Total No. of Printed Pages:2

SUBJECT CODE NO: H-493
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Elective-I: Advanced Industrial Automation
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 & 6 are compulsory.
ii) Solve any Two questions from section 'A' & solve any Two questions from section 'B' from remaining.

Section A

Q.1	a)	Explain Level control loop with neat diagram.	05
	b)	Define following 1) Air to open 2) Air to close 3) Valve gain 4) Valve capacity 5) Range Ability	05
Q.2	a)	Draw & explain Standard symbol set of process loop component.	08
	b)	Explain pressure booster with neat sketch.	07
Q.3	a)	What is span & zero adjustment? Explain in detail.	08
	b)	Why positioner is essential in Automation? How it affects the performance of control valve?	07
Q.4	a)	Explain proximity sensors with its types.	07
	b)	How stepper motor helpful in Industrial Automation? Explain with operation.	08
Q.5	a)	Explain pneumatic to current converter in detail.	08
	b)	Explain plant automation with neat diagram.	07

Section B

Q.6	a)	Differentiate between PLC & DCS.	05
	b)	Draw Ladder diagram for any assumed process & explain its implementation using PLC.	05
Q.7	a)	Explain DCS. How DCS help to upgrade the ERP?	08
	b)	Describe the HART protocol in detail?	07

Q.8	a)	Develop an LAD Logic for motor forward reverse with interlocking.	08
	b)	Explain different transmission modes of Modbus.	07
Q.9	a)	Explain the DCS function 1) Third party interface 2) Alarm management	08
	b)	Explain the different types of counters used in PLC programming.	07
Q.10	a)	Explain the structure of foundation field bus in detail.	08
	b)	Explain the SCADA system in detail.	07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-148
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Optical Fiber Communication
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No5 from section A & Q. No 10 from section B are compulsory.
ii) Attempt any two questions from remaining questions of each section.

Section A

Q.1	(a) Explain block diagram of optical fibre Communication technique?	08
	(b) Explain advantages of optical fibre communication techniques?	07
Q.2	(a) Explain LED and Laser in optical fibre communication in details?	08
	(b) Explain modulation techniques in optical fibre communication	07
Q.3	(a) Explain electrical characteristics of source and detector in detail.	08
	(b) Explain splices and connectors in detail.	07
Q.4	(a) Describe various optical fiber losses in details	08
	(b) Explain numerical aperture of optical fibre in detail	07
Q.5	Short note (any two)	10

(1) Photodiode and phototransistor
(2) Coupling losses
(3) Attenuation & absorption in ofc
(4) Optoisolators.

Section B

Q.6	(a) Explain block diagram of digital foc system.	07
	(b) Explain WDM in detail.	08
Q.7	(a) Explain Network topologies of optical network?	07
	(b) Explain OTDR measurement.	08
Q.8	(a) Explain passive optical Network in detail.	08
	(b) Explain optical Ethernet in detail	07
Q.9	(a) Explain measurement standards of ofc in details.	07
	(b) Explain optical time domain reflectometer in detail.	08

Q.10 Short note (any two) 10

(a) SONET
(b) SDH Tracking
(c) Eye design test
(d) System design for foc system

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-115
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Computer Communication Network
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.1 & Q.6 are compulsory
2. Solve any two from Q.2, Q.3, Q.4 & Q.5 of section A & from Q.7, .8, Q.9 & Q.10 of section B
3. Figure to the right indicate full marks.

Section A

Q.1 a) Explain TCP / IP network model in detail. 05
b) Explain different design issues of network. 05

Q.2 a) Compare & contrast circuit switching message switching & packet switching network 07
b) Explain why seven layered protocol is adopted by ISO – OSI reference model. Also elaborate the important function in each layer in ISO-OSI 08

Q.3 a) Explain with diagram hierarchical routing? 07
b) Explain one bit sliding window protocol in detail 08

Q.4 a) Explain http & www in detail 07
b) Explain in brief elements of transport protocol 08

Q.5 Write a short note on (any three) 15
a) Leaky bucket algorithm
b) SMTP
c) Connection oriented & connectionless services
d) DNS

Section – B

Q.6	a)	What are different principles of ISDN	05
	b)	What are different services provided by B- ISDN	05
Q.7	a)	Explain several possible configurations for ISDN user network interface proposed by ITU –T	08
	b)	Compare narrow band & Broad band ISDN	07
Q.8	a)	Discuss on LMI frame format	07
	b)	Draw & explain ATM protocol architecture	08
Q.9	a)	Write a short not ATM virtual path & virtual channel	07
	b)	Explain the main concept of data encryption standard	08

Q.10 Write a short note on (any three) 15

a) Security of RSA
b) Steganography
c) AAL functions
d) Congestion notification mechanism in frame relay

Total No. of Printed Pages:02

SUBJECT CODE NO: H-232
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC)
Elective-II
Microwave and Radar Engineering (EC)
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B i) Q. No.1 & 6 are compulsory.
ii) Solve any two from remaining questions.
iii) Assume suitable data wherever necessary.

