Government Polytechnic Sheohar

Department of Electrical Engineering
Unit wise Previous Years and Guess Questions

Subject: - *Fundamentals of Electrical and Electronics Engineering*

Prepared By: - *Mr. Pankaj Kumar* (*Guest Lecturer, EE*)

UNIT 01: Basic Electrical Parameters and Concepts

Q.1. Define i) charge ii) electric current iii) power iv) network & v) circuit.

Q.2. Define Resistance and specific resistance.

Q.3. Explain the factors affecting resistance of conductor.

Q.4. What causes current to flow?

Q.5. Why does current flow from positive to negative?

Q.6. Define electric potential, voltage, and potential difference.

Q.7. Calculate electric potential and potential difference from potential energy and electric field.

Q.8. Determine the charge stored on a 2.2 μF capacitor if the capacitor's voltage is 5 V

Q.9. Explain Series and parallel combination of resistors.

Q.10. Explain open and short circuit condition of electric circuit.

Q.11. Explain Types of Inductors including MEMS inductor and their applications.

UNIT 02 : Fundamental of DC and AC circuit

Q.1. Define (a) Current (b) E.M.F.

Q.2. State difference between E.M.F. and potential difference.

Q.3. Define power and energy.

Q.4. Find the cost of energy if 100w bulb operated 10 hrs daily for 30 days. Rate of energy is Rs. 5/unit.

Q.5. State and explain Ohm's law with its limitations.

Q.6. Define (a) Node (b) Branch (c) Loop (d) Mesh

Q.7. Explain Kirchhoff's Current Law with example.

Q.8. Explain Kirchhoff's Voltages Law with example.

Q.9. Explain voltage divider network with necessary circuits and equations.

Q.10. Draw and explain Energy band diagram of Insulator, Conductor and Semiconductor.

Q.11. Write a short note on: Series connection of batteries.

Q.12. Write a short note on: Parallel connection of batteries.

Q.13. Derive the expression for the value of resistance at 1°C.

Q.14. Explain the charging and discharging of a battery using suitable curves.

Q.15. Explain working of lead-acid.

Q.16. Explain the characteristics if lead acid battery.

Q.17. Explain how alternating EMF is generated? Also derive the equation of induced EMF

Q.18. Define: (a) Peak factor (b) Frequency (c) Time period (d) Amplitude (e) Cycle

Q.19. Define average value and RMS value of an alternating current.

Q.20. Derive equations of RMS value of sinusoidal waveform.

Q.21. The maximum value of a sinusoidal alternating voltage is 100v. Find out average and RMS value.

Q.22. Explain sector representation of an alternating quantity.

Q.23. Explain with diagram phase and phase difference.

Q.24. Explain multiplication and division of vector.

Q.25. Explain the case, when A.C. supply is given to pure resistor.

Q.26. Draw wave form of A.C. Voltage and current when it passes through pure resistor, pure indicator and pure capacitor.

Q.27. Prove that in ideal inductor current lags voltage by 90 degrees.

Q.28. Prove that in ideal capacitor current leads voltage by 90 degrees.

Q.29. Draw power triangle and explain active power, reactive power and apparent power.

Q.30. Define Peak factor and Power factor.

Q.31. Discuss use of power triangle in realization of different types of power.

Q.32. Draw phasor representation for: (a) In phase current (b) Lagging current.

Q.33. What is the series resonance?

Q.34. What is a parallel resonance?

Q.35. Determine the power factor of a RLC series circuit with R=5ohm, XL=8ohm and XC=12ohm.

Q.36. State the relationship between line voltage & phase voltage and line current & phase current of a 3-phase delta connected system

Q.37. Explain the concept of balanced load.

Q.38. What is phase sequence?

UNIT 03: Magnetic circuits and Electromagnetic induction

Q.1. Define Reluctance.

Q.2. What is its unit?

Q.3. Define Magnetic flux, Flux density.

Q.4. State the Lenz's law. State its applications.

Q.5. State Faraday's law of Electromagnetic Induction.

Q.6. State the phenomenon of magnetic Hysteresis.

Q.7. Define reluctance & permeance.

Q.8. Define magnetic flux density. State its unit.

Q.9. Define magneto motive force. State its unit.

Q.10. Define magnetic flux. State its unit.

