Ref. No. : Ex/PG/PE/T/128C/2019

Name of the Examinations: M.E. POWER ENGINEERING FIRST YEAR SECOND SEMESTER - 2019

Subject : POWER APPARATUS **Time : 3 Hrs.** **Full Marks : 100**

Answer any five questions.

1. Discuss the voltage ratio and polarity test of a three phase transformer using proper connection diagrams. Also draw the phasor diagrams for different vector group connections related to the polarity test of the same.
   How the temperature rise test is performed on a transformer possessing a low ratio of copper loss to iron loss?
   Discuss how the temperature of transformer winding is calculated at the end of temperature rise test.

   20

2. How is the induced over voltage test conducted on power transformer? Explain it with proper connection diagram and phasor diagram. Mention the voltage at which the test should be commenced and the precaution which must be taken during the test.
   Describe the standard impulse voltage wave shape ($1.2/50\ \mu s$) used for laboratory impulse test. Discuss the impulse test on power transformer.

   20

3. What are the different methods employed for drying out of transformer oil and transformer on site? Discuss with proper connection diagram.
   Explain with diagram the operation of oil filter press.

   20

4. Discuss the advantages and disadvantages of HVDC transmission system.
   Describe the following equipments in a converter station:
   Converter transformers, thyristor valves, harmonic filtering equipments, DC reactors

   20

5. What are the needs for deploying FACTs devices and FACTs controllers?
   Discuss with diagram the following FACTs devices:
   (a)TSC (b) TCR (c) TCSC

   20

6. Enumerate the merits and demerits SF6 circuit breaker.
   Discuss the constructional details of SF6 circuit breaker.

   20

7. Write short notes on any two of the followings
   (i) Vacuum circuit breaker
   (ii) Overvoltages due to lightning
   (iii)Partial discharge measurement of power transformer

   20