SECTION – A

Q.1 a) What are the various types of attenuation occurring in waveguide? 05

b) Write note on IMPATI Diode. 05

Q.2 a) What do you mean by waveguide? Explain which is the dominant mode as propagation in rectangular waveguide & why? 08

b) Derive the expression for cut off frequency phase velocity & phase constant. 07

Q.3 a) Compare TWT with klystron & Magnetron. 08

b) Draw & explain the working of two cavity Klystron amplifier. 07

Q.4 a) Explain the working of multihole directional coupler if the power is incident at i/p port. 08

b) State the application of microwave in civil and medical field in detail. 07

Q.5 a) Explain EMI & EMC in detail. 08

b) Explain- 07

1) Microwave IC fabrication
2) Effect of microwave on human body

SECTION – B

Q.6	a)	Explain low angle tracking	05
	b)	Radar display system? Explain.	05
Q.7	a)	Discuss the various RADAR applications. Discuss microwave signal generator used as radar transmitter.	07
	b)	Derive free space radar equation. Explain different factor limitation the range of radar.	08
Q.8	a)	What is the delay line canceller? Draw & explain the block diagram of single delay line canceller.	08
	b)	Explain limitation of MTI Radar system	07
Q.9	a)	Draw & explain the block diagram of amplitude. Comparison mono pulse Tracking.	08
	b)	Explain the working as conical scan Radar with the help of Diagram.	07
Q.10	a)	Draw & explain the Block diagram of CW – Radar System.	08
	b)	What are the various antenna and system losses occurring in radar and how they are overcome?	07

Total No. of Printed Pages:1

SUBJECT CODE NO: H-235
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Advanced Industrial Automation - II
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and 6 are compulsory.
ii) Solve any two questions from remaining from each section.

Section A

Q.1	a)	Explain different safety standards followed to design the control panel.	05
	b)	Give the difference between SCADA & PLC.	05
Q.2	a)	Develop a pneumatic position control circuit for $B^- A^+ A^- B^+$ sequence using cascade method.	08
	b)	Explain the comprehensive security levels for general SCADA system.	07
Q.3	a)	What is P-I diagram? Explain the role of different Engineers in drawing P-I diagram.	08
	b)	Develop an Electro pneumatic circuit for $B^- C^- A^- D^+ E^+$ operation.	07
Q.4	a)	What are different SCADA protocols? Explain in detail.	08
	b)	With the help of block diagram. Explain pneumatic system in detail.	07
Q.5	a)	What are the basic component installed on control panel? Explain in detail.	08
	b)	Develop a pneumatic forward – Reverse control of Double acting cylinder with delay of 6 sec between the forward-Reverse movement.	07

Section B

Q.6	a)	Explain the objectives of automation system.	05
	b)	What do you mean by BOM? Explain in brief.	05
Q.7	a)	Explain hydraulic system with its application.	08
	b)	Explain irrigation canal automation strategy with its block schematic.	07
Q.8	a)	Design & explain yogurt mixer with operational diagram.	08
	b)	Find out hydrostatic pressure in Bar at bottom of container filled with oil & has density of 1.2 kg /dm^3 & its height is 1200mm.	07
Q.9	a)	Design & explain sequence control circuit for clamp, drill & punch operation using pressure relief valve.	08
	b)	Explain Automation strategy of cement plant.	07
Q.10	a)	Design the carton sorting with the help of operation diagram, logic diagram & control panel design diagram.	10
	b)	Give the difference between hydraulic & pneumatic system.	05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-305
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Digital Image Processing
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
i. Q.5 and Q.10 are compulsory.
ii. Solve any two from Q.1, Q.2, Q.3, and Q.4.
iii. Solve any two from Q.6, Q.7, Q.8, and Q.9.
iv. Figures to the right indicate full marks.
v. Assume suitable data, if necessary.

