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Reg. No. :

Question Paper Code : 90206

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Second Semester

Aeronautical Engineering

BE 8253 – BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION
ENGINEERING

(Common to: Aerospace Engineering/ Automobile Engineering/ Industrial
Engineering/ Industrial Engineering and Management/ Manufacturing Engineering/
Marine Engineering/ Material Science and Engineering/ Mechanical Engineering/
Mechanical Engineering (Sandwich)/ Mechanical and Automation Engineering/
Mechatronics Engineering/ Production Engineering/ Robotics and Automation)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The circuit shown in Fig. 1 shows three lamps, each rated at 240V, connected in series across a 240 V supply. Determine the voltage across each lamp and comment on brightness of each lamp.

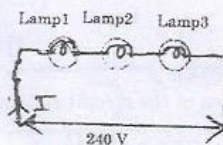


Fig. 1

2. State Superposition Theorem.
3. Sketch the power triangle.
4. Three phase 415V supply is connected to a three phase star connected balanced load with 12Ω resistors in each phase. Determine the total power dissipated by the resistors.
5. Define transformers turn ratio and state its significance.

6. Determine the synchronous speed (N_s) of an induction motor whose line frequency $F = 140$ Hz and number of poles $P = 12$.
7. Sketch the V-I characteristics of a P-N junction diode.
8. Calculate the gain of the amplifier given in Fig 2.

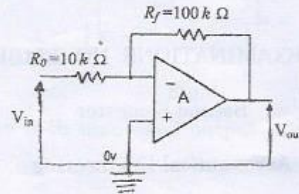


Fig.2

9. State the Hall effect.
10. List any two advantages of Moving Iron type instruments.

PART B — (5 × 13 = 65 marks)

11. (a) Determine the voltage across terminals 1 and 2 using Thevenin's theorem for the circuit shown in Fig. 3.

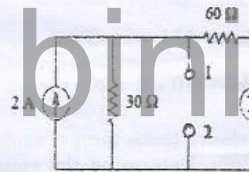


Fig.3

Or

- (b) Find the node voltages of the circuit shown in Fig. 4.

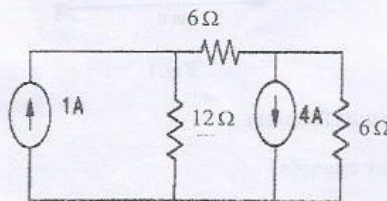


Fig.4

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12. (a) Define and explain cycle, periodic time, frequency, instantaneous and average values of an alternating waveform with a neat sketch.

Or

- (b) Explain any five symbols used in housing wiring and sketch a sample housing wiring.

13. (a) Explain the working principle of DC generator with neat sketches.

Or

- (b) Explain the construction and working principle of single phase induction motor.

14. (a) Explain the forward and reverse bias operation of a Silicon P-N junction diode and sketch the V-I characteristics.

Or

- (b) Describe the operation of 4 bit binary weighted resistor type DAC.

15. (a) Describe the working principle of photoelectric transducer and also explain any one type of the photoelectric transducer.

Or

- (b) Explain power and power factor measurement of a three phase system using two wattmeter method.

PART C — (1 × 15 = 15 marks)

16. (a) Use mesh analysis to determine I_x in the circuit show in Fig.5

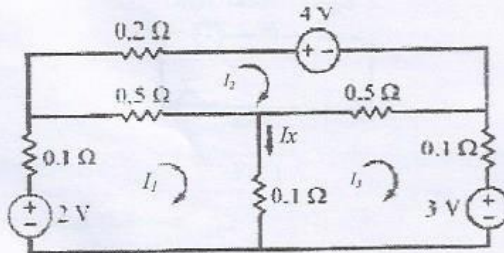


Fig.5

Or

- (b) (i) Calculate the voltage gain for each stage of this amplifier circuit shown in Fig. 6. Also calculate the overall voltage gain. (8)

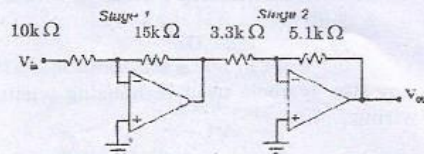


Fig.6

- (ii) Determine both input and output voltage in the circuit shown in Fig 7. (7)

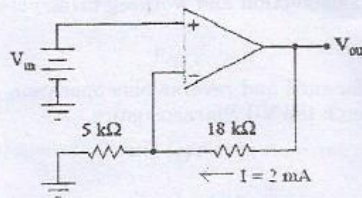


Fig.7

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