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10EE81

Eighth Semester B.E. Degree Examination, June/July 2019
Electrical Design, Estimation and Costing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

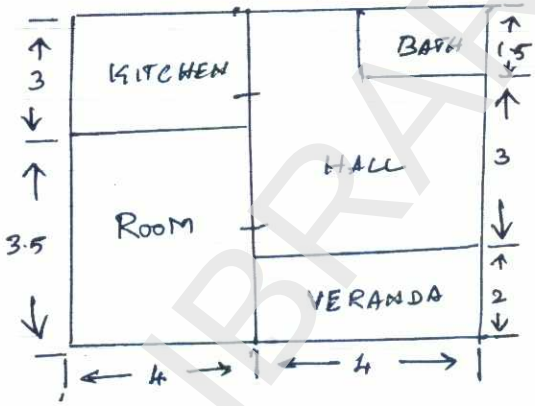
1 a. Write the necessity of estimation and costing. **(06 Marks)**

b. Explain the following terms :
(i) Contingencies (ii) Over head charges (iii) Profit. **(06 Marks)**

c. Briefly explain the modes of tendering. **(08 Marks)**

2 a. What are the general rules to be followed for domestic wiring? **(06 Marks)**

b. The Fig Q2(b) show the plan of a low income group government quarter. Draw the single line diagram for lighting and heating circuits on the sketch. Calculate total load, length of conduit, length and size of the wire by taking safety factor equal to two. **(14 Marks)**



Note : All dimensions are in meters

Fig Q2(b)

3 a. Write short note on Earthing of an Electrical installation and selection of earth electrode and Earth conductors. **(06 Marks)**

b. The ground floor plan and the first floor plan of a newly constructed double storeyed school building are shown separately Fig Q3(b)-(i) and Q3(b)-(ii). Draw a schematic diagram showing the distribution of power to the various prints from the 3 phase 4 wire.
(i) No of sub-circuits (ii) Deciding the cable sine (iii) Deciding the switch boards and distribution boards (iv) Busbar and busbar chamber

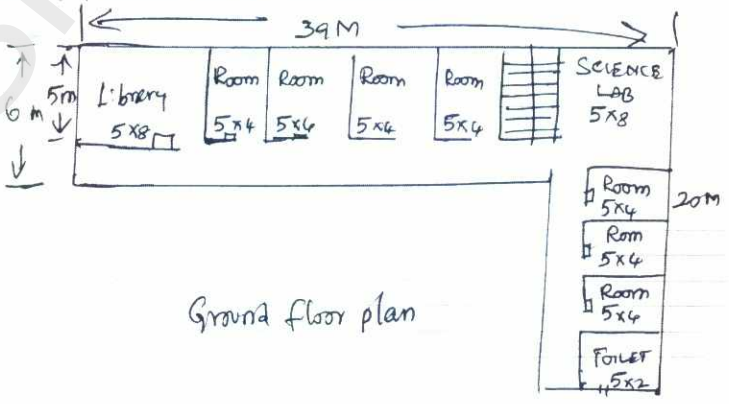
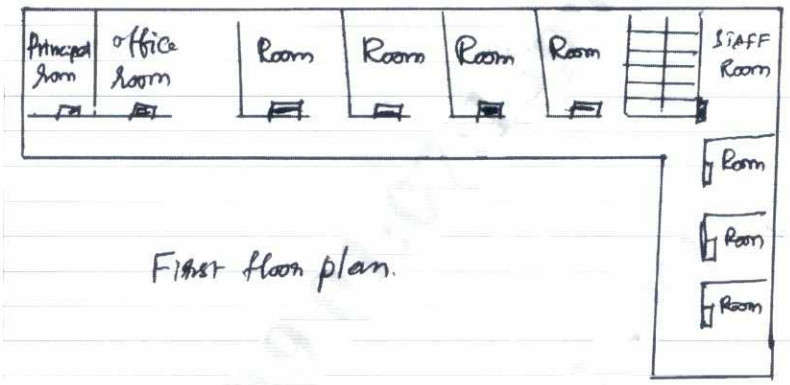