Q.11. Draw experimental set up and explain how to obtain hysterics loop of a magnetic material.

Q.12. An iron ring of mean circumference 200cm is uniformly wound with 500 turns of wire. Calculate the value of flux density to produce a current of 1 Amp in the ring. Assume μ_r =1200.

Q.13. The field winding of a DC electromagnet is wound with 960 turns and has resistance of 50Ω when the exciting voltage is 230V, the magnetic flux linking the coil is 0.005wb. calculate the self inductance of the coil and energy stored in it.

Q.14. Compare electric and magnetic circuit.

Q.15. Draw a neat sketch of series magnetic circuit. State the value of reluctance for both series and parallel magnetic circuit. Name each term used.

Q.16. Explain the properties of magnetic materials used for, a) Permanent magnet b) Electromagnet c) Non-magnetic material

Q.17. Deduce the formula for reluctance of a magnetic material.

Q.18. Draw and explain the shape of hysteresis loop for a) Soft iron b) Steel c) plastic

Q.19. State Fleming's Right-hand rule.

Q.20. State Lenz's law.

Q.21. State the types of inductors.

Q.22. A magnetic flux of 0.6mwb passed through a coil of 1000 turns is revered in 0.05 seconds. Determine the average value of self-induced emf.

Q.23. Define coefficient of coupling.

Q.24. Distinguish between statically and dynamically induced emfs.

Q.25. A coil consisting of 1000 turns is placed in the magnetic field of 0.3 mwb. Calculate the average emf induced in the coil when it is moved in 0.06 seconds from the given field to a field of 0.1mwb. if the resistance of the coil is 200Ω, find the induced emf in the coil.

Q.26. State and explain Faraday's laws of electromagnetic induction.

Q.27. Define self inductance. Derive the equation for self inductance.

Q.28. Two coils A &B of 1200 turns are arranged such that 60% of the flux produced by A links with coil B. A current of 4A in coil A produces a flux of 0.05wb. Find, L1, L2 and M

Q.29. Define mutual inductance. Derive the equation for mutual inductance.

Q.30. Define dynamically induced emf. Derive the equation for mutually induced emf.

UNIT 04 : Basic Electronics Component

Q.1. Explain the operation of PN junction diode under forward and reverse bias conditions with the help of V-I characteristics curve.

Q.2. What is PN junction diode? With the help of circuit diagram, explain the V-I characteristics of a diode.

Q.3. Draw and explain the V-I characteristics of a Si (Silicon) diode.

Q.4. Draw and explain the V-I characteristics of a Ge (Germanium) diode.

Q.5. Define following diode parameters: (i) Static resistance (ii) Dynamic resistance (iii) Knee voltage (iv) Forward voltage drop (v) Maximum forward current (vi) Reverse saturation current (vii) Reverse breakdown voltage (viii) Peak inverse voltage (PIV) (ix) Maximum power rating.

Q.6. What is diode? Explain the various parameters of diode in brief.

Q.7. What is semiconductor diode? Explain the different equivalent circuits of diode.

Q.8. Explain Energy band theory and effect of temperature.

Q.9. Explain operation and characteristics NPN and PNP Transistor.

Q.10. Explain operation and characteristics field effect transistors.

Q.11. Write the Classification of FET and advantages.

UNIT 05: Overview of Digital Electronics

Q.1. What is Boolean algebra? Explain the basic laws of Boolean algebra.

Q.2. State and prove DE Morgan's theorem.

Q.3. Explain the basic gates AND, OR and NOT gates with truth tables.

Q.4. Write the symbol and truth table of the following gates: (i) AND (ii) NOR (iii) XOR (iv) NAND

Q.5. Write symbol and truth tables of AND, OR, EX-OR and NOT gates.

Q.6. What is number system.

Q.7. Explain (a)Binary number system (b) Octal number system (c) Decimal number system (d) Hexadecimal (hex) number system

Q.8. Convert the following binary numbers to decimal numbers: (a) 110 (b) 1011 (c) 1110 (d) 1001

Q.9. Convert the following binary numbers to decimal numbers: (a) 101010 (b) 111000 (c) 1000001 (d) 10111000

Q.10. Convert the following decimal numbers to binary numbers:
(a) 31 (b) 42 (c) 57 (d) 63