**SUBJECT CODE NO: E-243**
**FACULTY OF ENGINEERING AND TECHNOLOGY**
**B.E.(EEP/EE/EEE) Examination Nov/Dec 2017**
**Power System Protection**
**(REVISED)**

[Time: Three Hours]                                                                 [Max.Marks:80]

Please check whether you have got the right question paper.

N.B             i) Q.No.1 and Q.No.6 are compulsory.
                ii) Solve any Two questions from section A & B each, excluding compulsory questions.
                iii) Assume Suitable data if Necessary.

**Section A**

Q.1     **Attempt any five.**                                                        10
        a)  Classify relays based on relay timing.
        b)  What do you mean by Reach in distance relay?
        c)  Define operating force and restraining force.
        d)  Give Difference between C.T. & P.T.
        e)  State Application of Static relay.
        f)  Explain Working principle of differential relay.
        g)  Define Current Setting & Pickup level.


Q.2     a)  Derive Torque Equation for Induction type relay.                          07
        b)  Determine the time of operation of 5 amps 3 second over current relay having Current setting  08
            of 130% & time setting multiplier of 0.7 connected to a supply Circuit through a 400/5 C.T.
            When a circuit carries fault current of 4000 amp (Consider time of operation 3.5 second)


Q.3     a)  State the type of functional relay & Explain Induction type directional Over current relay.    07
        b)  Explain in details Percentage differential relay with its advantages.                          08


Q.4     a)  Explain Different types of faults occurred in alternator.                 07
        b)  Explain harmonic restraint relay.                                        08


Q.5     **Write a short note on**
        a)  Merz Price Protection                                                     05
        b)  Negative Sequence relay                                                   05
        c)  Restricted Earth fault Protection                                         05

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## Section B

Q.6 **Attempt any five** 10
    a) Define making capacity & Breaking capacity of Circuit Breaker.
    b) What is difference between recovery voltage & arc voltage?
    c) What is Arc Phenomenon?
    d) State Application & Properties of SF6 Circuit Breaker.
    e) Explain ELCB.
    f) State the factors on which Arc resistance is depends.
    g) Classify oil circuit breaker.

Q.7   a) Explain in details Vacuum circuit breaker. 07
    b) Explain in details Bus Bar Protection system. 08

Q.8   a) Explain in details Microprocessor based impedance relay. 07
    b) Explain in details Air circuit breaker. 08

Q.9   a) An 11 KV 500 MVA circuit breaker suddenly closes on to a top fault determine 07
      i) Symmetrical breaking current
      ii) Asymmetrical breaking current assuming 50% of D.C. Component
      iii) The peak making current
      iv) Short time current rating
    b) Derive the expression for RRRV &Maximum value of RRRV. 08

Q.10 **Write a short note on**
    a) Protection of substation against direct stroke 05
    b) MCB 05
    c) Surge Absorber 05

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