

- Q.27 Explain the mathematical expression that power consumed in a pure inductance is zero.  
 Q.28 Define admittance, conductance and susceptance.  
 Q.29 Explain the constructional details of a core type transformer.  
 Q.30 Draw the phasor diagram and equivalent circuit of single phase transformer.  
 Q.31 In what ways does an auto-transformer differ from a conventional two-winding transformer? Write it's applications also.  
 Q.32 Explain the voltage regulation of a transformer.  
 Q.33 Define efficiency of a transformer and find the condition for obtaining maximum efficiency.  
 Q.34 Explain the construction of 3 phase transformer.  
 Q.35 Explain the working principle of thermal power plant.

#### **SECTION-D**

- Note:** Long answer type questions. Attempt any two questions out of three questions.  $(2 \times 10 = 20)$   
 Q.36 Derive the expression and draw the phasor diagram, impedance triangle of R-L series circuit.  
 Q.37 Explain the open-circuit and short circuit tests of a single phase transformer giving circuit diagram for each test. Also mention the uses of these tests.  
 Q.38 Draw the block diagram of Nuclear power station and Explain the function of its each part.

No. of Printed Pages : 4  
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122435/062434

**Branch : Mechatronics**  
**Subject:- Electrical Engineering Fundamentals / Basic Elect. Engg.**

Time : 3Hrs.

M.M. : 100

#### **SECTION-A**

**Note:** Multiple choice questions. All questions are compulsory  $(10 \times 1 = 10)$

- Q.1 An ideal voltage source has  
 a) Zero internal resistance  
 b) High internal resistance  
 c) Infinite internal resistance  
 d) Very low internal resistance  
 Q.2 When load resistance is very small as compared to internal resistance source, it will be have like a  
 a) Constant voltage source  
 b) Constant current source  
 c) Ideal voltage source  
 d) Ideal current source  
 Q.3 Thevenin's resistance  $R_{th}$  is determined  
 a) By a short circuiting the given two terminals  
 b) By removing the voltage source along with their internal resistance.  
 c) Between same open terminals as for  $V_{th}$   
 d) Between any two open terminals.  
 Q.4 Time constant of a R--L circuit is given by  
 a)  $T=L/R$       b)  $T=R/L$   
 c)  $T=RL$       d)  $T=R^2L$

- Q.5** The average value of sinusodial quantity is given by the relation:  
 a)  $I_m/\sqrt{2}$       b)  $0.707 I_m$   
 c)  $2I_m/\pi$       d) None of the above
- Q.6** In an a.c circuit, which of the following expression is true for apparent power?  
 a)  $V_{av} I_{av}$       b)  $VI \cos\theta$   
 c)  $V_{r.m.s} I_{r.m.s}$       d)  $VI \sin\theta$
- Q.7** The induced e.m.f in the transformer secondary will depend on  
 a) Frequency of the supply only.  
 b) Number of turns in secondary only.  
 c) Frequency and flux in core.  
 d) Frequency, number of secondary turns and flux in the core
- Q.8** Transformer core is laminated  
 a) Because it is difficult to fabricated solid core  
 b) Because laminated core provides high flux density  
 c) To avoid eddy current losses  
 d) To avoid hysteresis losses.
- Q.9** If the supply frequency to the transformer is increased the iron loss  
 a) Will not change      b) Will be zero  
 c) Will increase      d) Will decrease
- Q.10** Air preheater in a steam power plant  
 a) Recovers the heat from the flue gases leaving the economiser.  
 b) Improves combustion rate.  
 c) Raises the temperature of the furnace gases  
 d) All of the above.

## SECTION-B

- Note:** Objective type questions. All questions are compulsory. (10x1=10)
- Q.11** Draw the characteristics of practical voltage source.  
**Q.12** Define maximum power transfer theorem.  
**Q.13** If the frequency of an alternating current is 200 kHz, its time period will be \_\_\_\_\_  
**Q.14** Form factor is defined as the ratio of \_\_\_\_\_ and \_\_\_\_\_  
**Q.15** Define MMF.  
**Q.16** The energy stored in the magnetic field is \_\_\_\_\_ joules.  
**Q.17** Define reactive power.  
**Q.18** Define Auto-transformer.  
**Q.19** In a step up transformer, secondary turns are \_\_\_\_\_ than primary turns.  
**Q.20** In hydro-power plants operating cost is \_\_\_\_\_ and initial cost is \_\_\_\_\_.

## SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21** State and explain Superposition theorem.  
**Q.22** State and explain maximum power transformer theorem.  
**Q.23** Differentiate the similarities and dissimilarities of Electric and Magnetic circuit.  
**Q.24** Distinguish between self and mutual inductance.  
**Q.25** Derive an expression for the instantaneous value of alternating voltage varying sinusoidally.  
**Q.26** Show the r.m.s value of a sinusoidal a.c. Voltage of amplitude  $V_m$  is  $V_m \sqrt{2}$ .