

Code No. M0422

R07

Set No.1

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Expand Radar? Discuss the applications of radar.
b) Define maximum unambiguous range?
c) In the pulse repetition frequency is 10KHZ, calculate the maximum unambiguous range?
d) Write about the frequencies that are used for Radar communications? [4+4+4+4]
2. Explain about the following:
 - a) Minimum detectable signal (S_{min}) [8]
 - b) Target cross section s [8]
3. a) Draw the block diagram of a simple CW radar and explain the working of each block? [8]
b) Discuss the applications of a CW radar. [8]
4. Write short notes on the following:
 - a) Range and Doppler measurement of a target using a FM-CW radar. [8]
 - b) Unwanted signals and the measurement errors in FM altimeter. [8]
5. a) Draw the block diagram of a delay line filter which produces a 3-pole Chebyshev low pass filter characteristic with 0.5db ripple in the passband? [8]
b) Write about the following:
 - i) Blind speeds
 - ii) staggered prf. [8]
6. a) Explain how tracking is achieved using radar? [4]
b) Write about phase-comparison monopulse radar? [4]
c) Describe the phase comparison monopulse tracking technique in a radar system with the help of necessary block diagram. [8]

7. a) Draw the block diagram of a correlation receiver and explain its operation with necessary equations. [10]
b) Derive the transfer function for matched filter? [6]
8. a) Write a short notes on [8]
i) Noise figure
ii) Noise temperature
- b) A radar receiver is connected to a 50 ohms resistance antenna that has an equivalent noise resistance of 30 ohms. Calculate the noise figure of the receiver and the equivalent noise temperature of the receiver. [8]

Code No. M0422

R07

Set No.2

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RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. a) Draw the functional block diagram of simple pulse radar and explain the purpose and functioning of each block in it. [8]
b) List major applications of radar in civil and military systems. [8]
2. a) Discuss the effect of noise on the radar receiver sensitivity? [8]
b) Write about the following:
i). Beam-shape loss
ii). collapsing loss. [8]
3. What are the different methods that provide isolation between transmitter and receiver? [16]
4. a) With the help of suitable block diagram, explain the operation of a FM-CW altimeter. [8]
b) Discuss all the possible errors in the measurement accuracy of altitudes using a FM-CW radar. [8]
5. a) Draw the block diagram of MTI radar and explain its operation? [8]
b) What is the necessity for a delay line canceller? Compare the performance of double delay line canceller with single delay line canceller? [8]
6. a) Explain the following.
i) Low angle tracking
ii) Tracking in range
iii) Acquisition [8]
b) Draw the block diagram of amplitude comparison monopulse radar. And explain. [8]

Code No. M0422

R07

Set No.2

7. a) Explain the equivalence between matched filter and correlator? [8]
b) Discuss about the performance of matched filter with non white noise? [8]
8. a) Write a short notes on
i) Noise figure
ii) Noise temperature [8]
b) Write about CRT screens for display in radar systems. [8]

Code No. M0422

R07

Set No.3

IV B.Tech I Semester Supplementary Examinations, February/March, 2012

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. Derive the simple form of the radar equation? And explain the significance of each term in that equation? [16]
2. a) Derive the equation for minimum detectable signal S_{min} in terms of output signal to noise ratio? [8]
b) Discuss the effect of pulse repetition frequency on the receiver? [8]
3. a) Explain about the Doppler effect? [8]
b) What are effects of receiver bandwidth in CW radar? [8]
4. a) Write necessary equations to measure range and Doppler frequency in FM-CW radar? [8]
b) Compare FM-CW radar with pulse radar? [8]
5. a) Explain about range gated Doppler filters? [8]
b) Compare the performance of MTI with pulse Doppler radar? [8]
6. a) With the help of a suitable block diagram, explain sequential lobing type of tracking technique in a tracking radar system. [8]
b) Compare and contrast conical scan and sequential lobing type tracking techniques. [4]
c) Describe the process of acquiring a moving target prior to tracking it along with the patterns used for acquisition. [4]
7. a) Derive the equation for impulse response of a matched filter. [8]
b) Write short notes on
i) Efficiency of non-matched filters.
ii) Matched filter with non-white noise. [8]
8. a) Explain the effect of noise figure on the radar receiver? [8]
b) Write the principle of branch type duplexer? [8]

