

M.E (EXTC) old

QP Code : 2255

II

ADC 25/05/12

(Duration : 3 Hours)

Maximum Marks: 100

Note: i) Question no 1 is compulsory

ii) Solve any four out of remaining questions

iii) Figure to the right indicate full marks

- Q.1 Attempt all questions. (20)
- A Average mutual information and entropy (05)
 - B Linear modulation with memory (05)
 - C Lempel Ziv algorithm
 - D Miller codes (05)
- Q.2 A Compare source coding and channel coding. Explain the spectral waveform coding. (10)
- B Explain synchronization in FHSS technique with neat diagram. (10)
- Q.3 A What are adaptive equalizers? Explain with neat diagram using LMS algorithm. (10)
- B Explain decision feedback equalizer. (10)
- Q.4 A Describe the basic concept of ISI. Discuss design of band limited signal with controlled ISI. (10)
- B Compare slow frequency hopping with fast frequency hopping. Draw the hopping pattern for each case. (10)
- Q.5 A For a binary data 10 0 0 0 11 1 10 10, draw the output waveforms for duo binary encoder with pre coder. What are the drawbacks of duo binary encoder? Derive the transfer function and plot it. Also derive the impulse response. (10)
- B Describe the basic concept of ISI. State and prove Nyquist theorem for band limited signals. (10)
- Q.6 A Give a detailed account of optimum receiver for CPM signals. (10)
- B Obtain the signal space representation of BPSK, 4PSK and 8-PSK. Obtain the Euclidian distance and draw spectral efficiency for each. (10)
- Q.7 Write short notes on any two (20)
- A Adaptive Delta modulation and its advantages over Delta Modulation
 - B Kalman algorithm
 - C Kraft's inequality

m.E. (ETRX) → II → 01d → 251052015
Power Electronics

QP Code : 2237

(4 Hours)

[Total Marks : 100

- N. B. : (1) Question No. 1 is **compulsory**. Solve any four questions from remaining questions.
(2) Draw neat sketches/waveforms wherever necessary.
(3) **Figures to the right** indicate full marks.
(4) Assume suitable data if necessary.

1. Answer any five of the following :- 20
- (a) Why 'Snubber circuit' is necessary in SCR circuits.
 - (b) Compare Voltage source inverters and Current source inverters.
 - (c) Explain the terms 'Second breakdown' and 'SOAR' for power BJT.
 - (d) Explain di/dt and dv/dt ratings of SCR, give typical magnitudes of these and related protection circuits.
 - (e) Explain why power factor in semiconverter is better than that of fullconverter when both are operating in rectifier mode with same power output.
 - (f) What is necessity of isolation circuit between power circuit and control circuit draw two circuits which provides isolation
2. (a) Explain the effect of source inductance on performance of single phase full converter 10
operating in (i) rectifier mode and in (ii) inverter mode. Draw relevant waveforms and give expressions of input / output voltage in both cases.
- (b) The single phase full converter is fed from 230 V, 50 Hz supply mains. 10
If delay is $\pi/3$; calculate:
(i) Output dc voltage, (ii) Output rms voltage, (iii) Displacement factor, (iv) Harmonic factor, (v) Power factor.
for ripple free continuous load current. If delay angle changes to $2\pi/3$ what will be the effect on the circuit operation? Elaborate with waveforms.
3. (a) Draw the circuit diagram of impulse commutated chopper using SCR's, draw related waveforms of voltages/currents and explain the operation. 10
- (b) A d.c. separately excited shunt motor with rating 110 V, 900 RPM, 50 Amps with armature resistance $R_a = 0.12$ ohm working in braking mode using chopper rheostatic brake circuit. Choose suitable value for R_B and find duty cycle for braking torque equal to rated torque of the motor at full load. 10

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4. (a) Draw and explain three phase bridge voltage source inverters and explain its modes 120° and 180° . 10
- (b) A series inverter circuit has an inductor of 10 mH, a capacitor of 47 micro farad connected in series with a load resistance 5 ohms. Determine:
(i) Resonating frequency (ii) Time period of oscillation. 10
5. (a) Draw a diagram depicting a circuit model of IGBT. Which important characteristics and of which basic devices are combined in fabricating this device? 10
- (b) Draw and explain rheostatic breaking of separately excited DC motor. 10
6. (a) Draw a schematic diagram for a single phase to single phase cyclo-converter. Explain the generation of giving pulses, so as to achieve minimum harmonic contents in the output. 10
- (b) The input voltage to a cycloconverter is 120 V, 60 Hz. The load resistance is 5 ohms and the load inductance is 40 mH. The frequency of the output voltage is 20 Hz. If the converters are operated as semi converters and the delay angle $2\pi/3$ determine:
(i) RMS value of the output voltage, (ii) RMS current of each thyristors, (iii) Input power factor 10
7. Write short notes on the following :- 20
- (a) Protection circuits for overload in motor controllers
- (b) Current source inverters- working, advantages and applications
- (c) Vector control of induction motors.
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QP Code : 2253

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Attempt any five questions.
(2) Assumption made should be clearly stated.

1. (a) Explain satellite space and mass power estimation in detail. 20
(b) Explain network synchronization in TDMA system.
2. (a) Explain intermodulation noise ? Does it affect the C/N ratio. Derive the expression for C/N. 20
(b) Which type of double reflectors are used in satellite communication. Explain in detail.
3. (a) Explain with diagram TTC system. 20
(b) Explain :
 - (1) 1-dB compression point
 - (2) Uplink rain - fade margin and downlink rain fade margin.
 - (3) AM. to PM. Conversion.
4. (a) Explain with diagram of satellite transporter for 20
 - (1) Single conversion in 'c' bond
 - (2) double conversion in 'ku' bond.
(b) Draw block-diagram of Transmit Receive type earth station, explain each block in detail.
5. (a) Derive uplink equation with respective saturation flux density, input back off earth station HPA and uplink rain fade margin.
(b) Explain in detail various ways of propagation impairment that affect transmission of satellite signals.
6. (a) Explain in detail the operation of the spade system of demand assignment. What is the function of the common signaling channel ?
(b) Draw and explain different type of antenna used in satellite communication.
7. Write short note on :-
 - (a) Draw and explain
 - (1) VSAT
 - (2) GPS
 - (b) Explain the "polarization isolation" and briefly describe the factors which mitigate against good cross-polarization discrimination.