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10EE81

**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Electrical Design Estimation and Costing**

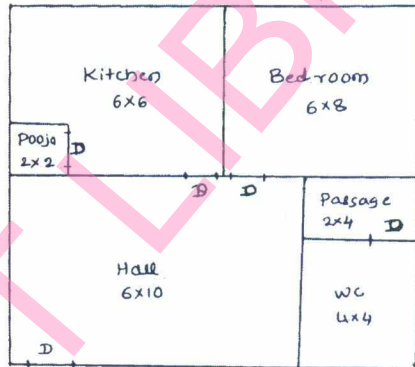
Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**  
**2. Use of Wire table is permitted.**

**PART – A**

- 1 a. Write the necessity of estimating and costing. (06 Marks)  
 b. Explain the following:  
 (i) Comparative statement (ii) Contingencies (06 Marks)  
 c. Write any four rules of Indian electricity. (08 Marks)
  
- 2 a. Write the general rules to be consider for wiring system. (06 Marks)  
 b. Fig. Q2 (b) shows the plan of residential building which has to be wire up with casing capping wiring system calculate the following:  
 (i) Show the wiring plan.  
 (ii) Propose load calculation.  
 (iii) Find the length of wire for wiring.  
 (iv) List the materials and find the total cost. (14 Marks)



Note: All dimensions are in mm.  
Fig. Q2 (b)

- 3 a. Differentiate residential and commercial electrification. (06 Marks)  
 b. Ground floor plan of school is shown in Fig. Q3 (b) which has same plan for floor 1 and 2. Rig up with conduit wiring system and calculate  
 (i) Draw the wiring layout for lighting system using 3 $\phi$  supply.  
 (ii) Propose lighting load.  
 (iii) Material required for the wiring system. (14 Marks)

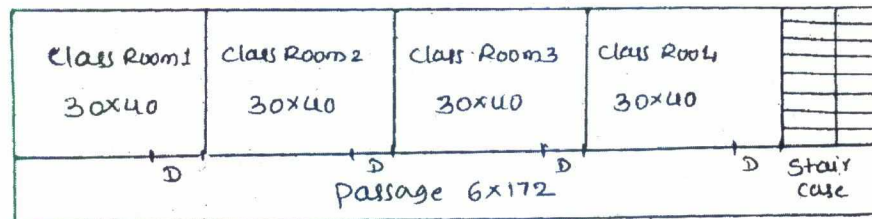


Fig. Q3 (b)  
1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 4 a. What are the different types of service connection, list advantages and disadvantages? (06 Marks)
- b. What are the reasons for excess reading of energy consumption by energy meter? (06 Marks)
- c. Prepare material required for overhead service, connection to home of 2 kW load at 240 V, 50 Hz supply. The supply is to be given from 20 meter away from the home. Assume diversity factor as 1.66 and future load as 100%. (08 Marks)

**PART – B**

- 5 a. Write the important consideration regarding motor installation wiring. (08 Marks)
- b. A 15 HP, 415 V, 3 phase, 50 Hz induction motor is to be installed in a workshop. The plan of which is shown in Fig. Q5 (b). Draw layout of the wiring and estimate quantity of material required. Assume efficiency of motor as 85% and power factor as 0.8. (12 Marks)

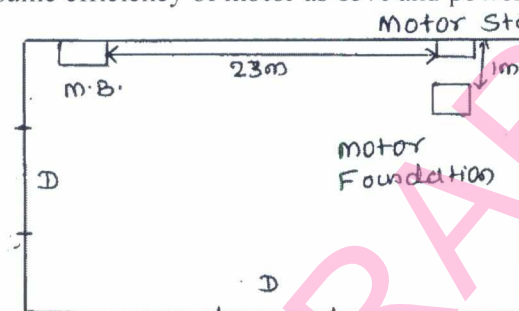


Fig. Q5 (b)

- 6 a. Write the main components of overhead lines. (08 Marks)
- b. A pole for an over head 11 KV, 3  $\phi$ , 50 Hz 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. Explain testing and commissioning of over head distribution line. (08 Marks)
- b. An overhead 3 $\phi$ , 415 V distributor is to be laid along a straight route 300 m long. The end supports are terminal poles with 50 m span in between. Prepare list of material for laying distributor. The following data may used:
- Conductor : ACSR  $\frac{6}{1} \times 2.11$  mm for phase, nutral and street light.
- Earth wire: GI wire, 8 SWG, 1 kg / 10 m weight.
- L.T.cable : 4-core, 60 mm<sup>2</sup>, 1100 V grade.
- Distance of first terminal pole from the substation is 12 m. (12 Marks)
- 8 a. Write different types of substation. (06 Marks)
- b. Write the material required for 33/11 KV outdoor substation and draw key diagram with one input and 6 output lines. (14 Marks)

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**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Power System Operation & Control**

Time: 3 hrs.

