BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : VII**
BRANCH: EEE **SESSION : MO/18**

SUBJECT: EE7211 COMPUTER AIDED POWER SYSTEM ANALYSIS

TIME: 3.00 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Discuss the impacts of computer in power system analysis and control [2]

Q.1(b) Explain the necessity of 3 winding transformer and the equivalent circuit. [4]

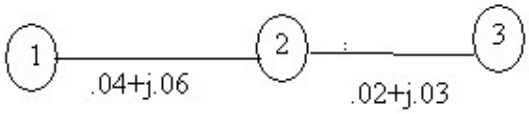
Q.1(c) Evaluate the way of representing of voltage regulating transformer when turn ratio is off-nominal. [6]

Q.2(a) Mention the assumptions taken for Decoupled Load Flow technique. [2]

Q.2(b) Obtain the complex bus bar voltage at bus 2 at the end of the first iteration. Use the NR method. In figure below, line impedances in p.u. are shown below the lines. The powers and voltages are also given in p.u. Consider Bus 1 and bus 3 are slack bus and generator bus respectively and bus 2 is the load bus. [10]

$P_{D2}+jQ_{D2}= 5.96+j1.46$, $P_{G3}+jQ_{G3}= 4.96+j.46$, $|V3| =1.02$, and $V1 = 1.0 \angle 0^o$, V_2^0(assumed) $= 1\angle 0^0$, $V_3^0 = 1.02\angle 0^0$ (angle is assumed as zero degree).

Q.3 [12]



Define unit commitment problem. Discuss about the constraints considered for the problem. Discuss in detail about the dynamic programming technique of UC problem.

Q.4(a) Derive co-ordination equation among the generating units for ELD when the generating units are located at different place of the network. Write the significance of penalty factor. [4+2]

Q.4(b) Three units of a plant have the following data : [6]

UNIT NO	Rs/hr	MAXIMUM OUTPUT(MW)	MINIMUM OUTPUT(MW)
1	$4600+64.8P_1+.012P_1^2$	600	150
2	$3100+78.5P_2+0.0194P_2^2$	400	100
3	$780+79.7P_3+0.0482P_3^2$	200	50

Determine the economic dispatch and the value of system lamda when the plant load is 850 MW. Produce the result after first iteration, if iterative technique is used.

Q.5(a) Write down the steps for Z bus building algorithm with one example. Consider the example in such a way that all the modifications are required to build the particular Z bus. [10]

Q.5(b) Determine the fault current for L-L-L-G occurred at any bus of the above network. Consider suitable date for the determination of fault current. [2]

Q.6(a) Justify that the Y bus and Jacobean matrix are sparse matrix. Why does conventional way of inverting a sparse matrix give non-accurate result? [4+2]

Q.6(b) Explain one technique for reducing computer memory requirement while saving Y bus data. [6]

Q.7(a) Write down in brief about the one way of solving stability in case of multi machine environment. [4]

Q.7(b) Evaluate the modified Ybus for 3bus system required for stability analysis. Generators are connected at buses 1 and 2. Admittances of lines in p.u. between bus 1 and 2, 1 and 3 and 2 and 3 are 1.47-j5.88, 2.94-j11.77, 2.75-j9.17 respectively. Synchronous reactance of generator 1 and 2 are j0.1 and j0.3 respectively. Results of Load Flow are given below: [8]

Bus	Bus Voltage(p.u.)	Generation (MW)	Generation (MVAR)	Load (MW)	Load (MVAR)
1	$1.04<0^0$	212.14	93.26	-	-
2	1.02<-3.09	100	70	50	20
3	0.93<-7.01	-	-	250	150

Consider Base MVA is 100.

:::::30/11/2018:::::M