



Discipline: **ELECTRICAL ENGINEERING**
(Faculty of Engineering & Technology)
3rd PhD ENTRANCE TEST (PET-2018)

Roll No: _____ Date: **3rd June 2018** Signature of the Candidate: _____

1. Transformer action requires:
 - (a) Constant magnetic flux
 - (b) Increasing magnetic flux
 - (c) Alternating magnetic flux
 - (d) Alternating electric flux

2. The no load current in a transformer lags the voltage by:
 - (a) 90 degree
 - (b) About 75 degree
 - (c) - 90 degree
 - (d) About 110 degree

3. A transformer secondary is connected to pure resistance load. The power factor on the primary side will be:
 - (a) Near about 0.95 (lead)
 - (b) Near about 0.95 (lag)
 - (c) Zero
 - (d) Unity

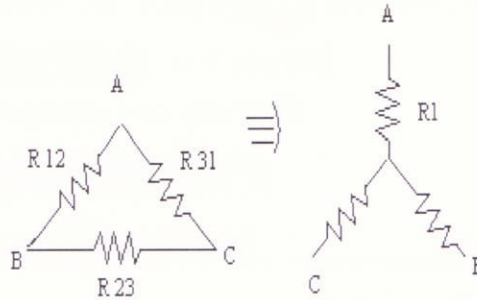
4. Transformer at no load behaves like:
 - (a) A resistor, $Pf=0$
 - (b) An inductive reactor, $pf=0.2$ lag
 - (c) A capacitive reactor, $pf=0.2$ lead
 - (d) An inductive reactor, $pf=0.8$ lag

5. A short pitch of a winding for an alternator gives:
 - (a) Improved waveform of the generated emf
 - (b) Reduced value of self inductance of the winding
 - (c) Increased rating of a machine
 - (d) Reduced tooth ripples

6. If applied voltage to the DC machine is 230 V, then the back emf for maximum power developed is:
 - (a) 115 V
 - (b) 200 V
 - (c) 230 V
 - (d) 460 V

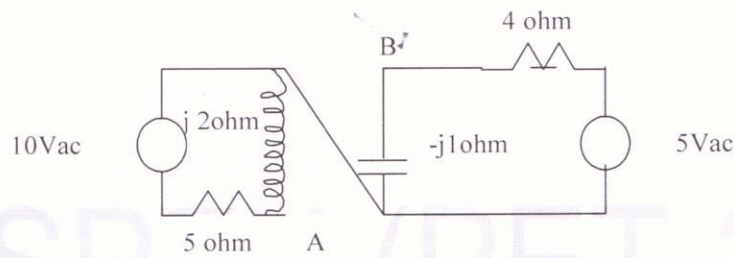


7. What will be the value of R1 for the following transformation:



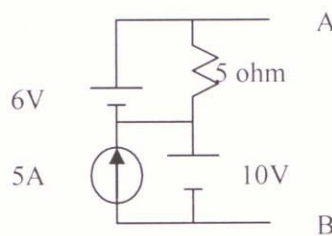
- (a) $\frac{R_{23}}{R_{12} + R_{23} + R_{31}}$ (b) $\frac{R_{12} R_{23}}{R_{12} + R_{23} + R_{31}}$
 (c) $\frac{R_{23} R_{31}}{R_{12} + R_{23} + R_{31}}$ (d) $\frac{R_{12} R_{31}}{R_{12} + R_{23} + R_{31}}$

8. Find Z_{AB} shown in figure:



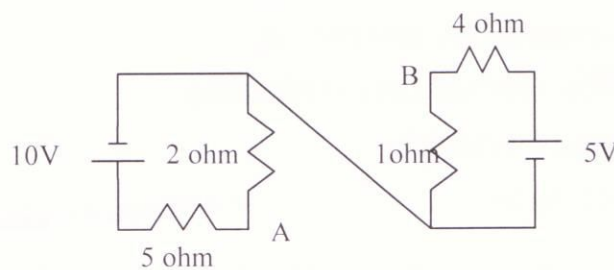
- (a) $0.83 + j0.7 \text{ ohm}$ (b) $0.93 + j0.75 \text{ ohm}$ (c) $-0.83 + j0.75 \text{ ohm}$ (d) $-0.83 - j0.7 \text{ ohm}$

