

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

CLASS: MTECH  
BRANCH: EEE

SEMESTER : III  
SESSION : MO/19

SUBJECT: EE605 MICRO GRID OPERATION AND CONTROL

TIME: 3 HOURS

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  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.
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Q.1(a) With proper micro grid management structure, define the importance of micro source controller, microgrid central controller, distribution management system (DMS). [5]

Q.1(b) With a proper diagram, Mention the importance of Area EPS, Local EPS, PCC and PoC according to IEEE standard 1547-2018. [5]

Q.2(a) Two generators are supplying power to a system. Their ratings are 50 and 500 MW respectively. The frequency is 60 Hz and each generator is half loaded. The system load increases by 110 MW and as a result the frequency drops to 59.5 Hz. What must the individual regulations be if the two generators should increase their powers in proportion to their ratings? [5]

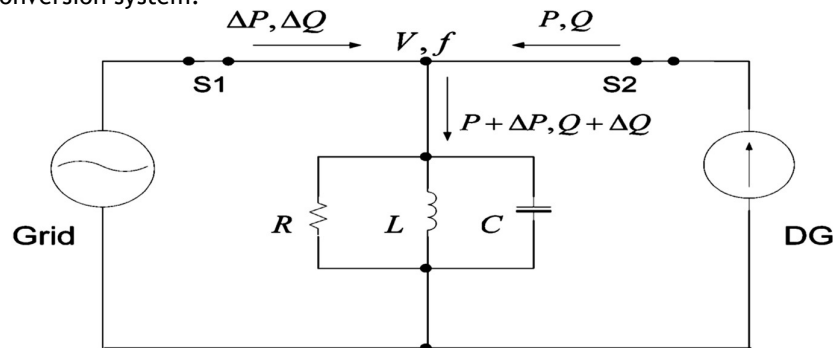
Q.2(b) For inverter based DG, write the proper droop equation to control active and reactive power considering the grid is inductive. Drive the droop equation when the grid resistive. Write your observations on the basis of the control philosophy for both the cases. [5]

Q.3(a) Develop mathematical model for PV power system and energy storage system. Mention the expression of duty cycle ratio for both the cases. [5]

Q.3(b) Discuss park transform from three phase a-b-c to d-q rotating frame with reference to three phase inverter control. [5]

Q.4(a) Deriving the maximum value of the coefficient of power coefficient (CP), describe MPPT control for wind energy conversion system. [5]

Q.4(b) [5]



Define Non Detection Zone (NDZ) with reference to islanding detection. For the above circuit, determine the non detection zone for OV/UV and OF/UF considering appropriate values. Suggest one technique to improve NDZ.

Q.5(a) Define the different types of Demand Response Programs. [5]

Q.5(b) Discuss Different benefits of DR Programs. How the benefit of Generating Utility and customer can be quantified? [5]