PAPER-II
ELECTRICIAN, ELECTROPLATER, LIFT MECHANIC/ LIFT &
ESCALATOR MECHANIC
(WORKSHOP CALCULATION & SCIENCE)
SEMESTER-III

TIME: 3 HRS.   MARKS: 75

Note: Attempt All the questions.
      All questions carry equal marks.

Choose the correct answers:

1. Which of the following property is affected by heat treatment?
   (a) Hardness   (b) Strength   (c) Ductility   (d) All of these

2. Annealing involves heating the component to a temperature........
   (a) Slightly below the critical temperature   (b) Equal to critical temperature
   (c) Slightly above the critical temperature   (d) None of these

3. Solution of equation $x^2 - 4x + 3 = 0$ are .....
   (a) 1, 3   (b) 3, 0   (c) 1, 0   (d) 2, 3

4. The sum of three consecutive number is 126. Number are
   (a) 39, 40, 41   (b) 42, 43, 44
   (c) 40, 41, 43   (d) 41, 42, 43

5. In a series circuit of L = 15mH, C = 0.015μF and R = 80Ω, the impedance at resonance is....................
   (a) 15Ω   (b) 80Ω   (c) 0.015Ω   (d) 95.015Ω

6. Two coils with self inductance of 3H and 4H have a mutual inductance of 3.2H. What is the equivalent inductance if they are connected in series opposition fashion?
   (a) 7H   (b) 13.4H   (c) 0.6H   (d) 1.7H

7. If a resistor R = 40Ω, a capacitor C = 50μF and an inductor L = 80mH are connected in series with a voltage source V = 150 Sin (100 t). What is the maximum current delivered by the source?
   (a) 0.765A   (b) 0.273A   (c) 0.340A   (d) 0.308A

8. The power factor at resonance for a series RLC circuit is............
   (a) Zero   (b) Unity   (c) 0.5   (d) Infinity

9. An alternating current completes 100 cycles in 0.1 s. Its frequency is............
   (a) 20Hz   (b) 100Hz   (c) 0.002Hz   (d) 1000Hz

10. _____ is a semi conductor.
    (a) Aluminium   (b) Silicon   (c) Copper   (d) None of these

11. A 10 μF capacitor is plugged into a 110 V_{RMS}, 60 Hz voltage source, with an ammeter in series. What is the RMS value of the current through the capacitor?
    (a) 0.838 A   (b) 0.626 A   (c) 0.415 A   (d) 0.203 A

12. The RMS value of the voltage with peak to peak value of 21 volt is...............
    (a) 7.423 V   (b) 14.847 V   (c) 22.270 V   (d) 11.352 V

13. Two resistors of value 40Ω and 60Ω are connected in parallel to the supply of 220 V. What is the total current in the circuit?
    (a) 5.54 A   (b) 9.167 A   (c) 3.667 A   (d) 10.296 A

14. Three capacitors of value 6 μF/100 V, each are connected in series. What is the value and working voltage of the equivalent combination?
    (a) 18 μF/100 V   (b) 18 μF/300 V
    (c) 2 μF/300 V   (d) 2 μF/33.3 V

15. The equivalent value of the parallel combination of three capacitors is 37 μF/600 V. If the values of 1st and 2nd capacitors are 22μF/600 V and 10μF/600 V respectively, what is the value of the 3rd capacitor?
    (a) 5μF/600 V   (b) 10μF/200 V
    (c) 5 μF/200 V   (d) 100 μF/600 V

16. The equivalent value of inductance of the parallel combination of three inductors of value 3H, 4H and 6H is...............
    (a) 2H   (b) 1.33H   (c) 0.75H   (d) 0.5H

17. If three batteries of 12 volts with an internal resistance of 0.3 Ω each are connected in parallel and discharged through a load of 4 Ω, what current will flow in the load resistor?
    (a) 4.0 A   (b) 3.5 A   (c) 3.0 A   (d) 2.8 A

18. A 1KVA, 24 V DC input inverter draws an average current of 40 A from the batteries, at fixed output load. If the available batteries are of size 6 V, 80 AH each, How will you connect the batteries to get 3 hours back-up time from the battery bank?
    (a) Two strings of "4 batteries in series" connected in parallel
    (b) Two strings of "3 batteries in series" connected in parallel
    (c) Three strings of "2 batteries in series" connected in parallel
    (d) Four batteries in series only

19. Hook's law holds good within ......
    (a) Plastic limit   (b) Ultimate limit
    (c) Elastic limit   (d) None of these

20. When a spring is stretched, the stress refers to the.........and strain refers to the............
    (a) Displacement, Energy   (b) Break point, Area
    (c) Elongation, Work   (d) Force, Elongation

21. The Longitudinal Modulus of Elasticity is called...............
(a) Shear Modulus   (b) Young's Modulus
(c) Bulk Modulus   (d) Lateral Modulus

22, In p-type semiconductors, number of holes are.........number of electrons.
(a) Equal   (b) Greater than
(c) Less than   (d) Twice

23. The value of dielectric constant for a material is...............
(a) Zero   (b) Equal to 1
(c) Greater than 1   (d) Less than 1

24. The Energy band gap size for semiconductors is in the range of....................eV.
(a) 1 – 2   (b) 2 – 3   (c) 3 – 4   (d) More than 4

25. A conductor carrying current is perpendicular to the page and the current flows into the page. What is the direction of the magnetic field?
(a) To the top of the page   (b) To the bottom of the page
(c) Clockwise   (d) Anti-clockwise

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