

Multiple Choice Question Bank

Switchgear and Protection

VIII Semester Electrical Engineering

1. The main function of a fuse is to
 - a) Protect the line
 - b) **Prevent excessive currents**
 - c) Open the circuit
 - d) None of the above
2. On which of the following routine tests are conducted?
 - a) Oil circuit breakers
 - b) Air blast circuit breakers
 - c) Minimum oil circuit breakers
 - d) **All of the above**
3. SF₆ gas
 - a) **Is nontoxic**
 - b) Is yellow in color
 - c) Is lighter than air
 - d) Has pungent smell
4. The arcing contacts in a circuit breaker are made of
 - a) Porcelain
 - b) **Copper tungsten alloy**
 - c) Electrolytic copper
 - d) Aluminium alloy
5. The thermal circuit breaker has
 - a) **Delayed trip action**
 - b) Instantaneous trip action
 - c) Instantaneous short action
 - d) Any of the above
6. Relays can be designed to respond to changes in
 - a) Resistance, reactance or impedance
 - b) Voltage and current
 - c) Temperature
 - d) **All of the above**
7. Overload relays are of _____ type
 - a) Solid state
 - b) Thermal
 - c) Electromagnetic
 - d) **All of the above**
8. Thermal overload relays are used to protect the motor against over current due to
 - a) Short-circuits
 - b) **Heavy loads**
 - c) Grounds.
 - d) All of the above

9. The magnetic circuit breaker has _____ trip action.
- Delayed
 - Instantaneous**
 - Short
 - None of the above
10. D.C. shunt relays are made of
- Few turns of thin wire
 - Few turns of thick wire
 - Many turns of thin wire**
 - Many turns of thick wire
11. The function of the circuit breaker is
- To safeguard the circuit**
 - On and off the circuit
 - To save human life
 - None of these
12. In order that current should flow without causing excessive heating or voltage drop, the relay contacts should
- Have low contact resistance**
 - Be clean and smooth
 - Be of sufficient size and proper shape
 - Have all above properties
13. Circuit breakers usually operate under
- Transient state of short-circuit current**
 - Sub-transient state of short-circuit current
 - The steady state of short-circuit current
 - After D.C. component has ceased
14. Circuit breakers are essentially
- Current carrying contacts called electrodes**
 - Arc extinguishers
 - Circuits to break the system
 - Transformers to isolate the two systems
15. The current zero interruption, in oil and air blast circuit breakers, is achieved by
- Lengthening of the gap
 - Cooling and blast effect
 - Both 1 and 2**
 - Deionizing the oil with forced air
16. Air blast circuit breaker is used for
- Over currents
 - Short duty
 - Intermittent duty
 - Repeated duty**

17. An efficient and well-designed protective relaying should have
- Good selectivity and reliability
 - Economy and simplicity
 - High speed and selectivity
 - All of the above**
18. The burden of a protective relay is the power
- Required to operate the circuit breaker
 - Absorbed by the circuit of relay**
 - Developed by the relay circuit
 - None of the above
19. Directional relays are based on the flow of
- Power**
 - Current
 - Voltage Wave
 - None of the above
20. Extinction of arc in air circuit breaker employed for the following medium?
- Water
 - Air**
 - Oil
 - SF6
21. A thermal protection switch can protect against
- Short-circuit
 - Temperature
 - Overload**
 - Overvoltage
22. Arc in a circuit behaves as
- A capacitive reactance
 - An inductive reactance
 - A resistance increasing with voltage rise across the arc**
 - A resistance decreasing with voltage rise across the arc
23. A differential relay measures the vector difference between
- Two current
 - Two voltage
 - Two similar quantities
 - Any of the above**
24. A transmission line is protected by
- Time graded and current graded overcurrent protection
 - Distance Protection
 - Both 1 and 2**
 - None of the above

25. A protective device, which reduces the steepness of wave front of a surge by absorbing surge energy is called
- Surge Diverters
 - Surge absorber**
 - Switching surges
 - Earthing screen
26. Large internal faults are protected by
- Merz price percentage differential protection**
 - Mho and ohm relays
 - Horn gaps and temperature relays
 - Earth fault and positive sequence relays
27. When a transmission line is energized, the wave that propagates on it is
- Current wave only
 - Voltage wave only
 - Both 1 and 2**
 - Power factor wave only
28. Protective relays are devices that detect abnormal conditions in electrical circuits by measuring
- Current during abnormal condition
 - Voltage during abnormal condition
 - Constantly the electrical quantities which differ during normal and abnormal conditions**
 - None of the above
29. The voltage appearing across the contacts after the opening of the circuit breaker is called _____ voltage.
- Recovery**
 - Surge
 - Operating
 - Arc
30. The rated voltage of the circuit breaker is
- RMS Phase to Phase Voltage**
 - Average Phase to Phase Voltage
 - RMS Ground to phase voltage
 - RMS Phase to Phase Voltage
31. Ionization in the circuit breaker is facilitated by
- High temperature
 - The increase of mean free path
 - Increasing field strength
 - All of the above**
32. A relay used on short transmission lines is
- Reactance Relay**
 - Mho's Relay
 - Impedance Relay
 - None of these

