

Code :R7421001

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IV B.Tech II Semester(R07) Regular Examinations, April 2011
INDUSTRIAL ELECTRONICS

(Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

1. (a) Draw a Darlington emitter follower circuit & derive the h-parameters for this circuit.
(b) Discuss about stabilization in DC amplifier with the help of relevant circuit diagrams.
2. (a) With a neat circuit diagram explain the principle of operation of the series voltage regulator.
(b) Design a zener shunt voltage regulator with the following specifications: $V_0=10\text{v}$, $V_{in}=20-30\text{ v}$, load current=30-50 ma, $I_Z=20-40\text{ ma}$.
3. (a) Explain in detail about both positive & negative type of three terminal IC voltage regulators.
(b) Give the comparison between linear & switched mode voltage regulators.
4. (a) With a neat circuit diagrams explain two transistor analog of an SCR and explain its working with help of VI characteristics.
(b) With neat diagram explain the triggering mechanisms of a transistor.
5. (a) What is an inverter? How does it differ from a converter?
(b) What are the typical uses of inverters?
(c) What are the requirements of a practical inverter?
6. (a) Explain the principle of operation step up DC chopper?
(b) Derive expression for DC output voltage in terms of source voltage & duty cycle?
(c) Explain how a step up DC chopper may be used in regenerative braking of DC motor?
7. Describe the principle of spot welding and butt welding. What are their main applications?
8. Describe the working of pulsed echo ultrasonic flaw detector.

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1. (a) What is meant by residual drift? Explain how this residual drift is compensated in DC amplifiers?
(b) Draw the circuit of a chopper amplifier & explain its working principle.
2. (a) Discuss about stabilization in regulated power supply.
(b) Give the simplified analysis of a series voltage regulator circuit
3. (a) Sketch a regulator circuit that uses an LM 217 IC positive voltage regulator & explain its working.
(b) Define short period & long period accuracy of a stabilizer give typical values of these parameters.
4. (a) With neat diagrams explain class A & class B commutation methods.
(b) Indicate various abnormal condition against which thyristors must be protected.
5. (a) What are the functions of the freewheeling diode in a half controlled converter?
(b) A series inverter operates under resonance condition along frequency of 4 KHz. The capacitance is 1 micro F. resistance is negligible, calculate the value of inductance.
6. (a) Explain the principle of operation step up DC chopper?
(b) Derive expression for DC output voltage in terms of source voltage & duty cycle?
(c) Explain how a step up DC chopper may be used in regenerative braking of DC motor?
7. Draw the block diagram of digital timer counting unit & explain its operation.
8. Describe the principle of dielectric heating in detail.

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1. (a) Explain about difference mode gain and common mode gain of a differential amplifier and define CMRR.
(b) Give the basic circuit of a differential amplifier and discuss the working principle of the circuit.
2. (a) With a neat sketch explain the principle of operation of series voltage regulator.
(b) Design zener shunt voltage regulator with the following specifications: $V_0=10V$, $V_{in}=20-30V$, load current (I_L)= $30-50\text{ mA}$, $I_Z=20-40\text{mA}$.
3. (a) Sketch a regulator circuit that uses an LM 217 IC positive voltage regulator and explain its working.
(b) Define short period and long period accuracy of a stabilizer. Give typical values of these parameters.
4. (a) Explain in detail about various voltage ratings and current ratings of a transistor.
(b) Ten thyristors are used in a string to with stand a voltage of 12 kv. The maximum leakage current and recovery charge difference of SCRS is 10mA and $50\mu\text{C}$ respectively. The values of R for steady state equalizing circuit is $40\text{ k}\Omega$ and value of capacitance C of dynamic equalizing circuit is $0.2\mu\text{f}$. Find the steady state and transient de-rating factor.
5. Describe the method of gate protection and over current protection of SCR?
6. (a) What are the main types of DC-DC converters? Which one is commonly used? Give reasons?
(b) Write about the principle of operation of a step down DC chopper.
7. Give the construction and describe the working of
 - (a) Spring loaded bimetal thermal timer and
 - (b) thermal expansion timer
8. Describe the working of pulsed echo ultrasonic flow detector.

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Answer any FIVE questions
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1. (a) What is meant by stabilization? Discuss about various stabilizations techniques used in DC amplifiers.
(b) Discuss about ideal characteristics of an operational amplifier.
2. (a) With a neat circuit diagram explain the principle of operation of the series voltage regulator.
(b) Design a zener shunt voltage regulator with the following specifications $V_0=10\text{V}$, $V_{in}=20-30\text{V}$ load current= $30-50\text{mA}$, $I_Z=20-40\text{mA}$.
3. (a) Explain in detail about both positive & negative type of three terminal IC voltage regulators.
(b) Give the comparison between linear & switched mode voltage regulators.
4. (a) Explain the parallel operation of SCRS & define & derive string efficiency.
(b) Explain various protection methods for SCR.
5. (a) What is an inverter? How does it differ from a converter.
(b) What are the typical uses of inverters?
(c) What are the requirements of a practical inverter?
6. for type A dc chopper with RLE load & continuous current condition. Obtain expression for load current under conditions of
(a) Chopper switch closed, free wheel diode D_f open &
(b) Chopper switch open D_f conducting.
7. (a) Describe the principle of electric arc welding
(b) Describe the principle of working of
 - i. metal arc welding &
 - ii. inert gas arc welding
8. Describe the principle of dielectric heating in detail.
