2024/FYUG/EVEN/SEM/
PHYSEC-151T/028

FYUG Even Semester Exam., 2024

PHYSICS

(2nd Semester)

Course No. : PHYSEC-151T

(Electrical Circuits and Safety)

Full Marks : 50
Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *fifteen* questions : 1×15=15

1. State Ohm's law.

2. What is the unit of power?

3. What is the average e.m.f. during the positive half cycle of an AC supply of peak value E_0?

4. State KCL first law.

5. What are the materials used for wiring?

6. What is delta wiring?

7. Define conduit wiring.

8. What is electrical conductor?

9. Define power factor.

10. Is transformer an active or passive component?

11. Which of the following transformers is $N_p < N_s$?

    (a) Step-up transformer

    (b) Step-down transformer

12. Define an electric generator.

13. What are rectifiers?

14. Give the symbol used for capacitor and inductor.

15. What are the units of inductance and capacitance.?

16. Draw circuit diagram of a half-wave rectifier.

17. What is electrical safety?

18. What are the effects of electric current on human body?

19. Define the term 'short circuit'.

20. What is the full forms of MCB and RCCP?

SECTION—B

Answer any *five* questions : 2×5=10

21. Explain series and parallel combination of resistances.

22. State two differences between AC electricity and DC electricity.

23. State two advantages of casing-capping wiring.

24. State two advantages of conduit wiring.

25. What are step-up and step-down transformers?

26. Name two electrical cables.

27. What is filter circuit?

28. State two uses of single-phase AC motor.

29. What are the two types of overcurrent?

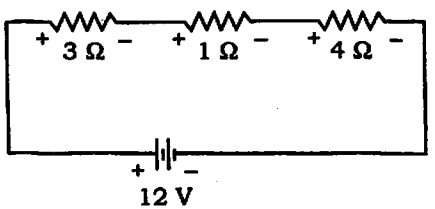
30. Mention two steps to prevent short circuit.

SECTION—C

Answer any *five* questions : 5×5=25

31. *(a)* State and explain Kirchhoff's voltage law. 2

(b) A simple circuit of an electrical gadget is shown below. Find the value of the unknown resistance *B* by applying Kirchhoff's voltage law. Current = 1A : 3



32. *(a)* Define the terms *(i)* time period, *(ii)* frequency, *(iii)* phase and *(iv)* phase difference. 4

(b) An oscilloscope shows 10 cycles of a sinusoidal wave occurring in 1 milli-second. What is the time period? 1

33. *(a)* What is the necessity of electrical switch? Explain one-way switch, two-way switch and intermediate switch. 1+1+1+1=4

(b) Name the two types of holders. 1

34. *(a)* What are the various materials required for casing-capping wiring? Mention two disadvantages of casing-capping wiring. 2+2=4

(b) Mention two disadvantages of conduit wiring. 1

35. *(a)* What is a ladder diagram? Mention one advantage of ladder diagram. 2

(b) Explain the terms 'capacitance', 'reactance' and 'impedance'. 3

36. *(a)* Explain the principle and working of generator. 4

(b) Mention one difference between AC generator and DC generator. 1

37. *(a)* Explain the principle of single-phase and three-phase a.c. motor. 2+2=4

(b) What material is used in the tunnel of the rotor of the single-phase induction motor? 1

38. *(a)* Explain the working of a full-wave rectifier. Mention one advantage of a full-wave rectifier. 4

(d) What is the efficiency of a full-wave rectifier? 1

39. *(a)* What does the term 'overloading' mean in electrical safety? What is the purpose of grounding electrical system? 2+2=4

(b) What is the colour coding for the groundwater in electrical system? 1

40. *(a)* What is short-circuit? How can short-circuit be prevented? 1+2=3

(b) What does a DP isolator do? What is the difference between MCB and isolator? 2

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