33. The time interval which is passed in between the energization of the trip coil to the instant of contact separation is called the _____
- a) **Opening Time**
 - b) Closing Time
 - c) Delayed Time
 - d) None of the above
34. Shunt capacitance is neglected while considering
- a) **Short transmission line**
 - b) Medium transmission line
 - c) Long transmission line
 - d) Medium and long transmission lines
35. The arc voltage produced in A.C. circuit breaker is always
- a) **In phase with the arc current**
 - b) Lagging the arc current by 90°
 - c) Leading the arc current by 90°
 - d) None of the above
36. IDMT Relay stands for
- a) Inverse Divide Minimum Time
 - b) Inverse Define Minimum Time
 - c) **Inverse Definite Minimum Time**
 - d) Inverse Differentiate Minimum time
37. Insulation resistance of high voltage circuit breakers is carried out when
- a) The circuit breaker is open
 - b) The circuit breaker is closed
 - c) **Any of the above**
 - d) None of the above
38. H.R.C. fuses provide the best protection against
- a) Overload
 - b) Reverse current
 - c) Open-circuits
 - d) **Short-circuits**
39. The ground wire should not be smaller than No _____ copper.
- a) 2
 - b) 4
 - c) 6
 - d) **10**
40. The delay fuses are used for the protection of _____
- a) **Motors**
 - b) Power outlet circuit
 - c) Fluorescent lamps
 - d) Light circuits

41. Which of the following is the least expensive protection for overcurrent in a low voltage system?
- a) **Rewireable fuse**
 - b) Isolator
 - c) Oil circuit breaker
 - d) Air break circuit breaker
42. Resistance grounding is used for voltage between
- a) 33kV to 66kV
 - b) **2.2 kV to 33 kV**
 - c) 3.3 kV to 11 kV
 - d) All of the above
43. The current zero interruption, in oil and air blast circuit breaker, is achieved by
- a) Deionizing the oil with forced air
 - b) **Lengthening of the gap or cooling the blast effect**
 - c) Lengthening of the gap
 - d) Cooling of the blast effect
44. In Railway applications _____ circuit breaker is used.
- a) SFe
 - b) Bulk oil
 - c) Minimum oil
 - d) **Air Blast**
45. MCB protects a circuit from
- a) Short circuit
 - b) Over Load only
 - c) **Both short circuit and overload**
 - d) None of the above
46. Wave trap is used to trap waves of
- a) Power frequencies
 - b) **Higher frequencies entering generator or transformer units**
 - c) Lower frequencies entering generator or transformer units
 - d) Medium frequencies entering generator or transformer units
47. The underground neutral transmission system is not recommended because of the system
- a) Insulation being overstressed due to overvoltages
 - b) Insulation overstress may lead to failure and subsequent phase to phase faults
 - c) Being inadequately protected against ground fault
 - d) **All of the above**
48. The reflection coefficient at the open-circuited end of a transmission line
- a) Zero
 - b) Infinity
 - c) **Unity**
 - d) None of the above

49. For the protection of power station buildings against direct strokes the requirements are
- Interception
 - Interception and conduction
 - Interception, conduction, and dissipation**
 - Interception, conduction, dissipation, and reflection
50. Which of the following is used for the measurement of the insulation resistance?
- Megger**
 - Wattmeter
 - Ammeter
 - Voltmeter
51. The interaction between a transmission line and the communication line is minimized by
- Transposing transmission as well as communication lines
 - Increasing the height of the transmission line tower
 - Increasing the distance between the two lines
 - All of the above**
52. In order to switch-off and EHV circuit for maintenance, the following sequence is adopted:
- Open the circuit breaker, open the isolator, operate the earth switch**
 - Operate the earth switch, open the isolator, open the circuit breaker
 - Open the isolator, operate the earth switch, open the circuit breaker
 - Open the isolator, open the circuit breaker, operate the earth switch
53. Which of the following statements is incorrect?
- Station batteries are used to operate relay only
 - The lightning arresters have basically surged diverters**
 - An impedance relay has maximum fault current when the fault occurs near the relay
 - A high-speed relay has an operation of 1 to 2 cycles
54. Discrimination between main and back up protection is provided by the use of relays
- Facts
 - Sensitive
 - Slow**
 - None of the above
55. Induction cup relay is operated due to changes in
- Current
 - Voltage
 - Both 1 & 2**
 - None of the above
56. A.C. network analyzer is used to solve problems of
- Load flow
 - Load flow and short-circuit
 - Load flow and stability
 - Load flow, short-circuit and stability**

