

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2017

Marks Scored:

Level : B.E.

Year : IV

Exam Roll No. :

Time : 30 mins.

Course : EPEG 415

Semester : II

F. M. : 10

Registration No. :

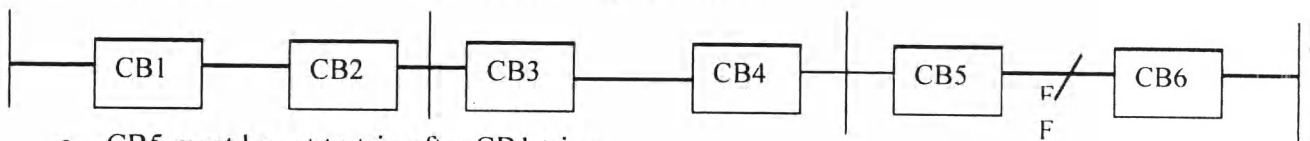
Date AUG 18 2017

SECTION "A"

[20 Q. × 0.5 = 10 marks]

1. What does protective relay provide?
 - a. Provide additional safety to the circuit breaker in its operation
 - b. Close the contacts when the actuating quantity attains a certain predetermined value
 - c. Limit the arcing current during the circuit breaker operation
 - d. Earth or ground any stray voltage
2. What is fusing factor?
 - a. The ratio of current rating of the fuse to the minimum fusing current
 - b. The ratio of minimum fusing current to the current rating of the fuse
 - c. The ratio of maximum fusing current to the current rating of the fuse
 - d. The ratio of minimum fusing current to the voltage rating of the fuse
3. What happens in the arc extinction using high resistance method?
 - a. Arc resistance is decreased with time
 - b. Arc resistance is increased with time
 - c. No change it remains same
 - d. Arc resistance is kept zero
4. For which among the following the current ratings are not required?
 - a. Circuit breaker
 - b. Relays
 - c. Isolators
 - d. Load break switch
5. Capacitance Voltage transformers is used to
 - a. improve the pf of the transmission line
 - b. reduce losses in a transmission line
 - c. connect instruments of the LT side
 - d. reduce the incidence of overvoltage surges on transmission lines
6. The rating of fuse wire is always expressed in
 - a. Ampere-hours
 - b. kWh
 - c. Amperes
 - d. ampere-volts
7. Earthing switch is used for
 - a. measuring of safety voltage
 - b. protection of equipment from ground faults
 - c. discharging residual energies
 - d. to detect a fault condition and interrupt current flow
8. In case of failure of prime mover of the generator, which type of relay is used?
 - a. offset mho relay
 - b. reverse power relay
 - c. impedance relay
 - d. distance relays
9. A fuse wire of circular cross-section has a radius of 0.8 mm. The wire blows off at an current of 8 Amp. Calculate the radius of wire that will blow off at a current of 1 amp?
 - a. 0.2 mm
 - b. 0.4 mm
 - c. 4 mm
 - d. 2 mm
10. The rating of CB is in terms of
 - a. volt – ampere
 - b. current
 - c. voltage
 - d. VAR

11. The pickup value of relay is 6.5 Amp and fault current in relay coil is 39 Amp. Its plug setting multiplier is
 a. 6 A b. 7 A c. 8 A d. 10 A
12. The rate of rise of restriking voltage depends upon the
 a. Inductance and capacitance of the system
 b. Capacitance of the system
 c. Inductance of the system
 d. Type of CB
13. Main bus bar protection scheme is /are
 a. Differential protection b. Both fault bus and differential protection
 c. fault bus protection d. relay protection
14. Merze price current scheme protection is used in
 a. transformer b. alternator
 c. Transformer and bus bar d. Transformer and Alternator
15. Where the voltage is high and current to be interrupted is low, which of following the breaker is preferable?
 a. Oil CB b. Vacuum CB
 c. Air blast CB d. Minimum oil circuit breakers
16. The arc voltage produced in an AC circuit breaker is always
 a. In phase opposition with the arc current b. In phase with the arc current
 c. lagging the arc current by 90 d. leading the arc current by 90
17. Three sections of a feeder are provided with circuit breakers CB1, CB2, CB3, CB4, CB5 and CB6. For the fault F as indicated in the given figure.



- a. CB5 must be set to trip after CB1 trips
 b. CB5 must be set to trip after CB3 and CB4 trips
 c. CB5 must be set to trip after CB2 trips
 d. CB5 must be set to trip before CB1, CB2, CB3 and CB4 trip
18. Plug setting of a relay can be altered by varying
 a. air gap of magnetic path b. no. of ampere-turns
 c. adjustable back up stop d. varying TSM
19. The value of fusing factor is
 a. less than unity b. more than unity c. unity d. varying
20. Back-up protection is generally employed for protection against
 a. short-circuit b. other than short-circuit
 c. external faults d. internal faults

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Level : B.E.
Year : IV
Time : 2 hrs. 30 mins.

Course : EPEG 415
Semester : II
F. M. : 40

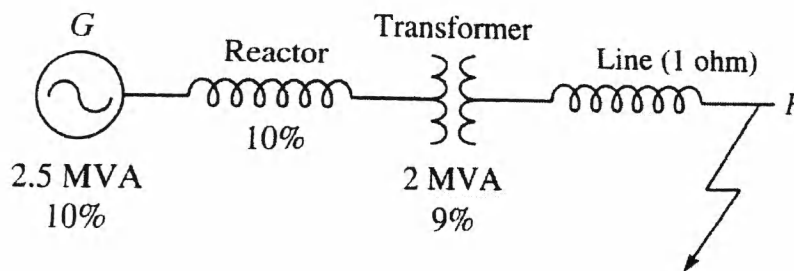
SECTION "B"

[4Q × 10 = 40 marks]

Attempt *ANY FOUR* questions.

1. a) Discuss various zones of protection for a modern power system. What is the role of back up protection? Also mention various method of providing back up protection. [5]
b) Discuss on the cutoff characteristics of fuse. [5]

2. a) A single phase power system network is shown in fig. A short circuit occurs at point F. The voltage at point *F* is 66 kV. Calculate:
i) The fault current, without series reactor [5]
ii) The fault current, with series reactor. [5]



- b) How are travelling waves produced in a transmission line? Draw and explain generalized wave shape of lightning stroke. [5]

3. a) Discuss arc phenomenon in a circuit breaker and also explain low resistance or zero point extinction method of arc extinction applied to circuit breaker. [5]
b) A 50 Hz generator has e.m.f to neutral 7.5 kV (r.m.s). The reactance of generator and the connected system is 4Ω and distributed capacitance to neutral is $0.001 \mu\text{F}$ with resistance negligible. Find [5]
i. maximum voltage across the circuit breaker contacts
ii. frequency of oscillations
iii. RRRV average upto first peak of oscillations

4. a) Explain with the help of neat diagram the construction and working of induction type relay. [5]
b) Describe the Merz-Price circulating current system for the protection of transformers. [5]

5. a) Discuss the time-graded over current protection for parallel feeders. [5]
b) Differentiate between fuse, circuit breakers and isolator. [5]

