



PAKISTAN ENGINEERING COUNCIL

Sample MCQs

Electrical Engineering (Electric Power)

1. Please read all the instructions carefully and do not start the paper unless asked to do so.
2. Fill in your particulars (Name, Roll Number, PEC Registration Number, CNIC and Discipline) in BLOCK letters in the space provided.
3. You are not allowed to change your seat during the test.
4. Hand over your answer sheet to the invigilator at the end of each part and keep seated until allowed to leave the centre.
5. The examination is divided into three Parts viz Part-I, Part-II and Part-III, with 30 minutes break.
6. All questions are to be attempted and carry equal marks.
7. Passing marks for each part is 60%, and passing all three parts is mandatory to qualify EPE.
8. Use only the provided pencil to fill completely the correct choice circle on answer sheet.
9. Programmable calculator, laptop, mobile phone, iPod, and any storage device/electronic gadget are not allowed.
10. No extra sheet will be provided; any calculation may be worked out on the back of the paper.
11. No candidate is allowed to indulge in any Law and Order situation to affect the exam process, and responsible(s) will be disqualified.
12. Use of unfair means will also lead to disqualification.

Instructions for Part-I

This part is common to all disciplines, comprising 30 multiple choice questions of one mark each (Total Marks=30) with the duration of two hours.

Instructions for Part-II

This is a discipline based open book breadth examination, comprising 30 multiple choice questions of one mark each (Total Marks=30), with the duration of two hours.

Instructions for Part-III

This is a discipline based open book depth examination comprising 40 multiple choice questions of one mark each (Total Marks=40), with duration of three hours. The candidates will be allowed only for the specialized field / area of practice, for which already applied at the time of application.

Electrical Engineering (Electric Power)

Part-I

Total Marks: 30

Total Time: 2 hours

Name:	S/o, D/o, w/o:
Roll Number:	PEC Reg#:
CNIC:	Discipline:

Q.1: Quality control is aimed at:

- a. Maintaining the desired quality
- b. Exceeding the desired quality
- c. Continuously improving the quality
- d. Following the quality

Q.2: Which of these is correct with respect to a product developed or a service performed?.

- a. Bad quality is acceptable, but bad grade is not.
- b. Bad grade is acceptable, but bad quality is not.
- c. Neither bad grade nor quality is acceptable.
- d. Grade and quality is the same thing.

Q.3: Project A has an internal rate of return (IRR) of 21 percent. Project B has an IRR of 7 percent. Project C has an IRR of 31 percent. Project D has an IRR of 25 percent. Which of these would be the BEST project?

- a. Project A
- b. Project B
- c. Project C
- d. Project D

Q.4: What characteristic best describes the cost baseline?

- a. Total budget for the project
- b. Time phased budget for the project
- c. Total budget for the project including the contingency budget

- d. Total budget for the project including the contingency budget and the management reserve.

Q.5: Present worth is:

- a. The discounted future cash flows to the present
- b. The compounding present cash flows to the future
- c. The current market value of the investment
- d. The opportunity cost at the present value.

Q.6: The first preferred way to resolve a dispute between the contracting parties is:

- a. Arbitration
- b. Litigation
- c. Negotiation
- d. Mediation

Q.7: Following document define the legal rights and obligations of the parties and may be described as the regulations under which the contract will be performed.

- a. Specifications
- b. General Conditions of Contract
- c. Special provisions
- d. Bill of Quantities

Q.8: The minimum notice period for National Competitive bidding is:

- a. 30 days
- b. 45 days
- c. 35 days
- d. 15 days

Q.9: Tsunamis' is generated by:

- a. Earthquake
- b. Air currents
- c. Tidal waves
- d. Large Ocean waves

Q.10: Globalization has direct impact on:

- a. National security
- b. Economy
- c. Society
- d. All above

Q.11: The passive voice for the sentence "He is writing a letter" is;

- a. A letter is wrote by him
- b. A letter is written by him
- c. A letter is being written by him
- d. A letter is been written by him

Q.12: Choose the correct sentence

- a. He is elder than me
- b. He is older than me
- c. He is ager than me
- d. He is older than I

Q.13: Effective communication is

- a. The transfer of message from sender to receiver
- b. Sending of message
- c. Receiving of message
- d. The transfer of message from sender to receiver and get the desired response.

