor bank required to correct the load p.f to unity. 10M
3. Show that $VD_{1-\phi} / VD_{3-\phi} = 2\sqrt{3}$ and $P_{LS1-\phi} / P_{LS3-\phi} = 2.0$ in single phase two wire ungrounded neutral? 10M
4. Show that $VD_{1-\phi} / VD_{3-\phi} = 6$ and $P_{LS1-\phi} / P_{LS3-\phi} = 6.0$ in single phase two wire uni grounded lateral with full capacity neutral? 10M
5. Explain Most economical power factor for constant KW load & constant KVA type loads? 10M
6. (a) Write notes on how an over excited synchronous machine improves power factor? 5M
(b) A 3-phase, 5 kW inductions motor has a power factor of 0.85 lagging. A bank of capacitor is connected in delta across the supply terminal and power factor raised to 0.95 lagging. Determine the kVAR rating of the capacitor in each phase? 5M
7. (a) Explain the effect of shunt compensation on distribution system? 5M
(b) How do you justify economically the connection of capacitors for the improvement of p.f. 5M

8. A 3- ϕ : 500 H.P,50 Hz 11 KV star connected induction motor has a full load efficiency of 85% at a lagging p.f of 0.75 and connected to a feeder. If it is desired to correct it to a p.f of 0.9 lagging load. Determine the following (i) The size of the capacitor bank in KVAR
(ii) The capacitance of each unit if the capacitors are connected in star as well as delta. 10M
9. A 3-phase transformer rated 6000 KVA and has a over load capability of 125 of the rating. If the connected load is 12100 KVA with a 0.8 pf(lag), determine the following:
(i) The KVAR rating of shunt capacitor bank required to decrease the KVA load of the transformer to its capability level
(ii) The p.f. of the corrected level
(iii) The KVAR rating of the shunt capacitor bank required to correct the load p.f to unity 10M
10. a) Define Power factor. 2M
b) Discuss the importance of power factor correction 2M
c) What are the disadvantages of low power factor 2M
d) What are the advantages of Series compensation? 2M
e) What are the advantages of Shunt compensation? 2M

UNIT –V
DISTRIBUTION AUTOMATION

1. Explain the various factors affecting the distribution system planning? 10M
2. Draw a block diagram and explain for a typical distribution system planning process? 10M
3. Explain the techniques used for distribution system planning? 10M
4. Draw and explain the flow chart for the distribution system planning process? 10M
5. Explain about Supervisory Control and Data Acquisition? 10M
6. Discuss briefly about Consumer Information Service? 10M
7. What is geographical information system and explain in brief? 10M
8. Write a short notes on Automatic Meter reading in distribution automation? 10M
9. Explain the various sensors used in distribution automation? 10M
10. a) Define SCADA 2M
b) Define Distribution Optimization 2M
c) Define Distribution Planning 2M
d) Define Distribution Automation 2M
e) Define geographical information system 2M

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23. In a power plant if the maximum demand on the plant is equal to the plant capacity, then []
A) plant reserve capacity will be zero B) diversity factor will be unity
C) load factor will be unity D) load factor will be nearly 60%
24. Generators for peak load plants are usually designed for maximum efficiency at []
A) 25 to 50 percent full load B) 50 to 75 percent full load
C) full load D) 25 percent overload
25. The knowledge of diversity factor helps in determining []
A) plant capacity B) average load
C) peak load D) kWh generated
26. An industrial consumer has a daily load pattern of 2000 KW, 0.8 lag for 12 Hrs and 1000 kW UPF for 12 Hrs. The load factor is = _____. * []
A) 0.5 B) 0.75
C) 0.6 D) 2.0
27. What is the maximum value of a load which consumes 500 kWh per day at a load factor of 0.40, if the consumer increases the load factor to 0.50 without increasing the maximum demand []
A) 52.08 kW B) 50.8 kW
C) 4.5 kW D) 60 kW
28. A consumer consumes 600 kWh per day at a load factor of 0.40. If the consumer increases the load factor to 0.70 without increasing the maximum demand, what is the consumption of energy in kWh []
A) 950 kWh B) 1000 kWh
C) 1050 kWh D) 1100 kWh
29. The yearly load duration curve of a power plant is a straight line. The maximum load is 750 MW and the minimum load is 600 MW. The capacity of the plant is 900 MW. What is the capacity factor and utilization factor? []
A) 0.56, 0.80 B) 0.83, 0.75
C) 0.78, 0.9 D) 0.75, 0.83
30. What is the utilization factor of a power station which supplies the following loads?
Load A: Motor load of 200 kW between 10 AM to 7 PM
Load B: Lighting load of 100 kW between 7 PM to 11 PM
Load C: Pumping load of 110 kW between 3 PM to 10 AM []
A) 1.60 B) 1.00
C) 1.32 D) 2.56
31. A power station supplies the peak load of 60 MW, 40 MW and 70 MW to three localities. The annual load factor is 0.50 p.u. and the diversity factor of the load at the station is 1.55. The maximum demand on the station and average load respectively will be []
A) 120 MW, 60.8 B) 90 MW, 50.6
C) 103.2 MW, 51.61 D) 100 MW, 0.51
32. A generating station has a maximum demand of 50 MW, a load factor of 60%, a plant capacity factor of 45% and if the plant while running as per schedule, were fully loaded. The daily energy produced will be []
A) 400 MW B) 720 MW
C) 500 MW D) 600 MW

