

MIZORAM PUBLIC SERVICE COMMISSION
DEPARTMENTAL EXAMINATIONS FOR
AE/SDO
UNDER PUBLIC HEALTH ENGINEERING DEPARTMENT, JANUARY 2016

ELECTRICAL ENGINEERING PAPER-II

Time Allowed : 3 hours

FM : 100 PM : 40

Part I - Objective Type Questions (60 Marks)

All questions carry equal marks of 2 each.

1. In a three-phase system, the voltages are separated by
 - (a) 45°
 - (b) 90°
 - (c) 120°
 - (d) 180°
2. When the frequency of the voltage applied to a series RC circuit is decreased, the impedance
 - (a) increases
 - (b) decreases
 - (c) remains the same
 - (d) doubles
3. In a three-phase system, when the loads are perfectly balanced, the neutral current is
 - (a) zero
 - (b) one-third of maximum
 - (c) two-thirds of maximum
 - (d) at maximum
4. A single-phase sinusoidal voltage of 120 V is connected to a 90W load. Current in the circuit is
 - (a) 13.3 mA
 - (b) 133 mA
 - (c) 1.33 A
 - (d) 6.2 A
5. Materials with lots of free electrons are called
 - (a) conductors
 - (b) insulators
 - (c) semiconductors
 - (d) filters
6. The unit of electrical charge is
 - (a) coulomb
 - (b) joule
 - (c) volt
 - (d) watt
7. An ammeter is an electrical instrument used to measure
 - (a) current
 - (b) voltage
 - (c) resistance
 - (d) none of these
8. An ohmmeter is an instrument for measuring
 - (a) current
 - (b) voltage
 - (c) resistance
 - (d) wattage
9. A certain appliance uses 350 W. If it is allowed to run continuously for 24 days, how many kilowatt-hours of energy does it consume?
 - (a) 20.16 kWh
 - (b) 201.6 kWh
 - (c) 2.01 kWh
 - (d) 8.4 kWh

10. A given power supply is capable of providing 6 Ampere for 3.5 hrs. Its ampere-hour rating is
(a) 0.58 Ah (b) 2.1 Ah
(c) 21 Ah (d) 58 Ah
11. A 15 V source is connected across a 12W resistor. How much energy is used in three minutes?
(a) 938 Wh (b) 0.938 Wh
(c) 56.25 Wh (d) 5.6 Wh
12. Three lights are connected in parallel across a 120 volt source. If one light burns out,
(a) the remaining two will glow dimmer
(b) the remaining two will glow brighter
(c) the remaining two will not light
(d) the remaining two will glow with the same brightness as before
13. Four 100W resistors are connected in parallel, the total resistance is
(a) 25 W (b) 500W
(c) 100W (d) 20 W
14. If one of the resistors in a parallel circuit is removed, the total resistance
(a) decreases (b) increases
(c) remains the same (d) doubles
15. When the speed at which a conductor is moved through a magnetic field is increased, the induced voltage
(a) increases (b) decreases
(c) remains constant (d) reaches zero
16. If the cross-sectional area of a magnetic field increases, but the flux remains the same, the flux density
(a) increases (b) decreases
(c) remains the same (d) doubles
17. When the current through the coil of an electromagnet reverses, the
(a) direction of the magnetic field reverses
(b) direction of the magnetic field remains unchanged
(c) magnetic field expands
(d) magnetic field collapses
18. A coil of wire is placed in a changing magnetic field. If the number of turns in the coil is decreased, the voltage induced across the coil will
(a) increase (b) decrease
(c) remain constant (d) be excessive
19. The ability of a material to remain magnetized after removal of the magnetizing force is known as
(a) permeability (b) reluctance
(c) hysteresis (d) retentivity
20. When the plate area of a capacitor increases,
(a) the capacitance increases (b) the capacitance decreases
(c) the capacitance is unaffected (d) the voltage it can withstand increases

21. When the voltage across a capacitor is tripled, the stored charge
- (a) triples
 - (b) is cut to one-third
 - (c) stays the same
 - (d) doubles
22. What kVA rating is required for a transformer that must handle a maximum load current of 8 A with a secondary voltage of 2 kV?
- (a) 4 kVA
 - (b) 0.25 kVA
 - (c) 16 kVA
 - (d) 8 kVA
23. When the turns ratio of a transformer is 20 and the primary ac voltage is 12 V, what is the secondary voltage?
- (a) 12 V
 - (b) 120 V
 - (c) 240 V
 - (d) 2,400 V
24. In a certain loaded transformer, the secondary voltage is one-fourth the primary voltage. The secondary current is
- (a) one-fourth the primary current
 - (b) four times the primary current
 - (c) equal to the primary current
 - (d) one-fourth the primary current and equal to the primary current
25. A transformer is used to
- (a) change ac to dc
 - (b) change dc to ac
 - (c) step up or down dc voltages
 - (d) step up or down ac voltages
26. When the frequency is decreased, the impedance of a parallel RL circuit
- (a) increases
 - (b) decreases
 - (c) remains constant
 - (d) is not a factor
27. What are the symbols used to represent digits in the binary number system?
- (a) 0,1
 - (b) 0,1,2
 - (c) 0 through 8
 - (d) 1,2
28. What kind of logic device or circuit is used to store information?
- (a) Counter
 - (b) Register
 - (c) Inverter
 - (d) Buffer
29. Which of the following gates has the exact inverse output of the OR gate for all possible input combinations?
- (a) NOR
 - (b) NOT
 - (c) NAND
 - (d) AND
30. With regard to an AND gate, which statement is true?
- (a) An AND gate has two inputs and one output.
 - (b) An AND gate has two or more inputs and two outputs.
 - (c) If one input to a 2-input AND gate is HIGH, the output reflects the other input.
 - (d) A 2-input AND gate has eight input possibilities.

Part II - Short Answer Questions (40 Marks)

All questions carry equal marks of 5 each. Answer any eight (8) questions.

31. What are the differences between MCB & MCCB?
32. What are the differences between Isolator and Circuit Breaker?
33. What is HRC fuse and where is it used?
34. What are the advantages of star-delta starter with induction motor?
35. Why are Delta Star Transformers are used for Lighting Loads?
36. Where should the lightning arrestor be placed in distribution lines and Sub-stations?
37. What is Buchholz relay and what is the significance of it in transformer?
38. What is ferranti effect?
39. What is AVR and where is it used?
40. When birds sit on transmission lines they do not get electric shock, why?

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