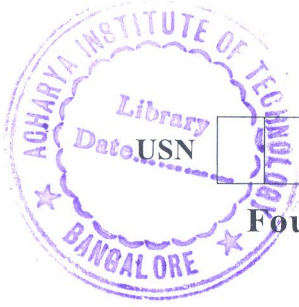# CBCS SCHEME

16/17EPS424

Fourth Semester M.Tech. Degree Examination, Aug./Sept.2020
Integration of Renewable Energy

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. With a neat figure, explain DC architecture of green and renewable power grid distribution system. **(08 Marks)**
   b. Explain how a DG system operations as a part of utility power system. **(08 Marks)**

OR

2 a. Outline the smart grid PV – UPS DG system. **(08 Marks)**
   b. Deduce an expression for equivalent control input of discrete time sliding mode current controller considering the inverter and filter subsystem without transformer and load dynamics. **(08 Marks)**

Module-2

3 a. Describe grid connected and stand alone AC power supply applications of DGS. **(08 Marks)**
   b. Explain how power flows when two inverters are connected to load. **(08 Marks)**

OR

4 a. Outline the different methods used to control the inverter voltage. **(08 Marks)**
   b. Enumerate different inverter system topologies. **(08 Marks)**

Module-3

5 a. Obtain the basic mathematical model of three phase four wire inverter with a split DC bus. **(08 Marks)**
   b. Write a note on Robust servo mechanism voltage controller and list out four conditions to obtain solution to RSC. **(08 Marks)**

OR

6 a. Obtain the per unit one dimensional equivalent model of the three phase inverter system and write the system equation in state space. **(08 Marks)**
   b. Obtain the output voltage waveform of space vector PWM in terms of base vectors assuming normalized DC bus voltage for Y connected load. **(08 Marks)**

Module-4

7 a. Write a note on stationary $\alpha\beta O$ reference frame versus ABC reference frame. **(08 Marks)**
   b. Briefly explain the generalized uncertainty in robust stability analysis. **(08 Marks)**

OR

8 a. Write a note on real and reactive power control problem in DG–grid connected mode. **(08 Marks)**
   b. Explain the impact of V and δ(Delta) variations on P and Q. **(08 Marks)**

Module-5

9 a. List out the necessary steps to obtain the closed loop plant model. **(08 Marks)**
   b. Write a note on Robust stability analysis using structured singular value μ. **(08 Marks)**

OR

10 a. Explain the control system of conventional PWM rectifier with feed forward load power. **(08 Marks)**
   b. Analyse the three phase AC – DC – AC system topology. **(08 Marks)**

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