- C) Primary distribution
D) Secondary distribution
29. If in a 3-wire d.c.system, the current in the neutral wire is zero, then voltage between any outer and neutral is----- []
A) same
B) half
C) double
D) zero
30. In order to maintain voltages on the two sides of the neutral equal to each other,-----set is used. []
A) Balancer set
B) tieset
C) cut set
D) equalizer set
31. The under ground system is ----- safe than overhead system. []
A) less
B) more
C) same
D) insufficient data
32. By which of the following systems electric power may be transmitted ? []
A) Overhead system
B) Underground system
C) Both (a) and (b)
D) None of the above
33. _____ are the conductors, which connect the consumer's terminals to the distribution []
A) Distributors
B) Service mains
C) Feeders
D) None of the above
34. The underground system cannot be operated above []
A) 440 V
B) 11 kV
C) 33 kV
D) 66 kV
35. Overhead system can be designed for operation upto []
A) 11 kV
B) 33 kV
C) 66 kV
D) 400 kV
36. If variable part of annual cost on account of interest and depreciation on the capital outlay is equal to the annual cost of electrical energy wasted in the conductors, the total annual cost will be minimum and the corresponding size of conductor will be most economical. This statement is known as []
A) Kelvin's law
B) Ohm's law
C) Kirchhoffs law
D) Faraday's law
37. The wooden poles well impregnated with creosote oil or any preservative compound have life []
A) from 2 to 5 years
B) 10 to 15 years
C) 25 to 30 years
D) 60 to 70 years
38. Which of the following materials is not used for transmission and distribution of electrical power ? []
A) Copper
B) Aluminium
C) Steel
D) Tungsten
39. Galvanised steel wire is generally used as []
A) stay wire
B) earth wire
C) structural components
D) all of the above
40. The usual spans with R.C.C. poles are []
A) 40—50 metres
B) 60—100 metres
C) 80—100 metres
D) 300—500 metres

26. An isolator is installed []
A) to operate the relay of circuit breaker B) as a substitute for circuit breaker
C) always independent of the position of circuit breaker
D) generally on both sides of a circuit breaker
27. A fuse in a motor circuit provides protection against []
A) overload B) short-circuit and overload
C) open circuit, short-circuit and overload D) none of the above
28. Protection by fuses is generally not used beyond []
A) 20 A B) 50 A
C) 100 A D) 200 A
29. A fuse is never inserted in []
A) neutral wire B) negative of D.C. circuit
C) positive of D.C. circuit D) phase line
30. Oil switches are employed for []
A) low currents circuits B) low voltages circuits
C) high voltages and large currents circuits D) all circuits
31. switchgear is device used for []
A) interrupting an electrical circuit B) switching an electrical circuit
C) switching and controlling an electrical circuit
D) switching, controlling and protecting the electrical circuit and equipment
32. The fuse wire, in D.C. circuits, is inserted in []
A) negative circuit only B) positive circuit only
C) both (a) and (b) D) either (a) or (b)
33. By which of the following methods major portion of the heat generated in a H.R.C. fuse is dissipated ? []
A) Radiation B) Convection
C) Conduction D) All of the above
34. A short-circuit is identified by []
A) no current flow B) heavy current flow
C) voltage drop D) voltage rise
35. The information to the circuit breaker under fault conditions is provided by []
A) relay B) rewirable fuse
C) H.R.C. only D) all of the above
36. To limit short-circuit current in a power system are used. []
A) earth wires B) isolators
C) H.R.C. fuses D) reactors
37. The The current , the Is the time taken by the fuse to blow out []
A) low, least B) greater, smaller
C) Smaller. Greater D) greater, greater
38. The auto recloser must sensefault current at the end of the section controlled by the sectionalizer. []
A) minimum B) maximum
C) Medium D) all of the above