Fig Q3(b)-(i)



Q3(b)-(ii) **(14 Marks)**

4 a. List the merits and demerits of over head service main. **(06 Marks)**

b. Explain points to be checked while carrying out inspection of wiring installation. **(06 Marks)**

c. Find the material required for 1ϕ over head service line of a house located 10 mtrs away from pole with following loads
Lighting – 300 watts, Heating – 2500 watts, Assume S.F = 2. **(08 Marks)**

PART – B

5 a. Explain the determination of input power, sine of conduit, distribution board main switch and starter. **(08 Marks)**

b. A 10HP, 415V, 3ϕ, 50Hz squirrel cage motor is to be installed in a flour mill, the plan of which in shown in Fig Q5(b), show the wiring diagram of the layout and estimate the quantity of materials required and its cost.

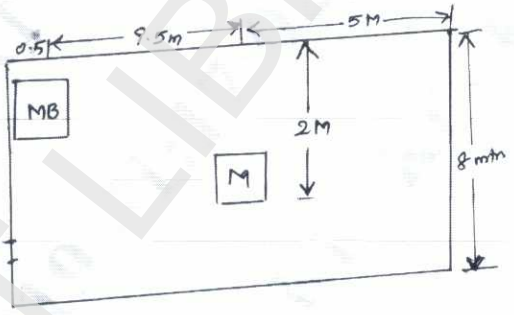


Fig Q5(b) **(12 Marks)**

6 a. What are the main requirements of the line supports, Describe factors governing height of pole? **(08 Marks)**

b. A pole for an over head 11kV, 3ϕ, 50Hz line is required to be earthed and stay is to be provided make a neat sketch how it should be done. Prepare list of materials required. **(12 Marks)**

7 a. Write short notes on Guys and stays. **(08 Marks)**

b. 1km long over head distribution line of 415V, 3ϕ, 50Hz is to be erected along a straight route from 100kVA. 11kV/433V pole mounting substation. The line is to be laid with 6/1×3.00mm ACSR conductor on RCC pole of 9 mtrs length. Estimate material required for line. The span between adjacent pole is 50mtrs draw a sketch of route. **(12 Marks)**

8 a. Explain the classification of substation. **(08 Marks)**

b. Estimate the quantity of material required for the augmentation of 33kV grid substation of 500kVA to 1000kVA, 33/11kV grid substation. **(12 Marks)**

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10EE82

Eighth Semester B.E. Degree Examination, June/July 2019
Power System Operation and Control

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Derive expression for frequency deviation and change in tie-line power flow in a two area inter connected power system. **(08 Marks)**

b. Explain the objectives and function of AGC in a power system. **(05 Marks)**

c. Two synchronous generators are initially supplying a common load at 1PU frequency (50 Hz). The rating of unit 1 is 337 MW and has 0.03 P.U droop built into its governor. Unit 2 is rated at 420 MW and has 0.05PU droop. Find each unit share of a 0.1 PU increase in the total demand. Also find the new line frequency. **(07 Marks)**

2 a. Describe the function of AVR with a neat block diagram. **(06 Marks)**

b. Write notes on basic generator control loops and cross coupling between control loops. **(08 Marks)**

c. Determine the primary ALFC loop parameters for control area having the following data:
Total rates area capacity, $P_r = 2000$ MW
Inertia constant 5.05, Frequency $f_0 = 60$ Hz
Normal operating load $P_D = 1000$ MW. **(06 Marks)**

3 a. Obtain the complete block diagram representation of Load Frequency Control (LFC) of an isolated power system, with necessary equations (transfer functions). **(10 Marks)**

b. Obtain an expression for steady state change in system frequency Δf_{ss} for step change in the load demand, assume free governor operations. **(10 Marks)**

