

BE Semester-VIITH (ELECTRICAL) Question Bank

(ELECTRICAL SWITCHGEAR)

All questions carry equal marks(10 marks)

Q.1	What is resistance switching? Prove, with derivation, that the restriking voltage can be reduced by incorporating resistance switching in an air blast circuit breaker.
Q.2	Explain slepain's theory of arc interruption and discuss its limitations. How does energy balance theory explain the process of arc extinction?
Q.3	Explain the construction, working principle of Puffer type SF6 circuit breaker with neat diagram.
Q.4	Explain the phenomenon of current chopping and its effects on circuit interruption. What measures are taken to reduce it?
Q.5	A 3 pole circuit breaker is rated as 1250 A, 500 MVA, 12 KV, 3 second vacuum circuit breaker. Find : (i) Rated service voltage (b) Rated normal current (iii) Rated symmetrical breaking current (iv) Rated Making current (v) Rated short time withstand current
Q.6	In a 220 KV power system the series inductive reactance and capacitance per phase up to the location of circuit breaker is 6Ω and $0.02 \mu\text{F}$ respectively. A resistance of 500Ω is connected across the contacts of circuit breaker. Determine the following when the circuit breaker opens: (i) Natural frequency of transient oscillations. (ii) Damped frequency of oscillations (iii)Critical value of damping resistance, which will give no transient oscillations.
Q.7	Explain a trip circuit diagram for the automatic operation of circuit breaker on fault.
Q.8	Explain the energy balance theory of arc interruption in ac circuit breaker.
Q.9	Define the following time quantities related to circuit breaker:(i) Total fault clearing time(ii)Break time(iii)Arcing time(iv)Opening time
Q.10	Distinguish clearly between recovery voltage and restriking voltage and explain the significance of RRRV in the operation of circuit breaker.
Q.11	Explain the duty of circuit breaker for capacitor bank or unloaded transmission line switching.
Q.12	Discuss the following term with reference to circuit breaking: 1) Rated Breaking capacity 2) Rated Making capacity 3)Rated Operating Duty

Q.13	Explain the construction, working principle of Puffer type SF6 circuit breaker with neat diagram.
Q.14	Explain the following duties which a circuit breaker has to perform: (i) Interruption of terminal faults (ii) capacitor switching.
Q.15	Explain the construction, working principle, merits and demerits of minimum oil circuit breaker.
Q.16	Explain the construction, working principle , merits and demerits of air blast circuit breaker
Q.17	Explain the principle, construction of vacuum circuit breakers. Also state the merits of VCBs.
Q.18	Explain the construction, working principle , merits and demerits of air break circuit breaker
Q.19	With neat diagram explain the principle of synthetic testing of circuit breaker. State its advantages.
Q.20	Explain working principle, construction, applications of HVDC circuit breaker.
Q.21	Explain Out of phase switching.
Q.22	Explain various duties of switchgear
Q.23	Explain interruption of short line faults by circuit breaker
Q.24	Explain Classification of restriking transients
Q.25	Explain various equipments used in short circuit testing stations
Q.26	Derive the equation of critical resistance in resistance switching.
Q.27	Explain various rated operating duty of circuit breaker.
Q.28	Explain Auto reclosure in circuit breaker.
Q.29	In a short circuit test on a 72.5 KV circuit breaker, the following readings were obtained on a single frequency transient curve.(i) Time to reach the peak transient restriking voltage= 93 μ s. (ii) the peak restriking voltage = 137KV. Calculate the average RRRV and the frequency of transient oscillations.

Q.30	Classify the circuit breaker according to (i) arc quenching medium (ii) Rated voltage (iii) location (iv) Design
Q.31	Explain the construction, working principle, of Bulk oil circuit breaker with neat diagram.
Q.32	Discuss the influence of the power factor and circuit conditions on the instantaneous value of recovery voltage.
Q.33	Explain how arc is initiated and sustained in a circuit breaker when the circuit breaker contacts separate.
Q.34	Explain the fault clearing process by using circuit breaker.
Q.35	How breaking and making capacity of a circuit breaker is tested in a laboratory type of short circuit testing station?
Q.36	What are the different Methods of testing of circuit breakers? What is direct testing?
Q.37	What are the various methods of indirect testing? Describe unit testing.
Q.38	State the difference between series current injection and Parallel current injection methods of synthetic testing.
Q.39	State the various tests carried out to prove the ability of a circuit breaker. Distinguish between type tests and routine tests.
Q.40	Why are short circuit test necessary? What information can be obtained from short circuit tests?