M. Tech(PSE)-2
CAPSP

COMPUTER AIDED POWER SYSTEM PROTECTION

Full Marks: 70
Time: 3 hours

Answer SIX questions including Q No. 1 which is compulsory.
The figures in the right hand margin indicate marks. *Symbols carry usual meaning.*

Q1. Answer all questions. [2×10]

a) What is Anti-aliasing filter? Explain.
b) Write short note on the performance of Instrument transformers.
c) What is the effect of increasing number of samples in a given window on the precision of DFT?
d) State Fourier series in trigonometric form as a cosine wave with phase angle.
e) What is the need for random processes in protective relaying?
f) Explain the Out-of-Step Protection in generators.
g) Explain the generator Backup Protection.
h) Write short note on counter measures against EMI.
i) State different hardware issues connected to substation relaying.
j) What do you understand by adaptive relaying?

Q2. a) Explain the benefits obtained from computer relaying in power system protection. [5]
b) Explain the principle of working of any one type of analog to digital converter with a neat block diagram. [5]

Q3. a) Explain the objectives and functions of a protection system. [5]
b) Discuss the protection schemes applied to transmission lines. [5]

Q4. a) Explain the protection of series compensated transmission lines. [5]
b) Discuss the Kalman filter usage in power system protection. [5]

Q5. a) Explain the sources of error in transmission line protective relaying. [5]
b) Draw the Program Flow Chart for Symmetrical component distance relay. [5]

Q6. a) Explain Fast algorithm used for digital protection of power transformers. [5]
b) Discuss the Anti-Motoring Protection of synchronous generator. [5]

Q7. a) Explain the implementation of practical travelling waves based protection relay. [5]
b) Explain the principle of operation of travelling wave differential relay used in protection of UHV transmission lines. [5]

Q8. Write short notes on any TWO. [5x2]

a) Fault generated traveling waves
b) Digital bus bar protection
c) Phasor measurement in dynamic state estimation.
d) Measurement of frequency and phase of a signal.