Q.14: Body language is form of;

- a. Personality and attitudes
- b. Non verbal communication
- c. Individual preference for expression
- d. The body expression

Q.15: Project feasibility report is aimed at;

- a. Informing the people
- b. Attracting the customer
- c. Justifying the investment
- d. Giving details of resources

Q.16: Research Proposal synopsis is developed at;

- a. Final stage of research
- b. Initial stage of research
- c. Before approval of research proposal
- d. In the middle of research

Q.17: Project monitoring is required:

- a. Before commencement of the project
- b. During implementation of the project
- c. After completion of the project
- d. At any stage of the project deemed necessary

Q.18: Re-appropriation Statement is form of

- a. Progress report
- b. Budget report
- c. Financial report
- d. Normal report

Q.19: PC-III (A) is used for

- a. For weekly progress report of public sector projects
- b. Monthly progress report of public sector projects
- c. Yearly progress report of public sector projects
- d. Quarterly progress report of public sector projects.

Q.20: Acquiring management and leadership skills are _____ for a Professional Engineer

- a. Wastage of time
- b. Not important
- c. Highly important
- d. Not necessary

Q.21: Engineering ethics refers to:

- a. The rules and standards given by an institution for Engineering practice
- b. The rules and regulation relating to obligations and rights of others.
- c. The professional regulation
- d. The rules and standards which govern the conduct of Engineers as professional Engineers.

Q.22: How many commandments are given in PEC Code of Ethics?

- a. 20
- b. 30
- c. 10
- d. 05

Q.23: As per PEC Code of Conduct a member shall report unethical professional practices of an engineer or a member with substantiating data to

- a. Court of Law
- b. Concerned Department
- c. Pakistan Engineering Council
- d. Law enforcing Agency

Q.24: When a member uses designs, plans, specifications, data and notes supplied to him by a client or an employer or are prepared by him in reference to such client or the employer's work such designs, plans, specifications, data and notes shall remain the property of the _____ and shall not be duplicated for any use without the express permission of the _____.

- a. Member, Member
- b. Client, Client
- c. Member, Client
- d. Client, Member

Q.25: As per PEC Code of Conduct to maintain, uphold and advance the honor and dignity of the engineering professional, a member shall do following except:

- a. uphold the ideology of Pakistan
- b. be honest, impartial and serve the country, his employer, clients and the public at large with devotion.
- c. Uphold personal interest first
- d. use his knowledge and skill for the advancement and welfare of mankind

Q.26: Conflicts are faced when:

- a. There are more than one expected outcomes
- b. There are more than one expected benefits and losses
- c. There is choice between two or more moral values each having its own merits.
- d. There are opposing outcomes.

Q.27: An example of a conflict of interest would be:

- a. As a responsible official you make a decision about a contract award that will benefit you personally
- b. You and a functional manager disagree with a task cost estimate
- c. Your sponsor decides to cancel your project because it no longer supports the company strategy
- d. Your personality conflicts with that of a key member of your project team.

Q.28: Adherence to professional ethics is _____ an engineer to society.

- a. Not obligation of
- b. An obligation of
- c. Optional for
- d. None of above

Q.29: While designing a project by an engineer, _____ should be taken into account to protect cultural heritage

- a. All possible alternates
- b. No protection
- c. Minimum protection
- d. No care

Q.30: Close interpersonal relationships are characterized by high intimacy whereas distressed relationships tend to involve reciprocation of _____ behaviour.

- a. positive
- b. negative
- c. normal
- d. casual

Answers:

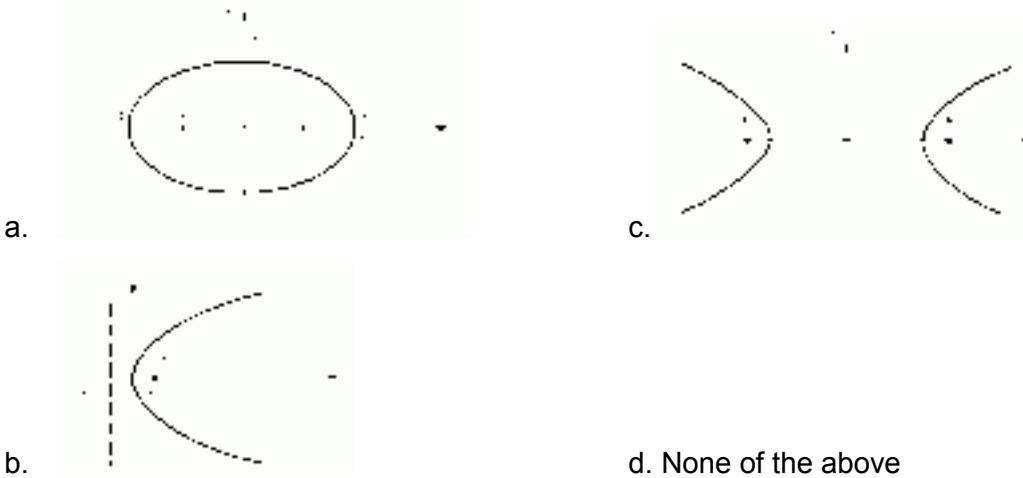
1. a
2. b
3. c
4. b
5. a
6. c
7. a
8. d
9. a
10. d
11. c
12. b
13. d
14. b
15. c
16. c
17. b
18. c
19. b
20. c
21. d
22. c
23. c
24. b
25. c
26. c
27. a
28. b
29. a
30. b

Part-II (Breadth of discipline)

Total Marks: 30

Total Time: 2 hours

Q.1: Which of the following is a hyperbola ?



Q.2: Integrating $\int \frac{\ln(\frac{1}{x})}{x^2} dx$ will result in

- a. $\frac{1}{x} \ln\left(\frac{1}{x}\right) - \frac{1}{x} + c$
- b. $\frac{1}{x} + c$
- c. $-\left(\frac{1}{x} \ln\left(\frac{1}{x}\right) - \frac{1}{x}\right) + c$
- d. None of the above

Q.3: An $n \times n$ matrix is said to be symmetric if;

- a. If it is equal to its transpose
- b. If its determinant is equal to zero
- c. If it is of 2nd order
- d. None of the above

Q.4: Mathematically, what is a differential?

- a. A technique used for mathematical modeling.
- b. A method of directly relating how changes in an independent variable affect changes in a dependent variable.
- c. A method of directly relating how changes in a dependent variable affect changes in an independent variable.

- d. None of the above

Q.5: The maximum current will pass through

- a. Resistance
- b. Inductance
- c. Capacitance
- d. None of above

Q.6: An element which consumes energy instead of storing in it is

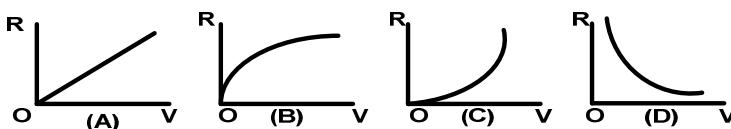
- a. Resistor
- b. Inductor
- c. Capacitor
- d. Conductor

Q.7: A 1000W heater is rated to operate at a direct current (DC) of 10A. If the heater is supplied alternating current (AC) for producing the same quantity of heat the value of current should be

- a. $I_{av}=10A$
- b. $I_{rms}=10A$
- c. $I_{peak}=10A$
- d. $I_{rms}=10\sqrt{2}A$

Q.8: A fixed resistance 'R' is connected across a dc voltage source. If the voltage is gradually and uniformly increased, the relationship between V and R is correctly represented in which group

- a. Fig(A)
- b. Fig(B)
- c. Fig(C)
- d. Fig(D)



Q.9: The effects due to electric current are:

- I. Magnetic effect
- II. Heating effect
- III. Luminous effect

Application working on which effect can be used on AC as well as DC supply?

- a. I only
- b. II only
- c. II and III only
- d. I, II only

Q.10: The root locus of a unity feed-back system is shown in fig. The open loop transfer function is given by:

- a. $k/s(s+1)(s+2)$
- b. $k(s+1)/s(s+2)$
- c. $k(s+2) / s(s+1)$
- d. $ks / (s+1)(s+2)$

Q.11: A certain common-emitter amplifier has a voltage gain of 100. If the emitter bypass capacitor is removed.

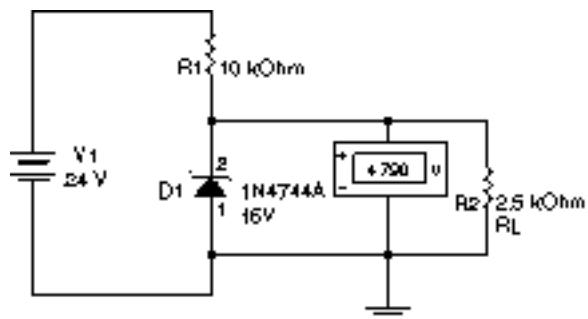
- a. The circuit will become unstable
- b. The voltage gain will decrease
- c. The voltage gain will increase
- d. The circuit will become stable

Q.12: A Darlington transistor connection provides a transistor having a very large

- a. Current gain
- b. Voltage gain
- c. Impedance gain
- d. Impedance matching gain

Q.13: What is wrong with this circuit?

