Subjective questions on MET-05

Q1.What do you understand by electricity? What are the various types of electricity used for power applications?

Q2.Explain briefly the following terms with examples:
(1) Conductors
(2) Insulators
(3) Capacitors
(4) Switches
(5) Current

Q3.Write short notes on the following.
(1) Ohm's law
(2) Kirchhoff law

Q4. Write the symbol and units of the following quantities:
Current, voltage, resistance, charge, power, temperature, frequency, capacitance, inductance, Luminous intensity, flux,

Q5.(a).Define Resistance?.What are the various factors affecting resistance of a conductor?
(b).Two wires one of copper and other of iron, are of the same length and same radius. Which will have more resistance? Give reason.

Q6.Define the term resistance and state its S.I unit. Write an expression connecting resistance and resistivity. State the meaning of symbol used.

Q7.Draw a circuit diagram connecting three resistance R_1,R_2,R_3 in series and parallel
And drive the formula for equivalent resistance in both cases.

Q8.Three resistance of 2Ω,3Ω and 4Ω are connected in (a)series (b)parallel.
Find the equivalent resistance in each case.(9ohm,.92 ohm)

Q9.Write an expression for the electrical power spent in flow of current through a conductor in terms of (a) resistance and potential difference (b) current and resistance.
Also state the meaning of the symbols used.

Q10.A electric bulb rated at 100W is connected to the main supply. Find the amount of electrical energy consumed by the bulb in 30 days if the bulb is switched on for 8 hrs daily?(2.4kwh/units)

Q11.4 tube lights of 40w each, 2 fans of 60w each ,a television of 100w and an air conditioner of 1kw are used for 6hrs daily .Find the cost of electrical energy for the month of march if 1 unit of energy costs Rs2.50.(Rs641.70)

Q12.An electrical appliance is rated 1500w, 250 volt. This appliance is connected to 250v mains. Calculate :(a)the current drawn (b)the electrical energy consumed in 60 hrs(c) the cost of electrical energy consumed at a rate of Rs 4.50 per kwh.(6A,90kwh,Rs405)

Q13.An electric lamp of 100 ohm toaster of resistance 50 ohm, and a water filter of resistance 500ohm are connected in parallel to a 220V source. What is the resistance of an electric iron connected to the same source that takes as much current as all the three appliances, and what is the current through it(7.04A)

Q14.An electric motor takes 5A from a 220V line .Determine the power of the motor and the energy consumed in 2hr. (1100w, 2.2kwh)

Q15. What is fuse? Name the material of the fuse. State characteristic of material used for fuse.

Q16.What is the common methods used for circuit protection?

Q17.What is natural and artificial magnets? State two reasons why we need artificial magnets.

Q18.Explain the comparison between electromagnet and permanent magnet.

Q19.Describe the advantages and uses of electromagnet.

Q20.What is electromagnetic induction? State Faraday's law of electromagnetic induction.

Q21.What is Lenz's law .State Fleming's right hand rule.

Q22.Explain the construction & principle of a.c generator with the help of labeled diagram

Q23.What is a transformer .Explain its principle, various types and uses

Q24. (a)What are the losses in transformers ? Explain.
(b)Why does the transformer require cooling? What are the methods of cooling?

Q25.An step down transformer has a primary coil of 340 turns and secondary coil of 11 turns. Its primary is plugged into an outlet with 110V(AC).If the current in the secondary coil is 25.65A,What current does the primary coil draw? What Is the power output of the transformer? (.83A, 91.31w)

Q26.Compare the following
(1) Alternating and direct current
(2) A.c.generator and d.c motor

Q27.What do you understand by D.C motors? What are its advantages over A.C motor?

Q28.Explain the construction & principle of d.c motor with the help of labeled diagram.

Q29.What is the different types of D.C motor? Explain in brief with the help of a circuit diagram.

Q30.What is a battery? How does it work?

Q31.How is the batteries classified? Explain briefly.

Q32.Explain briefly the construction, charging, discharging process of lead acid battery?

Q33.What do you understand by specific gravity of electrolyte? How do you measure battery capacity rating?

Q34.What precautions would you take in handling and maintenance of the battery ?

Q35. What is Alternating Current? Define the following in reference to A.C :
(a).Instantaneous value of alternating current
(b) Cycle of alternating current
(c) Time period of alternating current
(d) Frequency of alternating current
(e)Angular velocity of alternating current.

Q36.Describe the following
(a) Peak value of Alternating current.
(b) Average value of Alternating current.
(c) Root mean square value of Alternating current
(d) Form factor.
(e) Power of alternating current.

Q37. Briefly explain the power factor. How can it be improved?

Q38.Express each of the following in hertz:

a) 40 cycles in 4 sec
b) 80 cycles in 200millisec
c) 1000 revolution in 0.5 sec
d) 600 rotation in one minute

Q39. Express each of the following as angular velocity in radian per second:

a) 80 radian in 10 seconds
b) 2.5 kilo radian in 50 seconds
c) 400 radian in 200 seconds
d) 40 Mega radian in 10 seconds

Q40. Express each of the following frequency as angular velocity in radian per second

a) 60 Hertz
b) 500 Hertz
c) 10 K Hertz
d) 1M Hertz

Q41. Express each of the following periods in seconds

a) 500 Hertz
b) 90K Hertz
c) 900M Hertz
d) 5 Hertz

Q42. What is electronics? Mention some important application of electronics in Indian Railways.

Q43.Write short notes on the following :

a) Atomic structure.
b) Valence Electrons.
c) Free electrons.
d) Insulators.

Q44.What is the basis of classifying a material as a conductor,semiconductor or as a dielectric ? What is the conductivity of a perfect dielectric?

Q45. Differentiate between semiconductors, conductors and insulators? Briefly explain.

Q46 .What do you understand by a semiconductor? Discuss some important properties of a semiconductor.

Q47.Which are the most commonly used semiconductors and why?

Q48. Describe the difference between p type and n type semiconductors. What is a p-n junction?

Q49. Write short notes on the following:
(a) Holes in a semiconductor.
(b) Intrinsic semiconductor.
(c) Extrinsic semiconductor.
(d) Doping in semiconductors.
(e) Breakdown voltage.
(f) Zener diode.

Q50.What is a transistor? Show by means of diagram how you connect external batteries in npn and pnp transistors?

Q51. What do you understand by single phase, two phase and three phase alternator?

Q52.Draw a circuit diagram of 3 phase alternators in two different modes. Also write a formula for frequency with stating the meaning of each symbol used.

Q53.What is the various sources of electrical energy generation. Explain any two of them in detail.
Q54.Write the various methods of electrical energy conservation in detail.

Q55.Explain renewable energy, mention various forms of the same and elaborate on its potential in Indian Scenario.