BE Semester-_5th___ (Biomedical Engineering) Question Bank

(*BM- 304 BASIC ELECTRONICS*)

All questions carry equal marks (10 marks)

Q.1	a) Explain energy band diagram of insulator, semiconductor and conductor. b) Explain principle of operation of a Photodiode.
Q.2	Draw CE transistor configuration and give its input and output characteristics. Also derive the relation between current gain of CE, CB and CC configurations.
Q.3	Give constructional details of JFET and give its characteristics. Why FET is called voltage controlled device?
Q.4	Explain the operation of Emitter follower amplifier. Why is it named as emitter follower?
Q.5	Give points of difference between BJT and FET. Also explain FET as voltage variable resistor.
Q.6	State the need of biasing. Discuss voltage divider bias circuit and mention its advantages.
Q.7	What is the difference between voltage amplifier and power amplifier? State important features of power amplifier and classify them based on the position of Q point.
Q.8	Discuss h-parameter equivalent circuit for transistor in CE configuration
Q.9	State the role of voltage regulators in power supplies? Discuss working of a series voltage regulator.
Q.10	Explain Hall effect with neat sketch. Discuss how to measure charge density and mobility for a given specimen of semiconductor using Hall Effect?
Q.11	Specimen of material is 5 cm long and having radius of 5 mm. Current is due to electrons whose mobility is 5000 cm2 /V.s. Current of 50 mA flows through it when 0.5 Volt is impressed across it. Calculate concentration of free electrons and drift velocity
Q.12	Explain potential variation in graded semiconductor
Q.13	Derive the flowing equation for current density. $J=nq\mu\varepsilon$
Q.14	A sinusoidal voltage peak value of 40V and frequency 50 Hz is applied at the input of a half wave rectifier, No filter is used. The Load resistance is 500 Ω. Neglect cut-in voltage. Diode has Rf = 5 Ω and Rr = ∞ 1) Draw Output voltage waveform and derive expression for DC output voltage. 2) Calculate DC value of load current, rms value of load current and Rectification efficiency.
Q.15	Draw a fixed bias circuit. State advantages and disadvantages of fixed bias circuit. Specify components value to have operating point at (9V, 2mA). Take VCC = 12 V and ß = 70.
Q.16	Draw collector to base bias circuit and explain its operation. Also state advantages and disadvantages of the circuit.
Q.17	Draw Emitter follower circuit. Obtain Hybrid equivalent circuit and derive

	expression for current gain.
Q.18	What is transition capacitance of a p-n junction diode? For a step graded junction prove that the expression for the transition capacitance of a diode is same as the capacitance of a parallel plate capacitor.
Q.19	How does the designer minimize the percentage variation in I_C , due to variation in I_{CO} and V_{BE} and due to variation in ß in transistor amplifier circuit.
Q.20	Draw and explain the input and output characteristics of p-n-p silicon transistor in CB configuration. Indicate cut off , saturation and active regions.
Q.21	Describe briefly the construction and working of p channel enhancement MOSFET. Draw its characteristic and transfer curve.
Q.22	Explain in detail types of transistors.
Q.23	Explain in detail types of MOSFET.
Q.24	Explain in detail construction and characteristics of JFET.
Q.25	Write short note on CMOS.
Q.26	Write short note on VMOS.
Q.27	Describe RC high pass and low pass circuits.
Q.28	Write short note on schottky barrier diodes and varactor diodes.
Q.29	Write short note on Zener diode and LED.
Q.30	Explain the base-width modulation and its effect on minority-carrier concentration in the base region of a transistor as well as on the common base input characteristics of a typical p-n-p transistor.
Q.31	Draw a structure of p-channel MOSFET. Explain its working for enhancement type. Also draw and explain drain characteristics and transfer curve for the same device.
Q.32	Draw and explain working of the circuit for compensation of V_{BE} using diode.
Q.33	Explain DC biasing of BJT with voltage feedback.
Q.34	Sketch the half wave and full-wave rectifier circuit and explain its operation.
Q.35	a) Verify mathematically that transistor means “transfer resistor”. Explain the working of phototransistor. b) Distinguish: (i) avalanche breakdown and Zener breakdown.(ii) Drift current and diffusion current.
Q.36	Draw a transistor amplifier circuit using h parameter and derive expressions for current gain, voltage gain, input impedance and output impedance.
Q.37	Explain FET biasing using voltage divider bias.
Q.38	Explain FET biasing using fixed bias and self bias configuration.
Q.39	Explain FET and BJT as a switch.
Q.40	Design AND, OR and NOT gate using transistor circuit.