39. The advantage of the fuse is []
 A) Break low short circuit without noise or smoke
 B) Break heavy short circuit without noise or smoke
 C) Break heavy short circuit with noise or smoke
 D) none of the above
40. advantage of fuse is thetime of operation can be made much shorter than that of the circuit breaker. []
 A) maximum
 B) medium
 C) Minimum
 D) none of the above

UNIT -IV

POWER FACTOR IMPROVEMENT

1. The voltage of the alternator can be kept constant by changing the field current of the alternator in accordance with the load. This is known asmethod. []
 A) excitation control
 B) By using tap changing transformers
 C) Induction regulators
 D) none of the above
2. In excitation control, types of automatic voltage regulators are []
 A) Tirril Regulator
 B) Brown Boveri Regulator
 C) Induction regulators
 D) both (a) and (b).
3. Power factor can be improved by installing such a device in parallel with load which takes..... []
 A) lagging reactive power
 B) leading reactive power
 C) Both (a) and (b)
 D) none of the above
4. The excitation control method is suitable only forlines. []
 A) short
 B) long
 C) Medium
 D) none of above
5. In a Tirril regulator, a is cut in and out of the exciter field circuit of the alternator. []
 A) capacitance regulating
 B) Inductance regulating
 C) Regulating resistance
 D) none of the above
6. Induction regulators are used for voltage control insystem. []
 A) generating station
 B) primary distribution
 C) Secondary distribution
 D) none of the above
7. The secondary of the booster transformer is connected in with the line whose voltage is to be controlled. []
 A) series
 B) shunt
 C) Series and shunt
 D) none of the above
8. The statutory limit of voltage variation is of the declared voltage at consumer's terminals. []
 (a). $\pm 6\%$ (b). $\pm 1\%$ (c). $\pm 12\%$ (d). $\pm 14\%$

21. The power factor improved by using []
A) capacitors B) reactors
C) Resistors D) none of the above
22. An over-excited synchronous motor running on no-load is known as ... []
A) alternator B) induction motor
C) synchronous condenser D) none of the above
23. The value to which the power factor should be improved so as to have maximum net annual saving is known as []
A) most economical power factor B) consumer factor
C) Load factor D) none of the above
24. The power factor of an ac circuit is given by Power divided bypower []
A) reactive , apparent B) active , apparent
C) active , real D) none of the above
25. Power factor can be improved by installing such a device in parallel with load which takes..... []
A) lagging reactive power B) leading reactive power
C) Both (a) and (b) D) none of the above
26. The major reason for low lagging power factor of supply system is due to the use ofmotors []
A) Induction B) alternators
C) synchronous motors D) none of the above
27. The maximum value of power factor can be []
A) 0.5 B) 0.9
C) 0.7 D) 1
28. The most economical powerfactor for a consumer is generally..... []
A) 0.9 B) 0.95
C) 1 D) 0.7
29. disadvantages of low power factor maintained on distribution is []
A) larger copper losses B) poor voltage regulation
C) Reduced handling capacity of system D) all of the above
30. Advantages of Economic justification of capacitors are []
A) Reduction in the requirement of the feeder capacity
B) Improve the voltage profile at loads
C) Reduction in kVA demand for consumers.
D) all of the above.
31. Low power factor is usually not due to []
A) arc lamps B) induction motors
C) fluorescent tubes D) incandescent lamp
32. An induction motor has relatively high power factor at []
A) rated r.p.m. B) no load
C) 20 percent load D) near full load
33. By the use of which of the following power factor can be improved []
A) Phase advancers B) Synchronous compensators
C) Static capacitors D) Any of the above

