R18 Regulation *Subject code: 2P7BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VII Semester Regular/Supplementary Examinations, November 2022

POWER SYSTEM PROTECTION

(Electrical and Electronics Engineering)

Maximum Marks: 70 Date:05.12.2022 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 In which type of fault, zero sequence currents do not exist?
2 What is the main problem of the circuit breaker?
3 Define plug-setting multiplier.
4 Why directional relay is necessary for parallel feeder?
5 What are the main safety devices available with transformer?
6 Why busbar protection is needed?
7 What is meant by digital protection?
8 What happens if the sampling frequency is less than the Nyquist limit?
9 What do you mean by power swing?
10 What are the components of WAMS?

Part-B

Answer All the following questions. (5X10M=50Marks)

11 What are the different types of protection schemes in power system? 10M

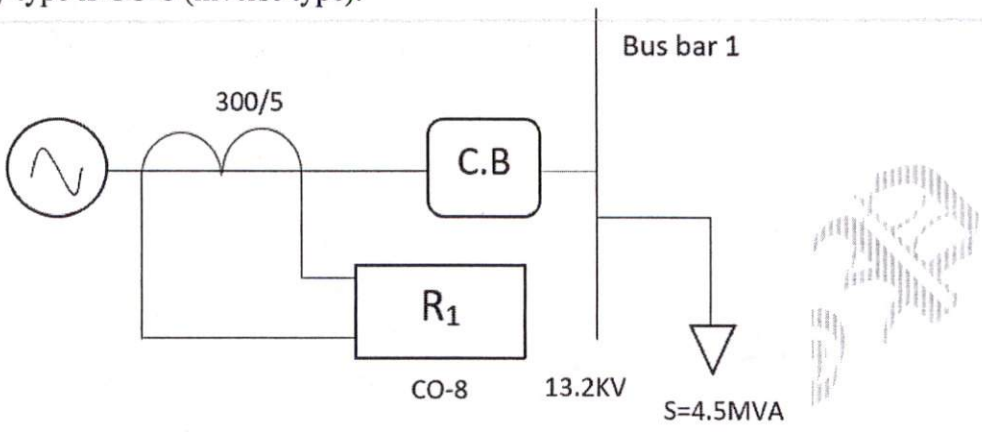
OR

12 With neat Diagram, explain the construction and operation of Non-Directional and Directional over current relay. 10M

13 A. If the rated current (pick up current) of a relay is 3A, and the time dial setting is 1. 5M

(i) How long does it take the relay to trip if the supply C.T is rated at 400:5 A, and the fault current is 480A? The type of the OC relay is CO-8.
(ii) Solve using the standard curve equation and compare the results.

B. For the relay R_1 in the system shown, determine the current tap setting CTS. If the maximum three-phase fault current is 2400A and the TDS=2.0 find the operating time if the relay type is CO-8 (inverse type). 5M



OR

14 Protection of parallel feeders:
(i) With non-directional relays. 5M
(ii) With directional relays. 5M

15 Explain with a neat circuit diagram the differential protection scheme used to protect star/delta transformers. 10M

OR

16 Discuss and compare briefly various bus-bar arrangement in a power system. 10M

17 A. What do you mean by Fourier analysis? Explain. 10M
B. A 12-bit ADC has conversion time of 10 microseconds. What is the maximum frequency that can be acquired without using a sample and hold unit?

OR

18 State the salient features of microprocessor-based protection relay. Draw block diagram of microprocessor based over current relay. 10M

19 A. Discuss about out of step blocking relay. 5M
B. Explain the Operating principle and setting of df/dt Relay. 5M

OR

20 What is PMU? Explain its working with the help of block diagram. 10M