- a. The zener is open
- b. The zener is shorted
- c. Nothing
- d. Not enough data



Q.14: An oscillator that uses a tapped coil to obtain the feedback is called:

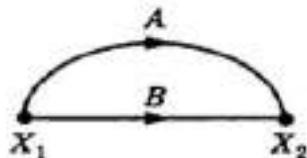
- a. A Hartley circuit
- b. A Pierce circuit

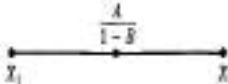
- c. A multivibrator
- d. A negative feedback circuit

Q.15: If the output filter capacitor in a power supply actually had a value twice its stated value, which of the following symptoms would be found?

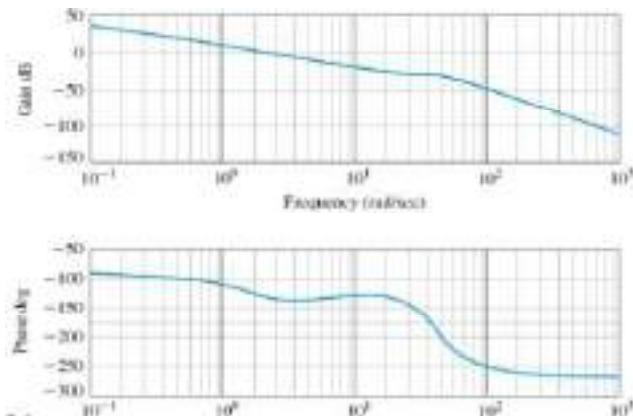
- a. The output voltage would be doubled and a small improvement in the ripple voltage would be detected.
- b. The ripple voltage would be half of what is expected and a small increase in the output voltage would be detected.
- c. The output and ripple voltage would be greater than expected.
- d. The output and ripple voltage would be less than expected.

Q.16: What is the simplified version of the signal flow graph represented below?



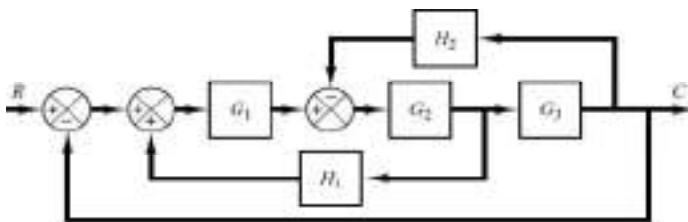
- a.) A circle containing BA with an incoming arrow from X_1 and an outgoing arrow to X_2 .
- b.) A horizontal line with gain $A + B$ connecting X_1 and X_2 .
- c.)  A horizontal line with gain $\frac{A}{1-B}$ connecting X_1 and X_2 .
- d.) A circle containing AB with an incoming arrow from X_1 and an outgoing arrow to X_2 .

Q.17: Consider the Bode Plot of a system shown below. Find the Gain Margin?



- | | |
|-------|-------|
| a. 50 | b. 20 |
| c. 30 | d. 10 |

Q.18: Consider a control system shown below. Its simplified model will be?



- | | | | |
|----|---|----------------------|---|
| a. | $\frac{G_1 G_2 G_3}{1 - G_1 G_2 H_1 + G_2 G_3 H_2 + G_1 G_3 H_3}$ | b. | $\frac{G_1 G_2 G_3}{1 - G_1 G_3 H_1 + G_2 G_3 H_2 + G_1 G_2 H_3}$ |
| c. | $\frac{G_1 G_2 G_3}{1 - G_1 G_2 H_1 + G_1 G_3 H_2 + G_1 G_2 H_3}$ | d. None of the above | |

Q.19: The spectrum of discrete-time Fourier transform will be:

- a. Periodic and discrete
- b. Aperiodic and continuous
- c. Periodic and continuous
- d. Aperiodic and discrete

Q.20: Frequency is inherently a physical quantity with characteristics.