7. The use automation and microprocessor based devices helps in []
A) Improved System Stability B) Quality of Supply
C) Customer Satisfaction D) All of the above
8. Which of the following is the utilization voltage? []
A) 11KV B) 440KV
C) 440V D) 230V
9. Which of the following does the term “Feeder Automation” include? []
A) Feeder Remote Point Voltage control B) Substation reactive power control
C) Automatic reclosing D) All of the above
10. Which of the following helps minimize overloads? []
A) Power Factor control B) Reactive power control
C) Reconfiguration D) Automatic reclosing
11. The major cost involved in feeder automation is? []
A) The distributed automation functions B) The field devices
C) Communications systems D) Both B and C
12. In a process the analog values in an RTU, which of the following can be used? []
A) Latch B) Buffer
C) A/D Converter D) D/A converter
13. Radio communication is similar to which of the following systems? []
A) Public telephone systems B) PLCC systems
C) Satellite Communication D) None of the above
14. Which of the following communication technologies can be used for two-way communication between the utilities? []
A) UHF MARS B) VHF Radio
C) Cellular Radio D) UHF point to point radio
15. The major advantage of Fibre Optics Communications is? []
A) It is not affected by electrical interference B) High rate of data transmission
C) Immunity from noise D) All of the above
16. Which of the following VSAT networks used in Indian Satellite communication? []
A) Mesh Technology B) Star Technology
C) Both A & B D) None of the above
17. DATA acquisition from substation requires []
A) host equipment B) communication network and infrastructure
C) field devices D) all the above
18. TMS in substation automation is []
A) trouble management system B) transformer management and supervision
C) total management system D) all the above
19. Feeders of long distance are protected using []
A) over current protection B) Distance protection and over current protection
C) Only distance protection D) Reverse power and distance protection

20. Spark gap is used for []
A) Over voltage protection B) under voltage protection
C) Over current protection D) All the above
21. Surge diverter consists of []
A) spark plugs B) non-linear resistors
C) Thermal protection device D) non-linear resistors with spark plugs
22. SCADA is an acronym that stands for Supervisory Control and Data Acquisition []
A) True B) False
C) Not related D) insufficient data
23. SCADA refers to a system that collects data from various sensors at a factory, plant or in other remote locations and then sends this data to a central computer which then manages and controls the data. []
A) True B) False
C) Not related D) insufficient data
24. A SCADA system will include []
A) signal hardware (input and output)controllers B) networks
C) communications equipment and software D) All of the above
25. A SCADA system will only monitor and never make changes to the operations. []
A) True B) False
C) Not related D) insufficient data
26. When planning a SCADA system you should: []
A) Have an understanding of the process B) Design a database
B) Design a secure system D) All of the above
27. Before planning an alarm system within the SCADA one should consider. []
A) What conditions triggers the alarm? B) How operators will be notified of those alarms?
C) What actions will occur in response to those alarms? D) None of the above
28. Every SCADA system is unique to its environment, so there is no need to be consistent with colors, symbols and terminology. []
A) True B) False
C) Not related D) insufficient data
29. A SCADA system is open to many inputs and output, for that reason a SCADA system can not be configured for secure access. []
A) True B) False
C) Not related D) insufficient data
30. A Dynamic Data Exchange (DDE) Server is a program that has access to data and can provide that data to other programs. []
A) True B) False
C) Not related D) insufficient data
31. Which among the components connects two physical equipments of the distribution system []
A) RTU B) Central room computer
C) Communication Infrastructure D) None of the above
32. The function of data acquisition begins at []
A) Communication Infrastructure B) Central room computer
C) RTU D) None of the above

33. In a SCADA system the operator interaction is driven by []
A) Communication Infrastructure B) PLC
C) Alarm D) RTU
34. In a SCADA system the host computer performs []
A) Data acquisition functions B) Computational tasks
C) Communication D) All of the above
35. Information display is achieved in the form of []
A) Limited graphics B) CRT color pages
C) Both A & B D) None of the above
36. During supervisory control which of the following methods is employed for verification []
A) Set point control B) Report by exception
C) Check before operate D) Sequence of events acquisition
37. Alarm processing refers to which of the following []
A) Acquiring data from the field RTU's B) Set point control of the RTU's
C) Alerting the operator to unscheduled events D) Retrieving real time data
38. Accurate record keeping is essential for []
A) Legal requirements B) Accounting purposes
C) Forecasting purposes D) All of the above
39. The typical time resolution of events captured during a SOE operation would be []
A) 5ms B) 10ms
C) 2ms D) 3ms
40. Which of the following protocols offers a byte stream service []
A) UDP B) TCP
C) RPC D) SNMP

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