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| Minoufiya University<br>Faculty of Engineering<br>Shebin El-Kom<br><br>Date: 11/1/2014<br>Time allowed: 3 Hours | Minufiya University | Department: Electrical Engineering<br>Diploma<br>Academic Year: 2013-2014<br>Course: Power System Analysis in Transient cases<br>Marks: 100 |

**Answer all the following questions:**

**Question (1)** **[35 Marks]**

a) **Discuss the stability of power system and write short notes about stability problem classification and different stability limits.**

b) **A three phase short circuit fault is occurred at a point on one of the transmission circuits each of 100 Km long as shown in Fig. (1). The generator is delivering the rated power before the fault at a torque angle of 30°. *Determine the distance at which the fault is occurred* if the critical clearing angle is equal to 68°.**

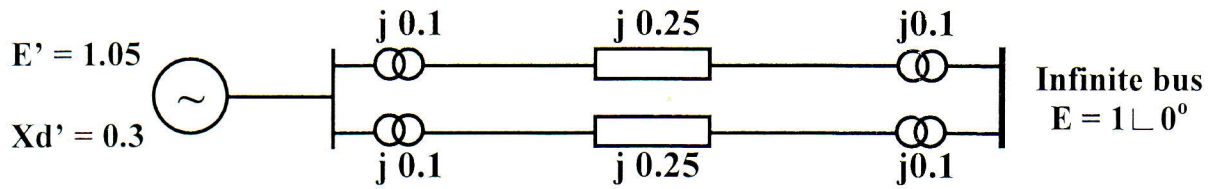


**Fig. (1)**

**Question (2)** **[30 Marks]**

**Consider the two-machine power system, shown in Fig. (2). During normal operation, one of the transmission circuits between buses 2 and 3 is suddenly opened. Use Euler method to determine the frequency and internal angle variations of each generator. Does the system maintain its synchronous stability? Take Δt=0.1 sec, and consider the time period of 0.4 sec.**

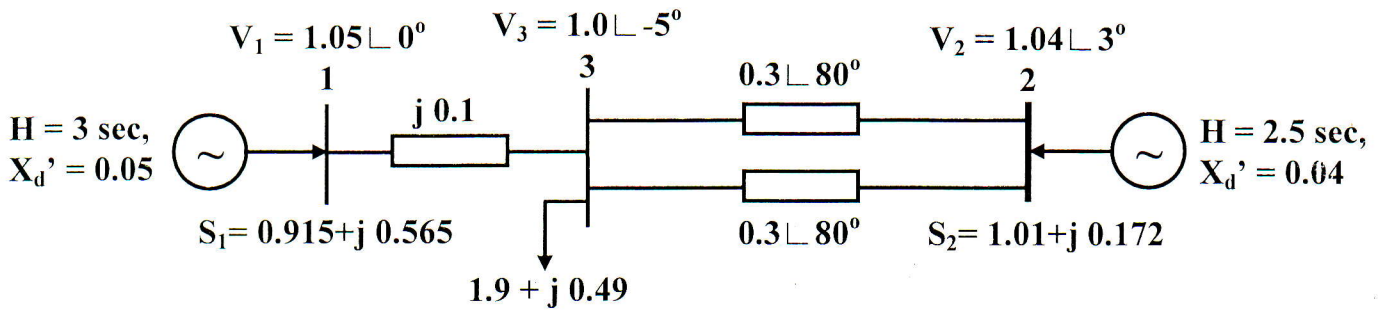


**Fig. (2)**

**Question (3)** **[35 Marks]**

a) **Define voltage stability and voltage collapse.**

b) **Deduce a relation between the load voltage and load active power for a lossless transmission line with a reactance of 0.2 pu and unity power factor with sending end voltage of 1 pu. Draw the p-v curve for power changing from 0 up to the maximum power with ΔP = 0.5 pu.**

*Good Luck,* *Dr. Tamer Fetouh*