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Question Paper Code : X10141

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020 AND
APRIL/MAY 2021

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

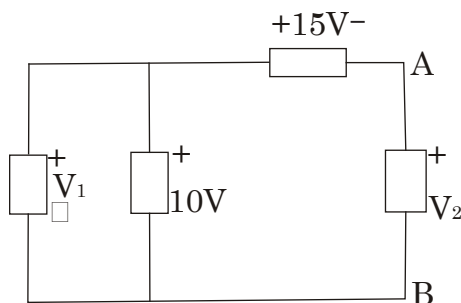
Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Apply Kirchoff's voltage law to find V_1 and V_2 in Fig.1.



2. State Maximum Power transfer theorem.
3. Define cycle, time period, frequency and amplitude of an alternating signal.
4. Sketch a three phase, three wire and balanced system supplying power to a balanced three phase delta load.
5. Define synchronous speed.
6. Write the equation for emf in a DC generator.



7. The diode current is 0.5mA at $V = 340\text{mV}$ with $I_0 = 1\text{mA}$. Determine the value of η . Assume $V_T = 25\text{mV}$.
8. Define slew rate.
9. What are active and passive transducers ?
10. A large water main is 2.50 m in diameter and the average water velocity is 6.00 m/s . Find the Hall voltage produced if the pipe runs perpendicular to the Earth's 0.00005T field.

PART – B

(5×13=65 Marks)

11. a) Determine Norton's Equivalent circuit at terminals AB for the circuit shown in Fig.2.

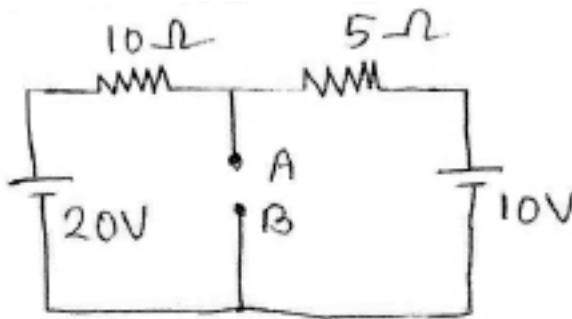


Fig. 2

(OR)

- b) Find mesh currents i_1 and i_2 shown in Fig.3.

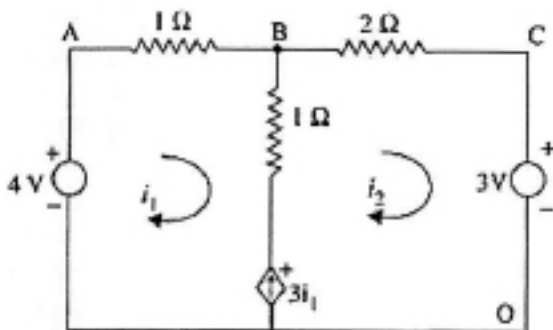


Fig. 3



12. a) What is average power in ac circuits ? Derive an expression to obtain average power.

(OR)

b) What is Industrial wiring ? Explain the safety methods followed and materials used in industrial wiring.

13. a) Explain the construction and working principle of single phase transformer with neat sketches.

(OR)

b) Classify and describe the working principle of different types of induction motor with neat diagrams.

14. a) Illustrate and explain the input-output characteristics of a Bipolar Junction Transistor under common emitter configuration.

(OR)

b) i) Consider the Op-Amp circuit shown in Fig.4.

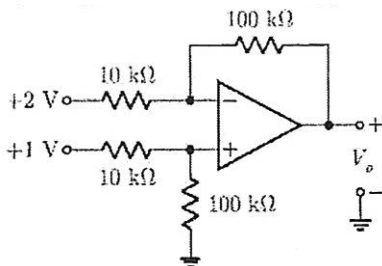


Fig. 4

What is the output voltage V_o in the above Op-Amp circuit ? (6)

ii) Design a non inverting amplifier with a gain of 5 using an op-amp. (7)

15. a) Classify and explain the operating principle and applications of thermo electric transducers.

(OR)

b) Explain the operating principle and applications of instrument transformers with neat sketches.



PART – C

(1×15=15 Marks)

16. a) Evaluate the voltages at each node of the circuit shown in Fig. 5 using nodal analysis.

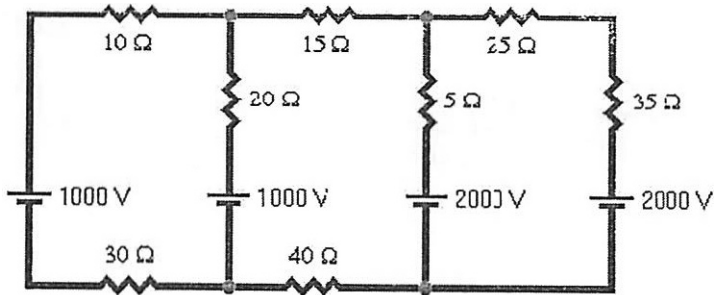


Fig. 5

(OR)

- b) For the fixed biased configuration of transistor as shown in Fig. 6. Evaluate.

- Base and collector currents (I_{BQ} and I_{CQ})
- Collector-Emitter Voltage (V_{CEQ})
- Base, Collector and Emitter Voltages (V_B , V_C and V_E)

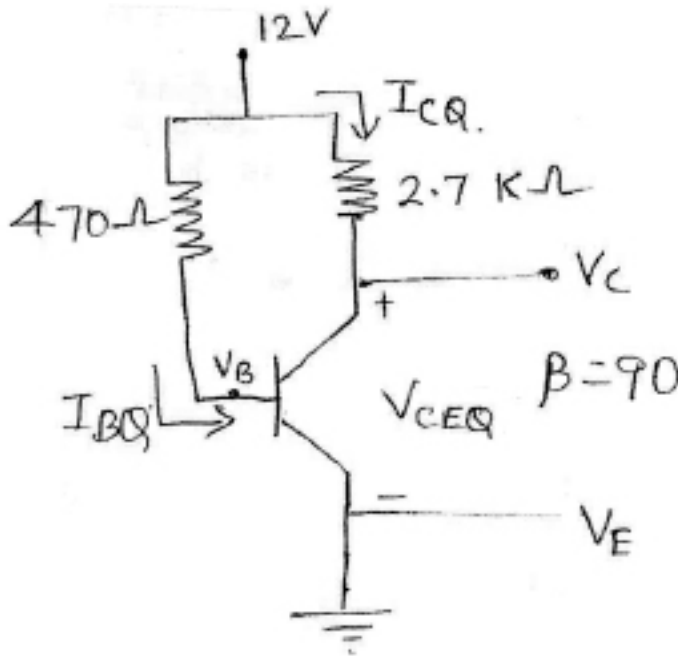


Fig. 6