هندسة الحاسبات والنظم

Mansoura University	Computer Systems Dept.
Faculty of Engineering	2nd Year, May 2013
PART (A) : 90 Minutes	Electrical Power & Machines

Please Attempt all questions;

First Question : (6 Marks):

1-Write in details the advantages and disadvantages of the Hydro-electric power stations.

2- What is the main advantages and disadvantages of a nuclear power station.

Second Question: (9 Marks):

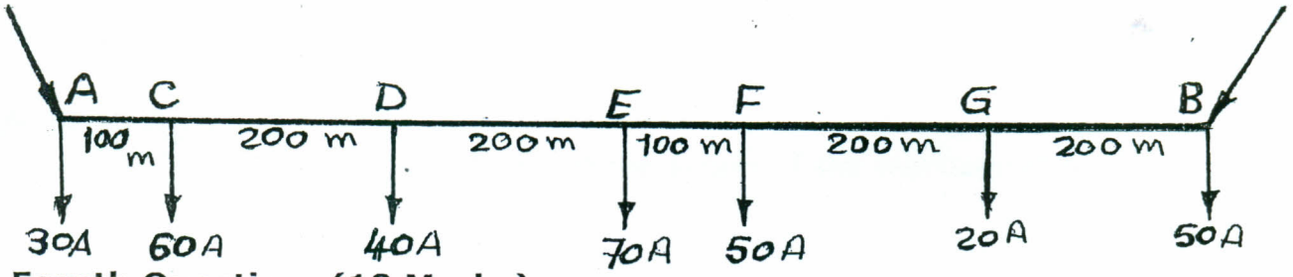
Draw a schematic diagram to show the main components of a steam power station specially;

(a) The air –Flue gas Circuit.

(b) The cooling-water circuit.

Third Question: (10 Marks):

The Figure shows a single line diagram of a distributor with its tapped currents. The resistance of the conductor per 1000 m of distributor (go & return)=0.02 Ω. Determine the point of minimum voltage and the efficiency of the distributor.



Fourth Question: (10 Marks):

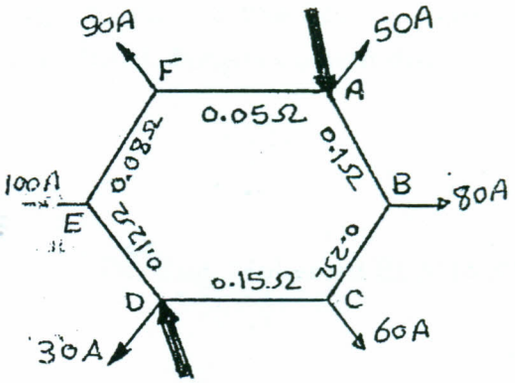
a- Draw the schematic diagram showing the main components of a Gas-Turbine power station. Explain the operation of this type of power stations.

B-Write down the advantages and disadvantages of Gas-Turbine power stations.

Fifth Question: (10 Marks):

A 2-wire, ring-d.c. distributor is shown in Figure. The go & return resistance of each section is shown. It is supplied at two points A & D at the same voltage of 250 V.

Define the point of minimum voltage and calculate the distributor efficiency.



WITH MY BEST WISHES

Prof. Dr. Kamal Shebl

Mansoura University
Faculty of Engineering
Electrical Engineering Department

Electric Power and Machines: EE3224
2nd year term Examination
Saturday 25-5-2013
Time allowed: 1.5 Hours

Pls. Answer All the Following Questions (Total Score 45 Marks)

Question 1 (25 Marks):

1. Starting from a single phase HV/LV transformer, how to determine the equivalent circuit parameters. What will be the full load iron and copper losses? *(10 Marks)*

2. Prove that the maximum efficiency of the transformer occurs when the constant losses is equal to the variable losses. *(5 Marks)*

3. A 10 KVA, 2500/250 V, single phase transformer gave the following test results:

Open circuit test:	250 V,	0.8 A,	50 W
Short circuit test:	60 V,	3 A,	45 W

   i. Calculate the efficiency at ½ and 1 ¼ of the full load at 0.8 P.F.
   ii. Calculate the load (KVA output) at which maximum efficiency occurs and also the value of the maximum efficiency at 0.8 P.F.
   iii. Compute the voltage regulation and the secondary terminal voltage under rated load at power factors of (1) 0.8 lagging and (2) 0.8 leading. *(10 Marks)*

Question 2 (20 Marks):

1. Explain briefly (using neat sketches) the action of the mechanical rectifier in the D.C. machines. *(5 Marks)*

2. Show that the electromotive force "E.M.F" equation of a D.C. Generator can be formulated by: $E_a = \frac{P}{a}\frac{Zn\phi}{60}$ *(5 Marks)*

3. A 550 V, 150kW D.C. compound generator has a series field resistance of 0.025 Ω, an interpole field resistance of 0.002 Ω, a shunt field resistance of 175 Ω, and an armature resistance of 0.038 Ω. Calculate the generated voltage when the machine is delivering rated power, and is connected: (a) short shunt; (b) long shunt. Neglect brush drops. *(10 Marks)*

Good Luck and with my Best Wishes

Dr. Eng. Mohamed ELADAWY