4 a. Define: i) Voltage stability ii) Voltage collapse iii) Sub synchronous resonance **(06 Marks)**

b. Explain briefly the components/equipments of power system that can generate and/or absorb reactive power. **(08 Marks)**

c. Derive the equations to get the relation between voltage, power and reactive power at a node. **(06 Marks)**

PART – B

5 a. With the help of a flow chart, explain the dynamic programming method in unit commitment solution. **(10 Marks)**

b. Explain priority list method for unit commitment problem with an example. **(10 Marks)**

6 a. Explain the factors affecting power system security. **(08 Marks)**

b. With the block diagram, explain AC power flow security analysis. **(06 Marks)**

c. With the help of flow chart, explain the contingency selection procedure. **(06 Marks)**

7 a. Explain Energy Management System. **(08 Marks)**

b. Explain the least square estimation method used in power system state estimation. **(12 Marks)**

8 a. With the help of flow chart, explain loss and load probability for planning of generating capacity. **(10 Marks)**

b. Obtain the expression for steady-state reliability and general reliability function. **(10 Marks)**

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10EE836

Eighth Semester B.E. Degree Examination, June/July 2019
Renewable Energy Sources

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain briefly the energy sources available. **(06 Marks)**
b. List the differences between Renewable and Non renewable energy sources. **(08 Marks)**
c. What are the advantages and limitations of Renewable energy sources? **(06 Marks)**

2 a. With a neat diagram, explain the principle of Pyranometer used to measure either global or diffuse radiation. **(10 Marks)**
b. Define the following ters and related to solar radiation geometry :
i) Declination. **(04 Marks)**
ii) Local solar time. **(04 Marks)**
iii) Hour angle. **(02 Marks)**

3 a. With a neat diagram, explain the principle of solar water heater. **(08 Marks)**
b. With neat diagrams, explain i) Solar cookers ii) Solar furnace. **(12 Marks)**

4 a. With a neat diagram, explain the power generation system using solar pond. **(08 Marks)**
b. List the advantages and disadvantages of Photovoltaic Solar energy conversion. **(08 Marks)**
c. List the application of Solar energy. **(04 Marks)**

PART – B

5 a. With a neat block diagram, explain the basic components of wind energy conversion system. **(08 Marks)**
b. Derive an expression for Power in the wind. **(06 Marks)**
c. List the advantages and disadvantages of Wind energy conversion system. **(06 Marks)**

6 a. List and explain the factors affecting biodigestion. **(10 Marks)**
b. With a neat diagram, explain KVIC biogas plant. **(10 Marks)**

7 a. With a neat diagram, explain the principle of ocean thermal energy conversion system. **(08 Marks)**
b. With a neat diagram, explain the principle of tidal power generation. **(08 Marks)**
c. List the advantages of tidal power generation. **(04 Marks)**

8 Write short notes on :
a. Fuel cells. **(05 Marks)**
b. Wave energy. **(05 Marks)**
c. Hydrogen energy. **(05 Marks)**
d. Small Hydro resources. **(05 Marks)**

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10EE842

Eighth Semester B.E. Degree Examination, June/July 2019
Energy Auditing and Demand Side Management

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Explain following sources of energy with example :
i) Primary and Secondary source ii) Commercial and non – commercial source
iii) Renewable and non – renewable source. **(06 Marks)**

b. Explain Indian Energy Scenario with relevant facts. **(06 Marks)**

c. List the salient features of :
i) Electricity Act 2003 ii) Energy conservation Act 2001. **(08 Marks)**

2 a. Develop cash flow model to predict future value of uniform series compound amount model. **(06 Marks)**

b. Energy efficiency of an equipment can be improved by 20% through enhanced maintenance leading to a fuel saving of Rs 250000/- per annum for 10 years. What is the maximum allowable investment on the project? Take interest rate as 12%. **(06 Marks)**

c. What is meant by depreciation? Explain the following methods of calculating depreciation reserve : i) Straight line method ii) Sum – of – year digits method iii) Diminishing balance method. **(08 Marks)**

3 a. Explain the ten – step approach for energy auditing. **(10 Marks)**

b. Discuss the various measurement and instruments used in energy auditing. **(10 Marks)**

