

FACULTY OF ENGINEERING

B.E. (CE/EE/Inst.) III-Semester (AICTE) (Suppl.) Examination,

December 2020

Subject : Energy Science & Engineering

Time : 2 hours

Max. Marks : 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 What are the advantages and limitations of renewable energy sources?
- 2 What are the primary and secondary energy resources?
- 3 Differentiate between steam power cycle and gas power cycle.
- 4 What is fossil fuel? List the merits and demerits of fossil fuels.
- 5 What are the different sources of geothermal energy?
- 6 State the various routes of biomass energy conversion to energy
- 7 What is the need of storing energy? Explain
- 8 What is waste heat recovery?
- 9 What is energy efficiency rating?
- 10 What are the pollution standards?

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 a) List the differences between renewable and non-renewable energy sources
b) Explain briefly the Indian energy scenario
- 12 a) How steam turbines are classified? Explain with neat sketch.
b) What are the different types of spillways? Explain with suitable sketches.
- 13 a) Describe the principle of solar photovoltaic energy conversion.
b) Explain the working of horizontal axis windmill with neat sketch
- 14 a) What methods can be adopted to harness the waste heat recovery? Explain in detail
b) With suitable sketch explain Co-generation and Tri-generation.
- 15 a) What are challenges in future energy needs? Explain in detail.
b) What are the impacts of power plants on environmental conditions?
- 16 a) State the advantages and disadvantages of Ocean Thermal Energy Conversion (OTEC) system
b) Explain the difference between geothermal power plant and thermal power plant?
- 17 a) Discuss on heat recovery by using heat recuperators and heat pumps
b) What are the different methods of pollution control? Explain.

FACULTY OF ENGINEERING

BE III – Semester (AICTE)(ECE)(Suppl.)Examination, December 2020

Subject: Electronic Devices

Time: 2 Hours

Max. Marks: 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

1. Determine the a.c resistance of a semiconductor diode when the applied forward bias voltage is 0.3V. The reverse saturation current at room temperature is $1.2\mu\text{A}$.
2. Distinguish between Drift Current and Diffusion Current.
3. Define PIV and Ripple Factor.
4. A HWR supplies power to $1\text{k}\Omega$ load. The input supply voltage is 230V. Calculate the average and RMS load current.
5. What is Thermal runaway? How it can be avoided.
6. What is Early Effect? What are its consequences?
7. Compare CB, CE and CC in terms of Current gain, Voltage gain, input resistance, output resistance, application and phase shift.
8. Draw the h-parameter model of BJT in CE configuration.
9. Compare BJT and JFET.
10. Define Pinch off Voltage. The pinch off voltage of a N-channel FET is $V_p = 5\text{V}$ and the drain to source saturation current is $I_{DSS} = -40\text{mA}$. The drain current is given by $I_D = -15\text{mA}$. Determine V_{GS} .

PART – B

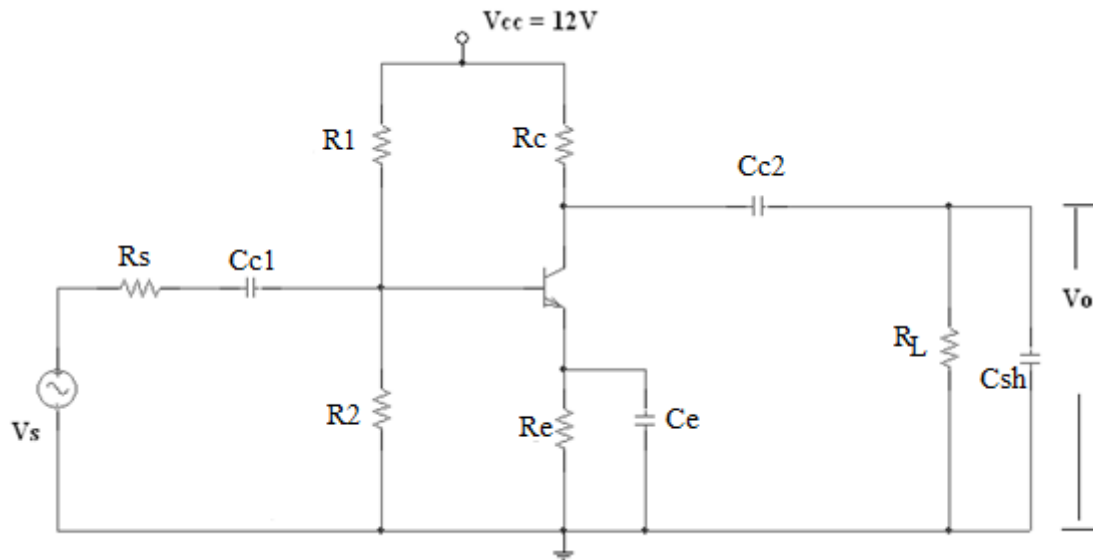
Answer any four questions.