57. Lightning arrester connected in a power system protect electrical equipment from
- Over-voltage due to indirect lightning stroke
 - Direct stroke of lightning
 - Frequency fluctuation
 - Overcurrent due to indirect lightning stroke**
58. Short-circuit currents are due to
- Single phase to ground faults
 - Phase to phase faults
 - Two-phase to ground faults
 - Three phase faults
 - Any of these**
59. In busbar protection what is the method of providing an earthed metal barrier surrounding a bus throughout its length called?
- Fault bus protection**
 - Time graded Overcurrent protection
 - Distance protection
 - Differential protection
60. Bus coupler is very essential in the arrangement
- Single bus
 - Double bus, double breaker
 - Main and transfer bus**
 - All of the above
61. For cost and safety, the outdoor substations are installed for voltages above
- 11 kV
 - 33 kV**
 - 60 kV
 - 110 kV
62. The short circuit in any winding of the transformer is the result of
- Mechanical vibration
 - Insulation failure
 - Loose connection
 - Impulse voltage**
63. A mho relay is used for protection of:
- Protection of a transformer against external fault
 - Long Transmission Line**
 - Protection of a transformer against all the internal faults and external fault
 - Medium Length lines
64. For which of the following protection from negative sequence currents is provided?
- Generators**
 - Motors
 - Transmission line
 - Transformers

65. A relay which measures impedance or a component of the impedance at the relay location is known as
- Induction Relay
 - Moving Coil Relay
 - IDMT Relay
 - Distance Relay**
66. Distance relays are generally
- Mho relays**
 - Reactance relays
 - Impedance relays
 - All of the above
67. For which of the following ratings of the transformer differential protection is recommended?
- Above 30 kVA
 - Equal to and above 5 MVA**
 - Equal to and above 25 MVA
 - None of the above
68. A _____ is used to measure the stator % winding temperature of the generator.
- Thermocouple
 - Pyrometer
 - Resistance thermometer
 - Thermometer**
69. The under voltage relay can be used for
- Generators
 - Busbars
 - Motors
 - All of the above**
70. The relay with inverse time is
- Directly proportional to the square of fault current
 - Direct proportional to the of fault current
 - Inversely proportional to the of fault current**
 - Inversely proportional to the square of fault current
71. Which of the following devices will receive voltage surge first traveling on the transmission line?
- Lightning arresters**
 - Relays
 - Step-down transformer
 - Switchgear
72. Which of the following parameter can be neglected for a short line?
- Inductance
 - Capacitance**
 - Resistance
 - Reactance

73. Series reactors should have
- a) **Low resistance**
 - b) High resistance
 - c) Low impedance
 - d) High impedance
74. Which of the following circuit breakers has high reliability and minimum maintenance?
- a) Air blast circuit breakers
 - b) **Circuit breaker with SF6 gas**
 - c) Vacuum circuit breakers
 - d) Oil circuit breakers
75. Arc in a circuit breaker is interrupted at
- a) **Zero current**
 - b) Maximum current
 - c) Minimum current
 - d) Maximum voltage
76. The transmission line has a reflection coefficient as one
- a) **Open circuit**
 - b) Short-circuit
 - c) Long
 - d) None of the above
77. What will be the reflection coefficient of the wave of the load connected to the transmission line if surge impedance of the line is equal to load?
- a) **Zero**
 - b) Unity
 - c) Infinity
 - d) None of the above
78. A Buchholz relay is used for
- a) **Protection of a transformer against all internal faults.**
 - b) Protection of a transformer against external faults.
 - c) Protection of a transformer against both internal and external faults.
 - d) Protection of induction motors.
79. Overvoltage protection is recommended for
- a) **Hydro-electric generators**
 - b) Steam turbine generators
 - c) Gas turbine generators
 - d) All of the above
80. In a thyrite lightning arrester the resistance
- a) Decrease linearly with the applied voltage
 - b) **Is high at low current and low at high current**
 - c) Is low at low current and high at high current
 - d) Increase linearly with the applied voltage