4 a. Represent various power components in a power triangle. Give expressions for various power components for 1 – phase and 3 – phase systems. **(06 Marks)**

b. Discuss briefly about presentation of energy audit report. **(08 Marks)**

c. Define Simple payback period. Mention the advantages and disadvantages of simple pay back period. **(06 Marks)**

PART - B

5 a. Derive an expression for most economical power factor keeping kw – load of consumer constant. **(08 Marks)**

b. What is the capacity of condenser required to improve power factor of a load of 400 kw at 0.8 pf lag to most economical values. The annual minimum cost is given as x = 3y. Where
X = annual cost per KVA of Maximum demand.
Y = annual cost per KVAr of pf improvement device. **(06 Marks)**

c. List energy efficient lighting options and lamp controls. **(06 Marks)**

6 a. Mention the requirement and objective of good tariff. **(08 Marks)**

b. An industrial consumer has 1 – phase , 230 V supply. The monthly consumption is 2020 units. The maximum demand indicator shows 40A, 0.9 pf for two hours daily which is charged at Rs 3.5 per unit. The remaining units are charged at Rs 1.8 per unit. Determine the monthly bill and average tariff per unit. **(06 Marks)**

c. Write a brief note on ABT. **(06 Marks)**

7 a. Mention benefits of Demand side management implementation from i) Society point of view ii) Consumer point of view iii) Supply industry point of view. **(08 Marks)**

b. Explain various steps in DSM planning and implementation with relevant flow diagram. **(08 Marks)**

c. Explain use of time – of - day tariff for DSM implementation. **(04 Marks)**

8 a. Explain i) Peak clipping ii) Valley filling iii) Strategic conservation iv) Load shedding. **(08 Marks)**

b. With a neat diagram, explain plant level organisation to implement DSM. **(08 Marks)**

c. Mention factors that influence customer participation in DSM. **(04 Marks)**

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10EE847

Eighth Semester B.E. Degree Examination, June/July 2019
Electrical Power Quality

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO full questions from each part.***

PART – A

1 a. Explain power quality evaluation procedure with a neat block diagram. **(04 Marks)**

b. Explain impulsive and oscillatory transients. **(06 Marks)**

c. Explain the various types of waveform distortion. **(10 Marks)**

2 a. Define minimum voltage sag ride through capability. Explain area of vulnerability with a neat diagram. **(04 Marks)**

b. Explain the following equipments used as solutions at the end-user level for voltage sag:
i) Ferroresonant transformer
ii) Online UPS
iii) Off-line UPS **(10 Marks)**

c. Explain the categorization of equipments sensitive to voltage sag. **(06 Marks)**

3 a. List the sources of transient over voltages on the utility on the utility system. Explain capacitor switching transients with the help of block diagram and waveforms. **(10 Marks)**

b. Explain the fundamental principles of overvoltage protection with a neat block diagram. **(10 Marks)**

4 a. Explain the impact of harmonics on:
i) Motors ii) Telecommunication lines. **(10 Marks)**

b. List the harmonic sources from commercial and industrial loads. Explain how single phase power supplies introduce harmonics. **(10 Marks)**

PART – B

5 a. Explain the voltage limit evaluation procedure with a flowchart. **(10 Marks)**

b. Explain the following devices for controlling harmonic distortion:
i) Line reactors ii) Zig-zag transformers. **(10 Marks)**

6 a. Explain power quality planning process with a neat block diagram. **(10 Marks)**

b. List and explain the typical steps in power quality bench marking process. **(10 Marks)**

7 a. Explain the various power quality issues affected by distributed generation. **(10 Marks)**

b. Explain the following distributed generation technologies:
i) Reciprocating engine genset ii) Combustion (gas) turbines. **(10 Marks)**

8 a. Explain with a neat block diagram, the basic design of an expert system for monitoring applications. **(10 Marks)**

b. Explain IEC flicker meter with a neat block diagram. **(10 Marks)**

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