9. Find R_{AB} using Thevenin's Theorem shown in Figure.



- (a) Zero Ohm (b) 5 Ohm (c) 10 ohm (d) None of these

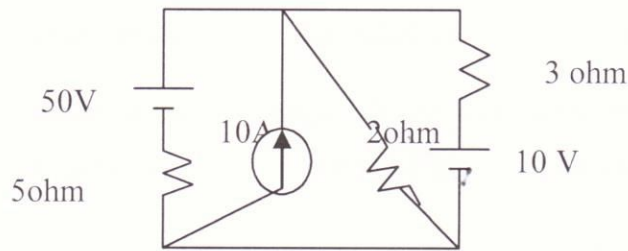
10. Determine V_{AB} using Thevenin's Theorem:



- (a) 2.85 V (b) 1.85 V (c) 1.75 V (d) 3.85 V



11. Find current delivered by 50 V source:



- (a) 5.50 A (b) 5.47 A (c) 6.54 A (d) 6.47 A

12. Poisson's equation is given by:

- (a) $\nabla^2 V < \frac{\rho}{\epsilon_0}$ (b) $\nabla^2 V = \frac{-\rho}{\epsilon_0}$ (c) $\nabla^2 V < \frac{\rho}{-\epsilon_0}$ (d) $\nabla^2 V < \frac{2\rho}{\epsilon_0}$

13. Cu behaves as a:

- (a) Conductor always
 (b) Conductor or dielectric depending on the applied electric field strength
 (c) Conductor or dielectric depending on the frequency
 (d) Conductor or dielectric depending on the electric current intensity

14. Which of the following equations is not Maxwell's equation for a static electromagnetic field in a linear homogeneous medium?

- (a) $\nabla \cdot B = 0$ (b) $\nabla \cdot xD = 0$ (c) $\oint B \cdot dl = \mu_0 I$ (d) $\nabla^2 xA = \mu_0 J$

15. If $\rho = \frac{5 \cos^2 \phi}{r^4} \text{ C/m}^2$, the charge in the volume defined by $1 \leq r \leq 2 \text{ m}$ in spherical coordinates is:

- (a) 4 $\pi \text{ C}$ (b) 5 $\pi \text{ C}$ (c) $\pi \text{ C}$ (d) 3 $\pi \text{ C}$

16. A point charge Q is located on the surface of a sphere of Radius R. The average electric field on the surface will be:

- (a) Infinite (b) $\frac{Q}{4\pi \epsilon_0 R^2}$ (c) $\frac{Q}{8\pi \epsilon_0 R^2}$ (d) Zero

17. Two point charges A = 20 nC and B = 10 nC are separated from each other by distances of 25 cm in free space, What is the electric field at a point P that is 15 cm away from A and 20 cm from B:

- (a) 6.31 kV/cm (b) 7.31 kV/cm (c) 8.31 kV/cm (d) 9.31 kV/cm

18. The voltages at the two ends of the lines are 132 kV and its reactance is 40 ohm. The capacity of the line is:

- (a) 435.6 MW (b) 217.5 MW (c) 251.5 MW (d) 500MW



19. As the length of the line increases, the charging current:
 (a) Increases (b) Decreases (c) No effect (d) Remain same
20. The increase in the resistance of the conductor due to non-uniform distribution of current is known as:
 (a) Proximity effect (b) Skin effect (c) Ferranti effect (d) None of these
21. The 11 kV lines use:
 (a) Pin insulators (b) Suspension insulators (c) Disc insulators (d) String insulators
22. The corona loss with decrease in pressure:
 (a) Decreases (b) Increases (c) Remains the same (d) None of these
23. For a 400 kV lines, the no of the discs in the string insulator is:
 (a) 31 (b) 22 (c) 16 (d) 10
24. Voltage regulation of a transmission line should be with in:
 (a) 5% (b) 10% (c) 15% (d) 20%
25. The ratio of the diameter of an ACSR conductor and a Cu conductor for the same resistance per unit length is:
 (a) Equal to 1 (b) Greater than 1 (c) Less than 1 (d) Equal to 2
26. Laplace transform of $1/S^3(S^2-1)$ is:
 (a) $-1 - t^2/2 + \cosht$ (b) $1 - t^2/2 + \cosht$ (c) $-1 + t^2/2 + \cosht$ (d) $-1 - t^2/2 - \cosht$
27. A unit step response of a system is given as $c(t) = \frac{5}{2} + 5t - \frac{5}{2}e^{-2t}$, the transfer function $C(s)/R(s)$ is given as:
 (a) $\frac{10(s+1)}{s(s+2)}$ (b) $\frac{15(s+1)}{s(s+2)}$ (c) $\frac{5(s+1)}{s(s+2)}$ (d) $\frac{10(s-1)}{s(s+2)}$
28. A unity feedback system is characterized by an open loop transfer function $G(s) = \frac{K}{s(s+10)}$, for damping ration of 0.5, the values of K is:
 (a) 100 (b) 120 (c) 10 (d) 50
29. A certain feedback system is described by the following transfer function $G(s) = \frac{12}{s^2 + 4s + 16}$, $H(s) = Ks$ for damping factor of system = 0.8, the overshoot of the system is:
 (a) 1.4 % (b) 1.5 % (c) 5.1 % (d) 4.1 %



30. The open loop transfer function of unity feedback system is $G(s)H(s) = \frac{K(s+2)}{s(s+3)(s+5)}$, for $K=8$, the natural frequency of oscillation is:
- (a) 4 rad/sec (b) 5 rad/sec (c) 6 rad/sec (d) 3rad/sec
31. The turn on time of an SCR in series with RL circuit can be reduced by:
- (a) Increasing circuit resistance R (b) Decreasing circuit resistance R
(c) Increasing circuit inductance L (d) Decreasing circuit inductance L
32. For an SCR of turn-on time of 5 micro-sec., an ideal trigger pulse should have:
- (a) Short rise time with pulse width = 3 μ sec (b) Long rise time with pulse width = 6 μ sec
 (c) Short rise time with pulse width = 6 μ sec (d) Long rise time with pulse width = 3 μ sec
33. A converter which can operate in both 3-phase and 6-phase modes is a:
- (a) 1-phase full wave converter (b) 3-phase half wave converter
 (c) 3-phase semi-converter (d) 3-phase full converter
34. A four quadrant operation requires:
- (a) Two full converters in series (b) Two full converters connected back to back
(c) Two full converters connected in parallel (d) Two semi-converters connected back to back
35. In a DC choppers, per unit ripple is maximum when duty cycle α is:
- (a) 0.2 (b) 0.5 (c) 0.7 (d) 0.9.
36. Dummy strain gauges are used for:
- (a) Compensation of temperature changes (b) To increasing the bridge sensitivity in which used
(c) Compensation the different expansion (d) Calibration of strain gauges
37. The inductance of high Q inductor can be measured using a:
- (a) Schering bridge (b) Wein bridge (c) Maxwell bridge (d) Hay bridge
38. Standardisation of potentiometer is done in order they become:
- (a) Accurate (b) Precise (c) Accurate and direct reading (d) Accurate and precise
39. Which of the following methods is used to measure power output of a radio transmitter while radiating:
- (a) Electrostatic meter (b) 3 - Watt meter method (c) 3 - Ammeter method (d) 2 - Wattmeter method
40. Phantom loading for testing of energy meter s is used:
- (a) To isolate the current and potential circuit
(b) To reduce the power loss during testing
(c) For meters having low tratings
 (d) To test meters having a large current ratings for which loads may not be available