Max. Marks: 100

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

**PART - A**

1. a. What is control centre of a power system? Explain the function of control centre. (06 Marks)  
 b. With the help of a block diagram, explain the function of typical digital computer control and monitoring system in a power system. (08 Marks)  
 c. Explain the objectives and functions of AGC in a power system. (06 Marks)
2. a. Draw the schematic of load frequency control and excitation voltage regulators of a generator and explain. (08 Marks)  
 b. Explain with block diagram, the modeling of, (i) Speed governing system (ii) Turbine (iii) Generator and load. (12 Marks)
3. a. With a block diagram representation, explain tie-line bias control of a two area load frequency control. (12 Marks)  
 b. Two machines operate in parallel to supply a load of 400 MW, the capacities of the machines are 200 MW and 500 MW. Each has a droop characteristic of 4%. Their governors are adjusted so that the frequency is 100% on full load. Calculate the load supplied by each unit and the frequency at this load. The system frequency is 50 Hz. (08 Marks)
4. a. Explain briefly the components/equipments of power system that can generate and / or absorb reactive power. (06 Marks)  
 b. Derive the equation to get the relation between voltage, power and reactive power at a node. (08 Marks)  
 c. In the radial transmission system shown in Fig. Q4 (c), all p.u. values are referred to the voltages bases shown and 100 MVA. Determine the power factor at which the generator must operate. (06 Marks)

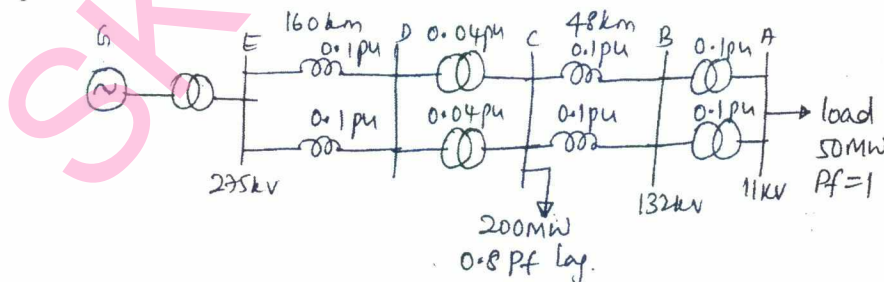


Fig. Q4 (c)

**PART - B**

5. a. Explain with flow chart unit commitment solution method. (10 Marks)  
 b. Define unit commitment problem. (04 Marks)  
 c. Discuss the constraints in unit commitment for thermal plants. (06 Marks)

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- 6 a. Explain the Security-Constrained Optimal Power Flow (SCOPF) function of power system security with an example. (06 Marks)  
b. Explain with the help of flow chart contingency analysis using sensitivity factors. (08 Marks)  
c. Explain the factors affecting power system security. (06 Marks)
- 7 a. Explain the weighted least square estimation method of power system state estimation. (10 Marks)  
b. Explain : (i) Suppression of bad data and (ii) Identification of bad data in state estimation problem. (10 Marks)
- 8 a. What are the requirements for power system adequacy assessment and also explain the adequacy indices. (10 Marks)  
b. Define reliability and explain the three modes of failure of a system. (10 Marks)

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**Eighth Semester B.E. Degree Examination, June/July 2017**

**Renewable Energy Sources**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. List the differences between renewable and non-renewable energy sources. (08 Marks)
- b. What are the advantages and limitations of renewable energy sources? (06 Marks)
- c. Explain briefly the Indian Energy scenario. (06 Marks)
- 2 a. Define the following with respect to solar radiation:
  - (i) Latitude angle      (ii) Altitude angle      (iii) Hour angle      (iv) Zenith angle
  - (v) Azimuth angle (10 Marks)
- b. What is the difference between a pyr heliometer and pyranometers? With neat sketch, explain the working of Angstrom type pyreheliometer. (10 Marks)
- 3 a. With a neat diagram, explain the working principle of solar water heater. (08 Marks)
- b. With a neat sketch, explain the working principle of solar still and solar furnace. (12 Marks)
- 4 a. With a neat sketch, explain the working of a solar pond electric power plant. (08 Marks)
- b. What are the advantages and disadvantages of solar PV systems? (06 Marks)
- c. With a neat sketch, explain any one type of thermal energy storage system. (06 Marks)