- a. Positive
- b. negative
- c. both a &b
- d. none of above

Q.21: If $x(n) = \{1, 2, 5, 7, 0, 1\}$ then its region of convergence (ROC) will be:

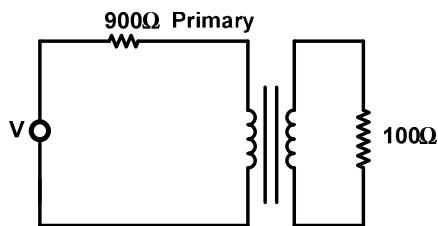
- a. Entire plane
- b. Entire plane except $Z=0$
- c. Entire plane except $Z=0$ and $Z= \infty$
- d. None of the above

Q.22: Which losses in a transformer varies significantly with load

- a. Hysteresis losses
- b. Eddy current losses
- c. Copper losses
- d. Core losses

Q.23: Consider the circuit shown in the given figure. For maximum power transfer to the load, the primary to secondary turn's ratio must be

- a. 9 : 1
- b. 3 : 1
- c. 1 : 3
- d. 1 : 9



Q.24: A lamp of 100W at 200V is supplied current at 100 volts. It will be equivalent to the lamp of:

- a. 50W
- b. 40W
- c. 25W
- d. 10W

Q.25: The CPU structure contains:

- a. Cache, ALU, Control Unit and Control Memory
- b. System Bus, ALU, Control Unit and Registers
- c. Memory, ALU, Control Unit and Cache
- d. Registers, ALU, Internal CPU Interconnection and Control Unit

Q.26: Clock Speed of which Intel microprocessor is 3 GHz?

- a. Core 2 Duo
- b. Core 2 Quad
- c. Pentium 4
- d. Pentium III

Q.27: Normally, the FPGA resources are used less than 70% because:

- a. Routing becomes excessively complicated
- b. Power issues
- c. Clock frequency
- d. Simulation time increases

Q.28: In which layer Telnet and FTP works?

- a. Application
- b. Session
- c. Network
- d. Physical

Q.29: As we know when there is a joint in optical fiber then there will be some loss then this loss be minimized by

- a. Using index matching fluid in the gap
- b. Making V-grooved splicing
- c. Both (a)and (b)
- d. Making carefully polishing

Q.30: Fast fading occurs if the channel_____ changes rapidly within the symbol duration.

- a. Bandwidth
- b. Frequency

- c. Impulse response
- d. None of the above

Answers:

- 1. c
- 2. c
- 3. a
- 4. c
- 5. c
- 6. a
- 7. b
- 8. a
- 9. c
- 10. a
- 11. b
- 12. a
- 13. a
- 14. a
- 15. b
- 16. b
- 17. c
- 18. a
- 19. c
- 20. a
- 21. c
- 22. c
- 23. a
- 24. c
- 25. d
- 26. b
- 27. a
- 28. a
- 29. a
- 30. c

Part-III (Depth: Electric Power)

Total Marks/ MCQs: 40

Total Time: 3 hours

(Sample MCQs = 28)

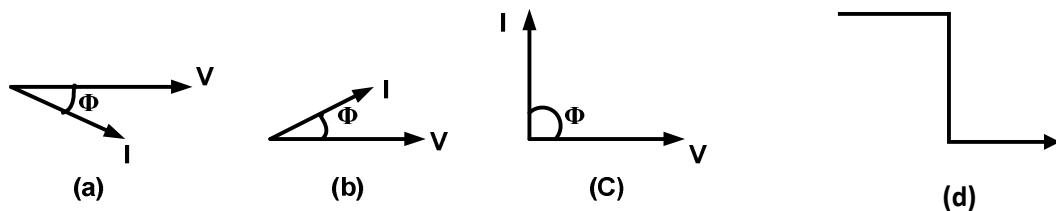
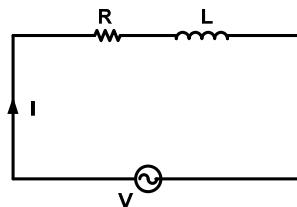
Q.1: Method of power factor improvement:

- a. Use of static capacitor and synchronous condensers
- b. Use of phase advancers
- c. Use of induction motors
- d. Both (a) and (b)

Q.2: According to the scheme of connection the distribution system is classified as:

- a. Radial system
- b. Ring main system
- c. Inter-connected system
- d. All of the above

Q.3: Figure below shows an R-L series circuit connected with a power source of voltage V , the phasor diagram of inductive load is



Q.4: What will be the efficiency when the transformer operates at unity power factor and 60% of full load

- a. 99%
- b. 96.5%

- c. 93.3%
- d. 91.8%

Q.5: Problem of instability of transmission line occurs due to excessive.