Section A

Q.1 a) List and explain different file format of image in detail. 08
b) Explain the various elements of DIP systems with a suitable diagram. 07

Q.2 a) Compare electronic camera with human eye. With the help of neat sketch, illustrate the image formation in the human eye. 08
b) What do you mean by aliasing in the context of image sampling? Explain the process of sampling & quantization. 07

Q.3 a) Derive the histogram equalization, 07

$$Sk = \sum_{J=0}^{k} Pr(rj)$$

b) What is enhancement? Explain the basic steps for filtering in frequency domain? 08

Q.4 a) What is median filter and compute the median value of marked pixel shown in using a 3×3 mask. 08

$$\begin{vmatrix} 1 & 5 & 7 \\ 2 & 4 & 6 \\ 3 & 4 & 1 \end{vmatrix}$$

b) Explain contrast stretching using point processing in detail? 07

Q.5 Write note on(Any Two) 10
a) Histogram Processing.
b) Stereo imaging.
c) DCT.

Section B

Q.6 a) Explain various operators used in image segmentations. 08

1) Roberts.
2) Prewitt.
3) Sobel.
4) Canny.

b) What do you mean by image segmentation? Describe use of motion in segmentation. 07

Q.7 a) Consider the image segment shown below. 08

1) Let V=(0,1) & Compute the lengths of the shortest 4,8 & in path P & Q
2) Repeat for V=(2,2)

3	1	2	1
2	2	0	2
1	2	1	1
1	0	1	2

b) What is fidelity criteria? Explain fidelity criteria in detail. 07

Q.8 a) Write a program for Image smoothing and sharpening. 08

b) Explain morphological algorithm thinning and thickening in detail. 07

Q.9 a) What is compression? List its types and explain error free compression in detail. 07

b) Explain the different types of region descriptor required in image descriptive step. 08

Q.10 Write note on (Any Two). 10

a) Compression standards.
b) Morphological Applications.
c) Dilation and erosion.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-288
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Elective-II: Satellite Communication (EC/ECT/E&C/IE)
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory. Solve any two questions from remaining questions in each section.
ii) Figures to right indicate full marks.
iii) Assume suitable data wherever necessary.

Section A

Q.1 Write short note on (any two) 10
(a) Satellite orbits
(b) Polar mount antenna
(c) EIRP
(d) SPADE System

Q.2 (a) State and explain Kepler's three laws of planetary bodies. 08
(b) An earth station is located at 30°W longitude and 60° Latitude. Determine the earth station azimuth angle with respect to geostationary satellite located at 50° W Longitude. 07

Q.3 (a) Explain various propagation impairments. 08
(b) A satellite link operating at 14 GHz has receiver feeder losses of 1.5dB and atmospheric absorption of and antenna pointing loss of 0.5 dB. Calculate free space losses and total link loss for clear sky condition. (Neglect depolarization losses) 07

Q.4 (a) Explain various transmission losses in satellite link. 07
(b) Draw and explain TDMA Frame structure. 08

Q.5 (a) Describe direct sequence spread spectrum. 08
(b) Explain demand assigned FDMA. 07

Section B

Q.6	Write a short note on (any two) (a) Station Keeping (b) TT&C (c) Dipole antenna (d) GEO		10
Q.7	(a) Explain power supply unit of a space segment		07
	(b) Draw and explain a wideband receiver of a space segment		08
Q.8	(a) Explain the process of tracking of earth station.		07
	(b) Explain equipment reliability and space qualification.		08
Q.9	(a) What are the applications of navigation? Explain satellite navigation		08
	(b) Explain scientific satellite.		07
Q.10	(a) Write a short note on Remote sensing.		07
	(b) What are the applications of geostationary satellite? Explain DBS television & Radio		08

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-183
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (ECT/E&C)
Consumer Electronics (ECT / E&C)
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No.1 and Q.No.6 are compulsory.
ii) Solve any two Questions from Section A and Section B from remaining.

