

B.E. CONSTRUCTION ENGINEERING FIRST YEAR SECOND SEMESTER-2019

Subject: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hour

Full Marks: 100

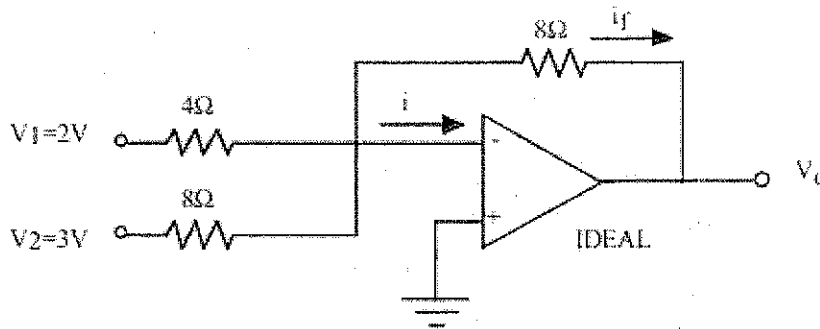
Group/Part: I (50 Marks)

(Answer any five questions)

Instructions: Use separate answer scripts for each group/part.

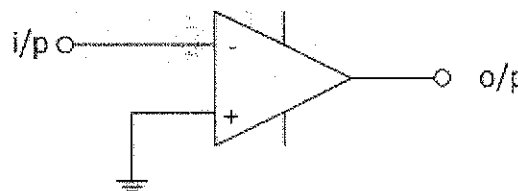
1. A) What is Zener Diode? Design and explain a voltage stabilizer circuit using Zener Diode. 2+4
 B) Differentiate avalanche breakdown from Zener breakdown. 2
 C) Show static characteristics of an n-p-n transistor used in a CE mode circuit. 2

2. A) What is Operational Amplifier and what are the characteristics of an ideal Op-Amp? 1+3
 B) Find out the output voltage of the following Op-Amp circuit. 4

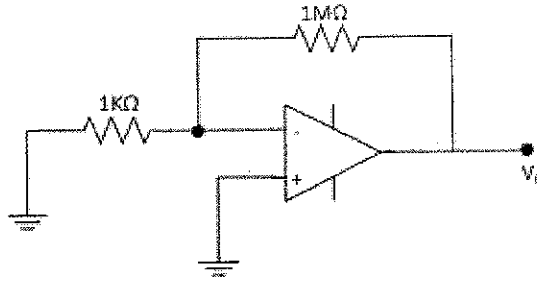


- C) How Op-Amp is used as differential amplifier? Show by circuit diagram. 2

3. A) What will be the output of the following circuit if the input is a sine wave? 2



- B) An Op – Amp has offset voltage of 1mV and is ideal in all other respects. If this Op – Amp is used in the circuit shown in figure below. The output voltage will be (Select the nearest value) 4



- C) Draw a basic Op-Amp circuit of a low pass filter and an integrator with all symbolic detail. 2+2
4. A) Discuss the input offset voltage and offset current for a practical operational amplifier. 2+2
 B) Show a full wave rectifier network with resistive load and find out a relation for load current in r.m.s. Compute the rectifier efficiency. 2+2+2
5. A) Explain with appropriate diagram why a semiconductor acts as an insulator at 0 K and why its conductivity increases with increasing temperature. 3
 B) What do you mean by load line of a transistor circuit? 2
 For a BJT, the common – base current gain $\alpha = 0.98$ and the collector base junction reverse bias saturation current $I_{CO} = 0.6\mu A$. This BJT is connected in the common emitter mode and operated in the active region with a base drive current $I_B = 20\mu A$. Find out the collector current I_C for this mode of operation. 5
6. A) What is CMRR? Define current gains α and β . How are they related? 2+2
 B) Why do we bias a transistor? What are the considerations in choosing an appropriate biasing scheme? 2+2
 C) A transistor has current gain of 0.99 when used in common base (CB) configuration. How much will be the current gain of this transistor in common emitter (CE) configuration? 2

**B.E. CONSTRUCTION ENGINEERING FIRST YEAR SECOND SEMESTER (OLD) -
2019**

**Subject : BASIC ELECTRICAL &
ELECTRONICSENGINEERING**

Time: 1 Hr 30 min

Full Marks: 50

Group/Part : II

Use Separate Answer scripts for each Group

Answer any five Question

1. (a) Define an ideal transformer. Draw and explain the no load phasor diagram of an ideal single phase transformer.
2. (b) A single phase transformer has the following particulars: turns ratio 4:1, no load current 5 amp at 0.3 p.f lagging. Secondary voltage 110V. Secondary load 10 kVA at 0.8 p.f (lagging). Find (i) the primary voltage, neglecting the internal voltage drop, (ii) the secondary current (iii) the primary current on load and (iv) the primary p.f. [4+6]
2. (a) What is NVC ? Why the starter is needed to start dc motor. Explain the working principle of three point starter.
- (b) A 4 pole 220 V, dc shunt motor has armature and shunt field resistances of 0.2 ohm and 220 ohm respectively. It takes 20 amp at 220 V from a source while running at a speed of 1000 rpm. Find (i) field current (ii) armature current (iii) back emf (iv) torque developed. [6+4]
3. (a) Explain the advantages of rotating field alternator over rotating armature alternator.
- (b) Explain Briefly how Synchronous impedance is measured by Potier triangle method
- (c) Define pitch factor. [4+4+2]
4. (a) Explain the significance of Skin Effect in power system.
- (b) Classify different type of circuit breakers.
- (c) Explain the working principle of electromagnetic relay. [4+3+3]
5. (a) Why open circuit test is conducted at a rated voltage of Transformer.
- (b) Explain why parallel operation of transformer is necessary.
- (c) What are the Performance test done on transformer explain briefly. [3+4+3]
6. Short note. (Any Two) [5*2]
 - (a) Percentage regulation
 - (b) TSM & PSM
 - (c) Synchronous speed
 - (d) RRRV