- a. Voltage drop
- b. Current drop
- c. Power drop
- d. None of above

Q.6: Shunt generator gives full voltage on load and the voltage drop as the load on the generator

- a. Decreases
- b. Increases
- c. Remains the same
- d. None of above

Q.7: KVA of an Auto-transformer of $V_1/V_2 = 220/150$ for a load of 100KVA is:

- a. 100KVA
- b. 50KVA
- c. 33.3KVA
- d. 20KVA

Q.8: Hysteresis losses in electrical machines is equal to

- a. $B_{1.2} \max f$
- b. $B_{1.6} \max f$
- c. $B_{1.2} \min f$
- d. $B_{1.2} \max f_{\min}$

Q.9: If the no load voltage of a certain generator is 220V and the rated load voltage is 200V, then the voltage regulation is:

- a. 1%
- b. 10%
- c. 20V
- d. 9%

Q.10: Which of the following quantity maintains the same direction whether a D.C. machine runs as a generator or as a motor

- a. Induced e.m.f.
- b. Armature Current

- c. Field Current
- d. Supply Current

Q.11: Probability of ionization is defined as:

- a. Number of ion pairs produced by an electron in traveling 1cm through gas at 760 mm Hg
- b. Number of ion pairs produced by an electron in traveling 1cm through gas at 1mm Hg
- c. Number of ion pairs produced by an electron in traveling 10cm through gas at 10 mm Hg
- d. Number of ion pairs produced by an electron in traveling 10cm through gas at 760 mm Hg

Q.12: High-voltage testing equipment is generally used in

- a. Routine testing Laboratories
- b. Research Laboratories
- c. Both of the above
- d. None of the above

Q.13: The frequency of the Trichel's pulses increases by:

- a. Increasing the gas pressure
- b. Decreasing the gas pressure
- c. Increasing the temperature
- d. Unaffected by any one of the above

Q.14: The probability of a photon ionizing an atom or molecule is maximum when $(hv-eV_i)$ is as small as:

- a. 0.5
- b. 1.5
- c. 3.5
- d. 10

Q.15: In air-core cable the surge voltage travels approximately at the speed of light and a cable of 100m length gives a delay of

- a. 0.666 μ sec
- b. 0.333 μ sec
- c. 1.555 μ sec
- d. 1 μ sec

Q.16: The degree of protection by ground wire depends upon the

- a. Arcing angle
- b. Shielding angle

- c. Power factor
- d. All of above

Q.17: Fuse wire protection system is usually not used beyond:

- a. 10A
- b. 25A
- c. 50A
- d. 100A

Q.18: The third generation relays - digital relays - are the basis of distribution system automation because of their:

- a. Self fault diagnostic capabilities
- b. Computing capabilities
- c. Easy interface for remote communication
- d. All of the above

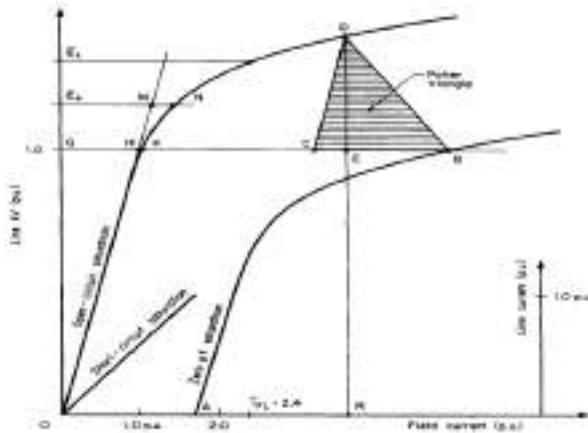
Q.19: Sparking occurs when a load is switched off because the circuit has

- a. High inductance
- b. High capacitance
- c. High resistance
- d. None of the above

Q.20: A series resistance is added to the over-current relay in a bus bar differential protection scheme which:

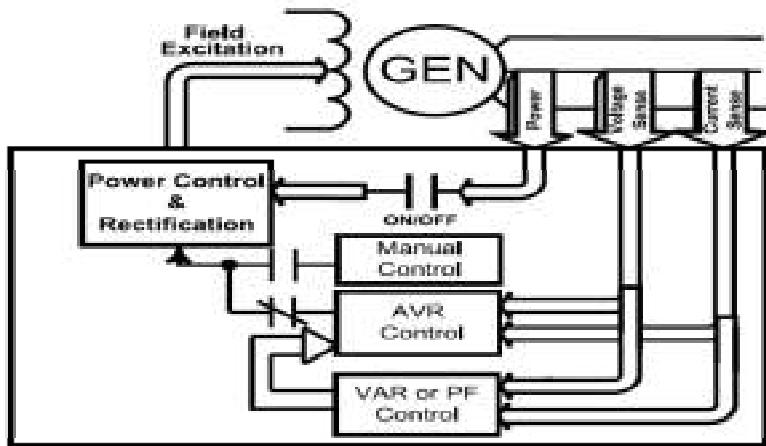
- a. Helps to develop some voltage across it which otherwise should appear across the relay and is dangerous
- b. Helps to dissipate some power which is needed by the relay to function properly
- c. Helps to counter the effects of CT saturation and lowers the pickup value of the relay
- d. All of the above

Q.21: A generator characteristic curves are shown below. The generator short circuit ratio is:



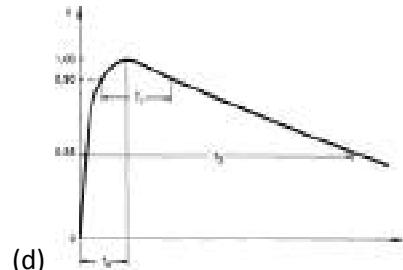
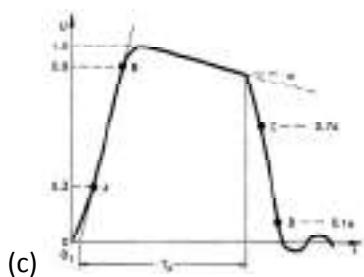
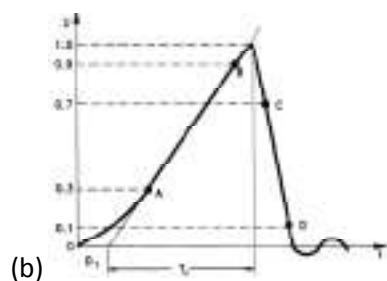
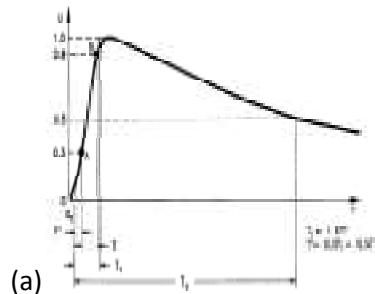
- a. SCR = 1.0
- b. SCR = 1.06
- c. SCR = 0.6
- d. SCR = 1.15

Q.22: A block diagram of an excitation system is shown below. What is the normal mode of operation?



- a. Manual Voltage Control
- b. Automatic Voltage Control
- c. VAR or PF Control
- d. Field Current Control

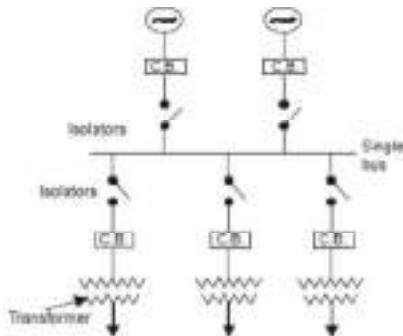
Q.23: Various standard lightning impulses are shown below. Which one of these is the Full Lightning Impulse:



Q.24: A standard switching impulse has:

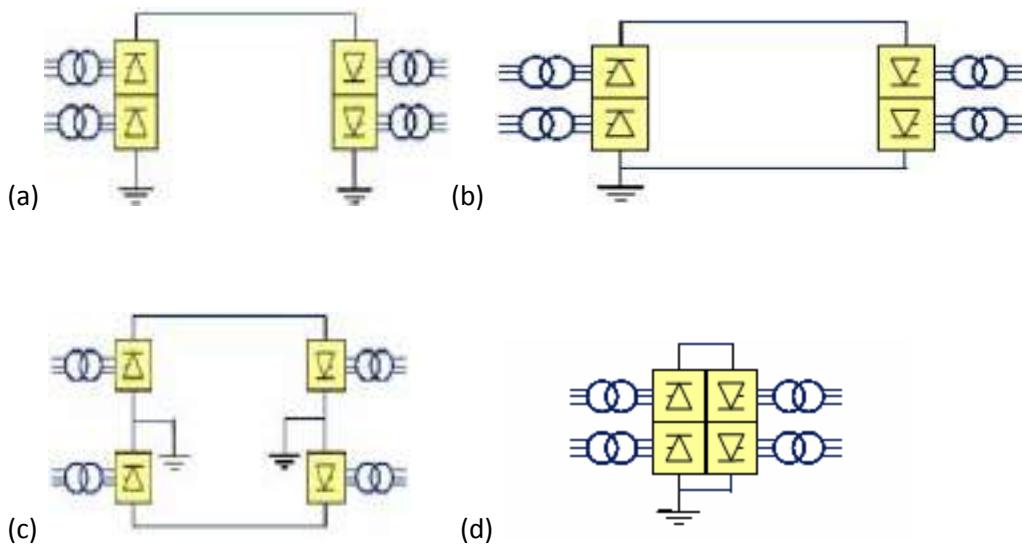
- a. A time to peak T_p of 250 μs and a time to half-value T_2 of 2500 μs
- b. A time to peak T_p of 1.2 μs and a time to half-value T_2 of 50 μs
- c. A time to peak T_p of 0.25 s and a time to half-value T_2 of 2.5 s
- d. A time to peak T_p of 0.12 s and a time to half-value T_2 of 0.5 s

Q.25: Which of the following statements is not true for the single busbar system shown below ?

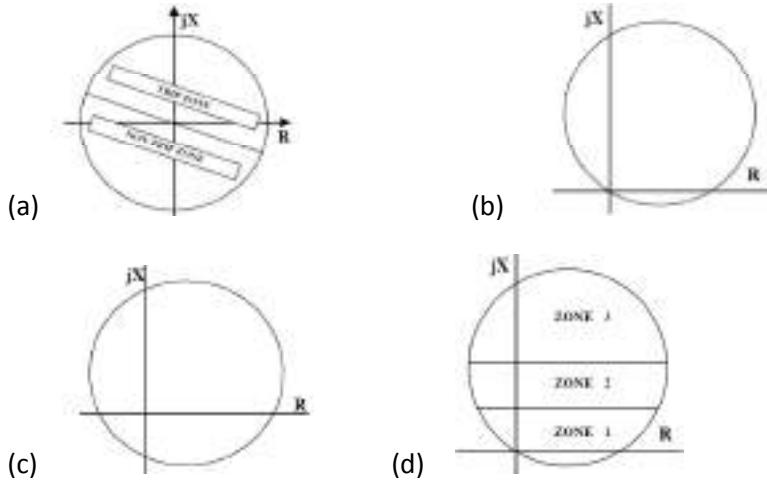


- a. The busbar cannot be cleaned or repaired without de-energising it
- b. In case of bus fault, there is complete interruption of power
- c. Single busbar system is characterised by high maintenance cost
- d. Single busbar system is characterised by simple operation

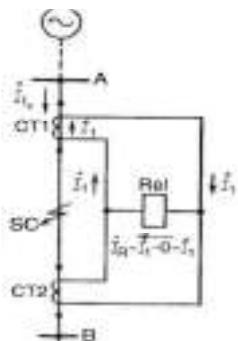
Q.26: In which of the HVDC Configurations shown below, two half voltage DC cables or line conductors can be used:



Q.27: Which of the following is the mho characteristic of a distance relay?



Q.28: A circulating current longitudinal relay performance is shown for a fault within its zone of protection in case of supply from single end. What will be the current flowing in the relay:



$$(a) \quad \vec{I}_R = \vec{I}_1 - \vec{I}_2 = 0$$

$$(b) \quad \vec{I}_R = \vec{I}_1 - 0 = \vec{I}_1$$

$$(c) \quad \vec{I}_R = \vec{I}_1 + \vec{I}_2$$

(d) None of the above

Answers:

- 1. d
- 2. d
- 3. a
- 4. b
- 5. a
- 6. b
- 7. b
- 8. b
- 9. b
- 10. a
- 11. b
- 12. c
- 13. a
- 14. d
- 15. b
- 16. b
- 17. d
- 18. d
- 19. a
- 20. c
- 21. c
- 22. b
- 23. a
- 24. a
- 25. c
- 26. c
- 27. b
- 28. b

