

Name _____

AE 363 - Exam 1

Part 1 Closed Book

Multiple Choice: 2 pt. each

1. In an AC circuit, power is used by
 - a) resistances
 - b) capacitances
 - c) inductances
 - d) all of the above
 - e) (a) & (b)
 - f) (a) & (c)
 - g) (b) & (c)

2. When an extra parallel load is added to a parallel circuit, total resistance of the circuit:
 - a) goes up.
 - b) goes down.
 - c) is not changed
 - d) can go up or down depending on circuit voltage.

3. The common type of alternating current meter indicates on its dial:
 - a) the actual current in the conductor.
 - b) the average current.
 - c) the peak current.
 - d) the square root of the mean of the instantaneous current squared.

4. Analysis of an electrical load shows a power factor of 1.1.
 - a) this load has more inductive reactance than capacitive reactance.
 - b) this load has more capacitive reactance than inductive reactance.
 - c) resistance load on the circuit exceeds the sum of capacitive and inductive load.
 - d) there has been an error in meters, meter reading, or calculations.

5. Power factor improvement
 - a) significantly reduces power usage of a motor.
 - b) significantly increases power usage of a motor.

- c) does not change power usage of motor.
 - d) a, b, or c depending on original power factor.
6. A ground fault circuit interrupter (or ground fault tripper) disconnects the circuit
- a) when a detector senses that current is flowing toward the load in both the black and white wires at the same time.
 - b) when the current in the black wire exceeds a certain amperage for a certain time.
 - c) when a detector senses a larger current in black (hot) than in white (neutral).
 - d) when a detector senses a current in the wrong direction in the white (neutral).
7. A ground fault interuption
- a) limits magnitude of shock current
 - b) limits duration of shocks
 - c) (a) and (b)
8. For purposes of analysis of shock circuits, the resistance of the human body between extremities is assumed to be:
- a) 0.5 ohm
 - b) 5 ohms
 - c) 50 ohms
 - d) 500 ohms
 - e) 500,000 ohms
9. The purpose of giving CPR to an unconscious shock victim is to
- a) revive the person.
 - b) prevent stoppage of the heart.
 - c) prevent ventricular fibrillation from occurring.
 - d) keep person alive until defibrillation assistance can arrive.
10. A 25-amp load is connected through a 120-volt watt-hour meter with $K_h = 7.2$. The meter disk will turn at
- a) 6.94 rpm
 - b) 0.144 rpm
 - c) 417 rpm
 - d) 0.417 rpm
 - e) 16.7 rpm
 - f) 3.47 rpm
 - g) none of the above

11. A 4kW load is connected through a watt-hour meter with $K_h=7.2$. How long does it take for the meter to register 1 kWh?
- a) 1 hour
 - b) 1 min
 - c) 28.8 min
 - d) 1.8 min
 - e) 15 min
12. If two equal-wattage 120-volt light bulbs are placed in series across 240 volts,
- a) they will both operate normally
 - b) one will burn out in a short time and open the circuit
 - c) they will both light, but light output will be greatly reduced
 - d) both will light, but the bulb nearer the source of electrons (negative terminal) will be brighter
13. In a service entrance panel, the neutral is normally
- a) not switched or overcurrent protected
 - b) overcurrent protected, but not switched
 - c) switched but not overcurrent protected
 - d) switched and overcurrent protected
 - e) not brought in because box is grounded
14. Voltage drop determines wire size for:
- a) very short distances
 - b) very long distances
 - c) heavy loads
 - d) branch circuits
 - e) aluminum conductors
15. The diameter of a rod having a cross-sectional area of 10,000 circular mils is
- a) 100 in.
 - b) 0.1 mil
 - c) 1000 mils
 - d) 0.1 in.
16. Phase current and line current on a 3-phase load
- a) are always equal
 - b) are never equal
 - c) are equal on a wye load
 - d) are equal on a delta load

17. The "wild leg" of a 3-phase delta service is not usable on a single-phase, 120-volt circuit because
- a) it will unbalance the system
 - b) it has an erratic voltage
 - c) it is a DC voltage
 - d) its voltage to ground is too high
18. (10) Write a paragraph on ground-fault interrupters -- how they work, how they protect people.

Part 2
Open book and notes
Show your work

10/13/98
CJB

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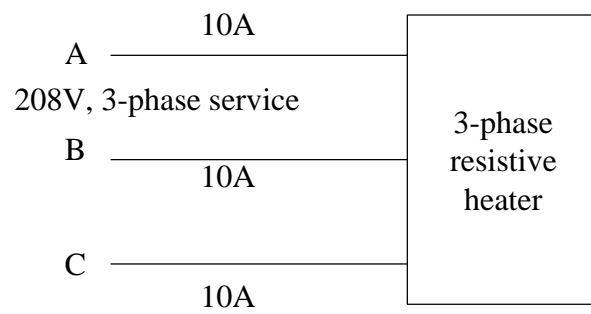
19. (16)

An aluminum size AWG-1, UF cable is run 175 feet (including connections) from a 240-volt panel to a 100-A load. Design specifications call for a 1% design voltage drop.

a) Is this design correct, considering environment, ampacity, and voltage drop? (use numbers in answer).

b) Compute watts of line loss during operation.

21) (15)



- a) What power does the load use?
- b) What is the resistance of each resistor if the load is wye-connected?