81. Over fluxing protection is recommended for
- Distribution transformer
 - Generator transformer of the power plant**
 - Auto-transformer of the power plant
 - Station transformer of the power plant
82. Series capacitors are used to
- Compensate for line inductive reactance**
 - Compensate for line capacitive reactance
 - Improve line voltage
 - None of the above
83. Admittance relay is _____ relay.
- Impedance
 - Distance**
 - Non-directional
 - None of the above
84. The material used for fuse must have
- The low melting point and high specific resistance
 - The low melting point and -low specific resistance**
 - High melting point and low specific resistance
 - Low melting point and any specific resistance
85. If the fault occurs near the impedance relay, the VI ratio will be
- Constant for all distances
 - Lower than that of if the fault occurs away from the relay**
 - Higher than that of if the fault occurs away from the relay
 - None of the above
86. The torque produced in induction type relay (shaded pole structure) is
- Inversely proportional to the current
 - Inversely proportional to the square of the current
 - Proportional to the current
 - Proportional to the square of the current**
87. The steady-state stability of the power system can be increased by
- Connecting lines in parallel**
 - Connecting lines in series
 - Using machines of high impedance
 - Reducing the excitation of machines
88. Stability of a system is not affected by _____
- Reactance of Line**
 - Losses
 - Reactance of generator
 - Output Torque

89. The following statement is associated with the Buchholz relay is not true
- It is a gas actuated device
 - It is a current operative device**
 - It is placed between the transformer tank and the conservator
 - It causes alarm for minor fault and tripping for major fault
90. A fuse is connected
- In series with the circuit**
 - In parallel with the circuit
 - Either in series or in parallel with circuit
 - None of the above
91. H.R.C. fuse, as compared to a rewirable fuse, has
- No aging effect
 - High speed of operation
 - High rupturing capacity
 - All of the above**
92. The fuse rating is expressed in terms of
- Current**
 - Voltage
 - VAR
 - KVA
93. Which one of the given fuse is bigger?
- DC**
 - AC
 - DC or AC
 - Both have same fuse size
94. MCB protects a circuit from
- Short circuit
 - Over Load only
 - Both short circuit and overload**
 - None of the above
95. In which of the following equipment, current rating is not necessary?
- Circuit breaker
 - Relay
 - Isolator**
 - Load break switch
96. A fuse in a motor circuit provides protection against
- Overload
 - Short-circuit**
 - Open circuit, short-circuit and overload
 - None of the above
97. Which of the following fuse is very fast in operation?
- KitKat fuse
 - Semiconductor Fuse**
 - Cartridge fuse
 - High rupturing capacity type

98. A fuse is never inserted in
- Neutral wire**
 - Negative of D.C. circuit
 - Positive of D.C. circuit
 - Phase line
99. The factor which influences the arc de ionisation dominantly _____
- line voltage**
 - magnitude of transient fault current
 - speed of reclosure
 - all of the mentioned
100. A three phase transformer having a line voltage ratio of 400/33000 V is connected in the star-delta. The CTs on the 400V side have a CT ratio of 1000/5. What must be the ratio of CTs on the 33000 side?
- 7/5**
 - 5/7
 - 3/5
 - 5/2
101. A three phase transformer having a line voltage ratio of 400/33000 V is connected in the star-delta. The CTs on the 400V side have a CT ratio of 1000/5. What will be the current through the pilot wire?
- $5\sqrt{3}$ A**
 - $5/\sqrt{3}$ A
 - 5 A
 - 1/5 A
102. The neutral of the three phase 20 MVA, 11kV alternator is earthed through a resistance of 5 ohms, the relay is set to operate when there is an out of balance current of 1.5 A. The CTs have a ratio of 100/5. What percentage of the winding is protected against L-G faults?
- 76.4
 - 77.8
 - 73
 - None of the mentioned**
103. The neutral of the three phase 20 MVA, 11kV alternator is earthed through a resistance of 5 ohms, the relay is set to operate when there is an out of balance current of 1.5 A. The CTs have a ratio of 100/5. What should be the minimum value of the earthing resistance to protect 90% of winding?
- 2.12 Ω**
 - 1.12 Ω
 - 4.24 Ω
 - 3.24 Ω
104. While a transformer is energised, the differentially connected relay will
- mal operate**
 - not mal operate
 - mal operate for lagging loads
 - never mal operate

105. If a transformer is provided with differentially connected relay. To prevent the mal operation of the relay, the relay operating coil is biased with _____
- a) 3rd harmonic
 - b) 2nd harmonic
 - c) 7th harmonic
 - d) **5th harmonic**
106. The frequency of the carrier in the case of carrier-current-pilot scheme is in the range of _____
- a) **50 kHz-500 kHz**
 - b) 1 kHz-10 kHz
 - c) 25 kHz-50 kHz
 - d) 15 kHz-25kHz