Code No. M0422

R07

Set No.4

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) What are the applications of radar? [8]
b) Write the radar equation and explain the factors on which it depends? [8]
2. a) Explain detection of signals in noise. [8]
b) Describe different noise components present in radar systems. [8]
3. a) Draw the block diagram of IF Doppler filter bank? Draw its frequency response characteristics? [8]
b) Calculate Doppler frequency shift (f_d) when the relative velocity of target with respect to radar is 50 knots at a transmitted frequency of 80MHZ. [8]
4. a) What are the major drawbacks of a simple CW radar? [8]
b) Write about multiple frequency CW radar? [8]
5. a) What is a delay line canceller? Illustrate the concept of blind speeds based on the frequency response of a single delay line canceller. [8]
b) Discuss the factors limiting the performance of an MTI system. [8]
6. a) Describe sequential lobing type of error signal generation to track a target automatically. [8]
b) Compare the four continuous tracking radar techniques? [8]
7. a) What is a matched filter receiver? Draw its response characteristics. [8]
b) Describe the operation of matched filter with non-white noise. [8]
8. a) Explain the following. [8]
i) Balanced type duplexer
ii) Branch type duplexer
b) Write notes on various types of displays that are used for monitoring radar. [8]

Code No. M0223

R07

Set No.1

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
POWER SYSTEM OPERATION AND CONTROL
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) What is an incremental fuel cost? How is it used in thermal plant operation? [8]
b) A power system with two generating units supplying a total load of 110 MW.
The incremental fuel cost characteristics of two units are
$$IC_1 = 15 + 0.08 P_{G1}$$
$$IC_2 = 13 + 0.1 P_{G2}$$
Determine the saving in fuel cost in Rs/hr due to economic scheduling as compared to equal distribution of the same load between the two units. Neglect the losses. [8]
2. a) Discuss and define the loss formula coefficients. [8]
b) Discuss the objective of economic scheduling when losses considered. [8]
3. a) Determine the daily water used by hydro plant and daily operating cost of thermal plant with the load connected for total 24 hrs from the given data.
The load connected, $P_D = 400\text{MW}$
Generation of thermal plant, $P_{GT} = 200\text{MW}$
Generation of hydro plant, $P_{GH} = 300\text{MW}$. [8]
b) Write the advantages of operation of hydrothermal combinations. [8]
4. a) Derive the transfer function of an excited system and represent in a block diagram. [8]
b) Derive the model of a speed governing system and represent it by a block diagram. [8]
5. Explain the dynamic response of load frequency control of an isolated power system with a neat block diagram. Draw the plots of change in frequency with respect to time with and without making approximations in the analysis. [16]
6. a) Explain load frequency control problem in a Multi-area power system. [8]
b) Derive an expression for steady-state change of frequency and tie-line power transfer of a two-area power system. [8]

Code No. M0223

R07

Set No.1

7. a) Obtain an expression for steady state response of a load frequency controller with integral control. How it is different from without integral control. [10]
b) Explain about the economic load dispatch control. [6]
8. a) Write short notes on compensated and uncompensated transmission lines [8]
b) Explain briefly about the shunt and series compensation of transmission systems. [8]

6. a) Draw the block diagram of load frequency control in two-area control system and explain. [8]
b) Derive an expression for steady-state change of frequency and tie-line power transfer of a two-area power system. [8]
7. a) Distinguish between load frequency control and economic dispatch control. [7]
b) Derive the transfer function, $F(s)/P_D(s)$, for a proportional and integral control of a single area system and explain it. [9]
8. a) Describe in detail off load and on load tap changing transformers.
b) Discuss in detail about the generation and absorption of reactive power in power system components. [8]

Code No. M0223

R07

Set No.3

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
POWER SYSTEM OPERATION AND CONTROL
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Derive the condition for economic scheduling of generators in a plant by excluding the losses in the system. [8]
- b) Three plants of load capacity 425 MW are scheduled for operation to supply a total load of 300 MW. Find the optimum load scheduling if the plants have the following incremental cost characteristics and generation constraints. Neglect the losses. [8]

$$\frac{dC_1}{dP_{G1}} = 30 + 0.15 P_{G1} \quad \text{Rs/MWh,} \quad 25 \leq P_{G1} \leq 125$$

$$\frac{dC_2}{dP_{G2}} = 40 + 0.20 P_{G2} \quad \text{Rs/MWh,} \quad 30 \leq P_{G2} \leq 100$$

$$\frac{dC_3}{dP_{G3}} = 15 + 0.18 P_{G3} \quad \text{Rs/MWh,} \quad 50 \leq P_{G3} \leq 200$$

2. a) What is a penalty factor? Explain the significance of penalty factor in optimal scheduling of generators. [8]
- b) The incremental fuel costs in \$/MWh for two units are given below:

$$\frac{dF_1}{dP_{G1}} = 0.01P_{G1} + 2.0$$

$$\frac{dF_2}{dP_{G2}} = 0.012P_{G2} + 1.6$$

The limits on the plants are $P_{\min}=20$ MW, $P_{\max}=125$ MW. Obtain the optimal schedule if the load varies from 50 to 250 MW. [8]