**PART – B**

- 5 a. With a suitable block diagram, explain the functions of different components of WECS. (10 Marks)
- b. Classify the wind energy conversions system. (04 Marks)
- c. Describe the main considerations in selecting a site for wind generators. (06 Marks)
- 6 a. With a neat diagram, explain the working principle of biogas plant. (10 Marks)
- b. List & explain the factors affecting biogas generation. (10 Marks)
- 7 a. With a neat diagram, explain the principle of tidal power. (10 Marks)
- b. With a neat diagram, explain the principle of ocean thermal energy conversion system. (10 Marks)
- 8 a. Describe the classification of fuel cells. (06 Marks)
- b. Explain the principle of operation of an alkaline fuel cell. (08 Marks)
- c. What are the advantages and disadvantages of hydrogen energy? (06 Marks)

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**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Energy Auditing and D.S.M**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Explain how energy sources are classified broadly. Give examples for each classification. (06 Marks)
- b. Write a brief note on “energy scenario in India”. (08 Marks)
- c. List the objectives of energy conservation act 2001. (06 Marks)
- 2 a. What do you meant by i) cash flow model ii) depreciation. (06 Marks)
- b. Develop a cash flow model for uniform series compound amount factor. (06 Marks)
- c. Calculate the depreciation for data give below, salvage value Rs = 0, life of the equipment = 5 years, initial expenditure P = Rs 1,50,000/-. For declining balance use a 200% rate, by using i) straight line method ii) sum of years digit method iii) Decline balance method. (08 Marks)
- 3 a. What is an energy audit? Explain data acquisition and data analysis with respect to energy audit. (06 Marks)
- b. Give the ten methodology steps for detailed energy audit and explain each one in brief. (10 Marks)
- c. Write a short note on “energy use profile”. (04 Marks)
- 4 a. Explain the typical A.C power supply scheme with suitable line diagram. (08 Marks)
- b. Write a short note on “energy audit report”. (06 Marks)
- c. A single phase motor is connected to 400V, 50Hz AC supply takes a 20A at a power factor of 0.7 lagging. Calculate the capacitance required in parallel with the motor to raise the power factor to 0.9 lagging. (06 Marks)

**PART – B**

- 5 a. Using the power distribution diagram discuss the location of capacitors in a plant to reduce the energy consumption. (06 Marks)
- b. What do you meant by Energy efficient motor (EEM), briefly discuss the design features of EEM. (06 Marks)
- c. What is ABT? Discuss the broad features of ABT design. (08 Marks)
- 6 a. Briefly discuss the lighting control systems are used at design stage. (08 Marks)
- b. Explain the following Indian tariffs  
i) Three part tariff ii) Power factor tariff iii) KVA maximum demand tariff. (06 Marks)
- c. Write a note on energy efficient lamps i) CFL ii) HPSV iii) TLD. (06 Marks)
- 7 a. What is demand side management? Mention the benefits of DSM. (06 Marks)
- b. Explain: i) peak clipping ii) valley filling. (08 Marks)
- c. Discuss the energy conservation opportunities in  
i) Agriculture sector ii) Illumination system. (06 Marks)
- 8 a. Briefly discuss various DSM based tariffs. (08 Marks)
- b. Write a note on DSM implementation issues. (06 Marks)
- c. Explain the plant level energy conservation program with flow chart. (06 Marks)

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**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Electrical Power Quality**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. What are short duration voltage variation? Explain momentary interruption sag and swell due to fault in a power system. (10 Marks)  
b. Explain how power quality is equivalent to voltage quantity. How the power quality evaluation is done in real time analysis? (10 Marks)
- 2 a. Discuss the severity of sag during full voltage starting of induction motor. (10 Marks)  
b. With neat diagram, explain the fundamental principle of protection in voltage sag. (10 Marks)
- 3 a. What are inter harmonic? Describe the harmonic spectrum produced by a typical induction furnace? (10 Marks)  
b. Explain how lighting can cause transient over voltage. (10 Marks)
- 4 a. What is the nature of current drawn by a fluorescent lighting? Explain the frequency spectrum with a neat diagram. (10 Marks)  
b. Explain how RMS voltage, current, active power and apparent power difference between sinusoidal and non sinusoidal condition. (10 Marks)

**PART – B**

- 5 a. Discuss stepwise procedure for performing power system harmonic study. (10 Marks)  
b. Explain briefly how in-line reactors or chokes devices are used for controlled harmonic distribution. (10 Marks)
- 6 a. Explain the power quality planning process and their power quality cost in planning process. (10 Marks)  
b. Discuss power quality state estimation method for monitoring power quality. (10 Marks)
- 7 a. Discuss the various power quality issues affected by distributed generation. (10 Marks)  
b. Explain distributed generation. Explain briefly any four types of distributed generation technologies. (10 Marks)
- 8 a. Illustrate basic design of an expert system for power quality monitoring application. (10 Marks)  
b. What are the important factors to be considered when selecting the instruments for measurement in power quality monitoring? (10 Marks)

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