(4 x 15 = 60 Marks)

11. a) Explain the formation and working of PN junction diode in forward and reverse bias with neat diagrams. Draw its V-I characteristics.
b) Derive the expression for Diffusion capacitance.
12. a) Derive the expression of ripple factor for Full wave rectifier with capacitor filter.
b) Design a Full wave rectifier with capacitor filter to provide dc output with 1% ripple for a 1000Ω load.
13. a) Derive the stability factor of a Collector to Base circuit.
b) For a collector to base bias circuit having the supply voltage $V_{CC} = 12\text{V}$, $R_C = 4\text{k}\Omega$, $R_B = 500\text{k}\Omega$ and $\beta = 200$ and $V_{BE} = 0.65\text{V}$. Determine the Operating point and the stability factor.

-2-

14. For a CE amplifier shown in figure with $R_1 = 100\text{K}\Omega$, $R_2 = 10\text{K}\Omega$, $R_E = 1\text{K}\Omega$, $R_C = 10\text{K}\Omega$, $R_S = 1\text{K}\Omega$, $R_L = 10\text{K}\Omega$. Calculate A_i , A_v , R_i , R_o Using Exact and approximate analysis. Use $h_{fe}=50$, $h_{ie}=1.1\text{k}\Omega$, $h_{re}=250\mu$, $h_{oe}=25\mu\text{A/V}$.



15. a) Explain the construction and working of an N-channel enhancement MOSFET with drain and transfer characteristics.
 b) Explain the steps involved in the Fabrication Process of Integrated Circuits.
16. a) Explain the current components in a PNP transistor.
 b) Draw the circuit of CE amplifier using diode compensation for V_{be} . Describe how bias compensation is achieved.
17. Write Short notes on
 a) Light Emitting Diode and Solar Cells
 b) Zener diode as regulator

FACULTY OF ENGINEERING

B.E. III-Semester (AICTE) (M/P/AE/CSE/IT) (Suppl.) Examination,

December 2020

Subject : Basic Electronics

Time : 2 hours

Max. Marks : 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Define TUF. What is its significance?
- 2 What is the ripple factor and efficiency of half wave rectifier?
- 3 Justify the name transistor for BJT.
- 4 What is the advantage of JFET over BJT?
- 5 Why do you prefer negative feedback for amplifiers?
- 6 What is the difference between an amplifier and Oscillator?
- 7 What is a differential amplifier?
- 8 Define a logic gate? What are the different types of Logic gates.
- 9 Write a short note on Strain gauge.
- 10 What is R-2R ladder?

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 a) Explain the VI characteristics of diode using diode current equation.
b) What is Zener Breakdown?
- 12 a) What are h-parameters? Explain why do we need h-parameters?
b) Explain the characteristics of Common Source JFET
- 13 a) Draw a neat circuit diagram of Hartley Oscillator. Derive its frequency of Oscillations
b) Draw the crystal Oscillator and its equivalent circuit? Explain its working principle
- 14 a) Draw the Op-Amp as Differentiator circuit and hence drive its output
b) Draw the Half adder and implement the same using logic gates
- 15 a) Explain the construction and working of thermocouple
b) What are the different types of transducers?
- 16 a) Draw the full wave rectifier with capacitor filter and derive ripple factor for it?
b) What is thermal runaway in BJT?
- 17 Write a short note on
 - a) Zener diode as regulator
 - b) Cathode ray Oscilloscope
 - c) Early effect in BJT.