3. a) Explain the hydroelectric power plant model and discuss the functions of its components. [8]
- b) What is hydrothermal scheduling? Obtain the condition for optimal scheduling of hydrothermal plants. [8]
4. a) Derive the transfer function of speed governor model. State the assumptions made. [8]
- b) Derive the generator load model and represent it by a block diagram. [8]

5. a) Briefly explain the control area concept and control area error [6]
 b) A power system has load of 1250 MW at 50 Hz. If 50 MW load is tripped, find the steady state frequency deviation when (i) there is no speed control (ii) the system has a reserve of 200 MW spread over 500 MW of generation capacity with 5 % regulation on this capacity. All the generators are operating with valves wide open. Due to dead band, only 80 % of governors respond to load change. Assume load damping constant $B=1.5$. [10]
6. Two areas are connected via an inter tie line. The load at 50 Hz, is 15000 MW in area 1 and 35000 in area 2. Area 1 is importing 1500 MW from area 2. The load damping constant in each area is $B=1.0$ and the regulation $R=6\%$ for all units. Area 1 has a spinning reserve of 800 MW spread over 4000 MW of generation capacity and area 2 has a spinning reserve of 1000 MW spread over 10000 MW generation. Determine the steady state frequency, generation and load of each area and tie-line power for
 a) Loss of 1000 MW in area2, with no supplementary control.
 b) Loss of 1000 MW in area2, with supplementary controls provided on generators with reserve. [8+8]
7. Show that the critical gain magnitude of integral controller of a load frequency control system in terms system parameters is given by $K_{i, \text{critical}} = \frac{f^0}{8H} \left[\frac{1}{R} + B \right]^2$. [16]
8. A 3- Φ overhead line has resistance and reactance per phase of 25Ω and 90Ω respectively. The supply voltage is 145 kV while the load end voltage is maintained at 132 kV for all loads by an automatically controlled synchronous phase modifier. If the kVAr rating of the modifier has the same value for zero loads as for a load of 50 MW, find the rating of the Synchronous Phase modifier. [16]

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
POWER SYSTEM OPERATION AND CONTROL
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Explain how the incremental production cost of a thermal power station can be determined. [8]
- b) Explain the various factors to be considered in allocating generation to different power stations for optimum operation. [8]
2. a) Derive general transmission line loss formula and state assumptions made for calculating B- coefficients. [8]
- b) Consider a two bus system as shown in figure 1. The incremental production costs at the two generating station are given by

$$\frac{dC_1}{dP_{G1}} = 5 + 0.005 P_{G1}$$

$$\frac{dC_2}{dP_{G2}} = 6 + 0.004 P_{G2}$$

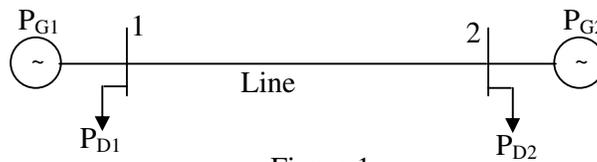


Figure 1.

The B-coefficients in MW⁻¹ are given in the matrix form as

$$B = \begin{bmatrix} 0.0002 & -0.00005 \\ -0.00005 & 0.0003 \end{bmatrix}$$

Determine the exact and approximate penalty factors at both the buses. Given that $\lambda=8$. [8]

3. Explain the hydro-thermal economic scheduling problem. Derive the necessary equations. [16]
4. a) Derive the model of a speed governing system and represent it by a block diagram. [8]
- b) Briefly explain swing equation with simplified diagram. [8]

5. An isolated generator and its control have the following parameters:

- i). Generator inertia constant=5 second
- ii). Governor time constant $\tau_g=0.25$ seconds
- iii). Turbine time constant $\tau_T=0.6$ seconds
- iv). Governor speed regulation=0.05 p.u
- v). Load damping constant $B=0.8$

The turbine rated output is 200 MW at 50 Hz. The load suddenly increases by 50 MW. Find the steady state frequency deviation. Plot the frequency deviation as a function of time.

[16]

6. a) Explain how the tie-line power deviation can be incorporated in two-area system block diagram.

[8]

b) What are the features of the dynamic response of a two-area system for step load disturbances?

[8]

7. a) Discuss the merits of proportional plus integral load frequency control of a system with a neat block diagram.

[8]

b) Discuss the importance of combined load frequency control and economic dispatch control with a neat block diagram.

[8]

8. a) Describe the effects of connecting the series capacitors in transmission system.

