ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2012
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALIZATION PAPER for ELECTRICAL ENGG./ ELECTRICAL & ELECTRONICS ENGG.

Date	: 14 October 2012
Total Marks	: 100
Examination Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to examination time)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY:

1. Write your Roll Number clearly on the Answer Booklet in the space provided.
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are NOT PERMITTED TO WRITE during this time.
3. Use either Blue or Black ink pen or ball point pen for the written part and Pencils for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper or any other materials.
5. All answers must be labeled with appropriate question numbers (Section, Question and sub-Question Numbers wherever applicable). Unlabelled answers will not be assessed.
6. This paper is divided into two sections-namely SECTION A and SECTION B.
7. SECTION A consists of two parts: Part I and Part II.

   Part I consists of 30 Multiple-Choice Questions carrying one (1) mark each and is compulsory. The answer of your choice should be clearly written in whole along with the question and option number on your answer booklet. Eg. 31(c).

   Part II consists of four (4) short answer questions of five (5) marks each and all questions are compulsory.
8. SECTION B consists of two Case Studies. Choose only ONE case study and answer the questions under your choice. Each case study carries fifty (50) marks in total.
9. This Paper consists of THIRTEEN (13) pages including this Instruction page.

6. The preferable choice of turbine for high head (say beyond 350 meter) in hydroelectric power plant is:

   a) Francis Turbine
   b) Cross Flow Turbine
   c) Pelton Turbine
   d) Turgo Impulse Turbine

7. While carrying out the Load Flow Analysis, the slack or infinite bus is usually assigned to:

   a) Biggest generation bus
   b) Smallest generation bus
   c) Highest Load bus
   d) Lowest Load bus

8. If the winding of transformer is such that: HV side is connected in Delta, LV side is connected in Star with Neutral brought out and the LV leads HV by 30 degree, the winding configuration is:

   a) YNd11
   b) Dyn5
   c) Dyn11
   d) Dyn10

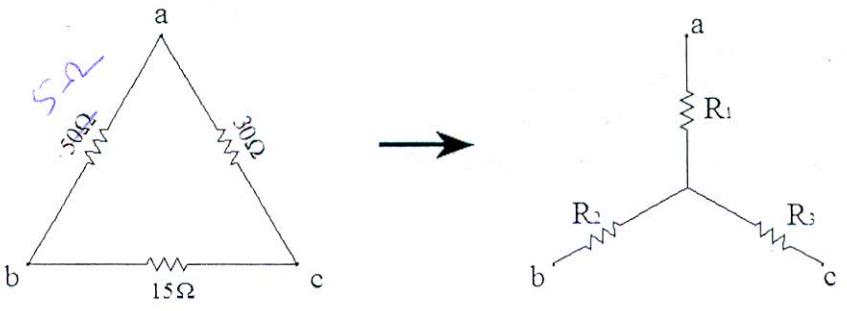
9. Which one of the following is NOT a condition of parallel operation of transformer?

   a) Voltage ratio of transformers must be same
   b) Percentage impedance of transformers must be same
   c) MVA rating of transformers must be same
   d) Polarity of transformers must be same

10. If the supply frequency of the transformer doubles, the eddy current loss in the transformer will:

    a) Doubles
    b) Become half
    c) Increase by eight times
    d) Increase by four times

17. A delta connected network with Y-equivalent is shown below. The resistance R_1, R_2, R_3 (in ohms) are respectively,



a) 1.5, 3, and 9
b) 3, 9 and 1.5
c) 9, 3 and 1.5
d) 3, 1.5 and 9

18. A generating station has maximum demand of 25 MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%, then the reserve capacity of the plant is

a) 30 MW
b) 15 MW
c) 10 MW
d) 5 MW

19. A 100 kVA transformer has copper loss of 1000 watts at full load and iron loss of 1000 watts. At half the full load and 0.8 power factor (lagging), the efficiency of the transformer will be nearly

a) 98.91%
b) 96.97%
c) 95%
d) 91.91%

20. The time taken for a surge to travel a 600 km long overhead transmission line is

a) 6 s
b) 1 s
c) 0.02 s
d) 0.002 s