[8]

b) A short transmission line having an impedance of $(2+j3)$ ohms interconnects two power stations A and B both operating at 11 kV; equal in magnitude and phase. To transfer 25 MW at 0.8 p.f. lagging from A to B determine the voltage boost required at plant A.

[8]

Code No. N0521

R07

Set No.1

IV B.Tech I Semester Supplementary Examinations, February/March, 2012

NETWORK PROGRAMMING

(Common to Computer Science & Engineering and Information Technology)

Time: 3 hours

Max. Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. a) Distinguish between UDP & TCP protocol.
b) What are the limitations on the size of the IP datagram? How they affect the data transmitted by an application.
2. Write the syntax and explain each of the following socket functions.
 - a) Listen
 - b) Close and related
 - c) Connect
 - d) Bind
3. a) Explain about terminate and signal handling server process termination.
b) Discuss about TCP Echo server functions.
4. a) Explain about IPV6 Socket option and TCP socket options.
b) Make a comparison of the five different I/O models.
5. a) Explain about Lack of flow control with UDP.
b) Describe the important functions of UDP echo server.
6. a) Explain the use of uname function with an example?
b) Discuss the use of gethostbyname function with an example?
7. a) Explain about File and Record Locking?
b) Explain how semaphores are used to synchronize the access to the shared memory segments?
8. Discuss about terminal modes and control terminals?

Code No. N0521

R07

Set No.2

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
NETWORK PROGRAMMING
(Common to Computer Science & Engineering and Information Technology)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) With the help of a neat sketch explain the steps and buffers involved when an application writes to a TCP socket.
b) Summarize the protocol usage of any 4 common Internet applications.
2. a) Explain byte ordering and byte manipulating functions.
b) Explain about and exec function and close function and related function
3. a) Explain about normal startup and termination between client and server.
b) Explain the procedure steps for crashing, rebooting and shutdown of server hosts.
4. a) What socket options are processed by IPv6 with a level of IPPROTO_IPv6?
Explain.
b) Explain protocol independent socket options.
5. Explain the UDP client-server application for echoing the text given by the user.
6. a) Describe geteservbyname and getservbyport fuctions with example.
b) Explain about Resolver options.
7. a) What are the advantages of FIFO's over pipes? Explain stream and messages with example.
b) Discuss the importance of message queue? Explain different functions.
8. a) Explain about RPC transparency issues.
b) Briefly explain on Pseudo-Terminals.

Code No. N0521

R07

Set No.3

IV B.Tech I Semester Supplementary Examinations, February/March, 2012
NETWORK PROGRAMMING
(Common to Computer Science & Engineering and Information Technology)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Draw the OSI seven layered model along with the approximate mapping to the internet protocol suite. Explain the functions offered by each layer?
b) Explain how TCP connection is established using Three-way handshake protocol?
2. a) Discuss IPv4 socket address structure and the significance of each field?
b) Explain byte ordering and byte manipulating functions?
3. a) Explain the procedure steps for rebooting and shutdown of server hosts.
b) Discuss about signal handling server process termination?
4. Write short note on
 - a) Batch input
 - b) select function
 - c) Shutdown function
 - d) poll function
5. Write a program for UDP Echo Server and Echo client and Explain?
6. Explain the following functions
 - a) gethostbyname
 - b) uname
7. a) What is semaphore ? Explain how locking can be achieved with semaphores?
b) What is pipe? How are Pipes are different from FIFO's?
8. a) Briefly discuss overview of rlogin with an Example?
b) Explain about Terminal line disciplines?

Code No. N0521

R07

Set No.4

IV B.Tech I Semester Supplementary Examinations, February/March, 2012

NETWORK PROGRAMMING

(Common to Computer Science & Engineering and Information Technology)

Time: 3 hours

Max. Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) What are the limitations on the size of the IP datagram? How they affect the data transmitted by an application.
b) Summarize the protocol usage of any 4 common Internet applications.
2. Write the syntax and explain each of the following socket functions.
a) Accept
b) Close and related
c) Connect
d) Bind
3. a) Discuss about TCP Echo server functions
b) Explain the procedure steps for crashing and shutdown of server hosts.
4. a) Explain protocol independent socket options
b) Explain about IPV6 Socket option and TCP socket options
5. a) Determine outgoing interface with UDP?
b) Explain about Lack of flow control with UDP.
6. a) Explain about Resolver options
b) Explain the use of uname function with an example
7. a) Explain about File and Record Locking? Write a program to lock a file using advisory locking.
b) Discuss about FIFO's and Pipes? Give an example
8. a) Briefly discuss overview of rlogin with an Example?
b) Discuss about control terminals?