Section A

Q.1	(a) Enlist the different components of mobile Handset.	05
	(b) Enlist Advantages of Plasma TV.	05
Q.2	(a) Explain Gesture technology in TV.	08
	(b) Give comparison between LCD and LED TV.	07
Q.3	(a) What do you mean by 2G Technology?	07
	(b) Write a Note on Android Technology.	08
Q.4	(a) Explain the working of microwave oven.	08
	(b) Explain how Electronics weighing Balance is working.	07
Q.5	(a) Explain PA system.	07
	(b) Write Notes on Video conferencing.	08

Section 'B'

Q.6	(a) What do you mean by Blue Ray disc.	05
	(b) Explain working principle of Blue Ray disc.	05
Q.7	(a) Explain the working of scanner.	08
	(b) Draw Block diagram of photo copier.	07
Q.8	(a) Explain Biometric Attendance Monitoring systems.	08
	(b) What do you mean by Home automation System?	07
Q.9	(a) Enlist the advantages of solar lamp.	08
	(b) Explain working principle of DVD player.	07
Q.10	(a) Write Notes on EVM	08
	(b) Write the advantages and principle of working of ATM.	07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-184
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC)
Applied Digital Signal Processing
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.5 and Q.10 are compulsory.
2. Answer three questions from each section.
3. Assume suitable data, if necessary.
4. Draw neat labeled diagram wherever required.

Section A

Q.1	a)	Explain polyphase filter structures.	07
	b)	Discuss sampling rate conversion by non-integer factors with example.	08
Q.2	a)	Explain recursive least square algorithm. What are limitations of recursive least square algorithm?	08
	b)	Describe main components of adaptive filter.	07
Q.3	a)	Explain AR, MA, ARMA models. Why AR is widely used?	07
	b)	With expressions explain linear forward prediction and its use.	08
Q.4	a)	Explain multistage interpolation.	07
	b)	Describe noise cancellation using adaptive filter.	08

Q.5 Write short notes on: (any two) 10
- i) Two channel quadrature mirror filter bank
- ii) Lattice structures
- iii) LMS adaptive algorithm

Section B

Q.6	a)	Explain Welch method for power spectrum estimation.	09
	b)	Write characteristics of random signal.	06
Q.7	a)	Explain Harvard architecture & concept of pipelining of DSP processor.	07
	b)	Draw and elaborate architecture of SHARC processor.	08
Q.8	a)	Differentiate between fixed point and floating point representations of DSP.	06
	b)	Describe the biomedical signal processing applications of DSP processors.	09
Q.9	a)	Explain Bartlett method of power spectrum estimation.	08
	b)	Use of DSP in radar system.	07
Q.10	Write short notes (on any two)		10

1) Circular buffering
2) Selection criterion for DSP processors
3) Implementation of IIR filter on DSP processor

Total No. of Printed Pages:2

SUBJECT CODE NO: H-374
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
VLSI Design
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Question No. 1 & Question No.6 are compulsory.
ii. Solve any two questions from Q. No. 2 to Q. No. 5.
iii. Solve any two questions from Q. No. 7 to Q. No. 10.
iv. Figure to the right indicate full marks.
v. Assume suitable data if necessary.

Section A

Q.1 Attempt any two from the following. 10

a) Explain IC technology.
b) Compare VHDL and Verilog.
c) Write syntax of case statement & explain with example.
d) Explain full & partial scan.

Q.2 a) Explain different language elements of VHDL. 07

b) Write VHDL code for four bit full adder using 1 – bit full adder as a component. 08

Q.3 a) What are various modeling styles in VHDL? Explain with example in brief. 07

b) What is test bench? Write a test bench to verify design of AND gate. 08

Q.4 a) With suitable schematic explain operation of TAP controller. 07

b) Write VHDL code for 3:8 decoder. 08

Q.5 Write short notes on any three 15

i) Architecture of XC 9500
ii) Function & procedure
iii) Stuck at fault model
iv) JTAG technology.

Section B

Q.6 Attempt <u>any two</u> from the following. 10

a) IV characteristics of ideal nMOS transistor.
b) Explain self-aligned process in CMOS.
c) State and dynamic power dissipation in CMOS.
d) What is body effect? How it effects on the threshold voltage.

Q.7 a) What are the effects of channel length modulation on the performance of MOS transistor? Explain in brief. 07

b) Explain the term velocity saturation and mobility degradation in CMOS. 08

Q.8 a) Explain pass transistor logic with suitable example. 07

b) Design CMOS logic gate for 08
i) $f = \overline{(AB + C).D}$
ii) $f = \overline{AB + DE + C}$

Q.9 a) Explain the twin – tub process of CMOS fabrication. 07

b) Explain skewed gates in static CMOS transistor. 08

Q.10 Write short notes on any three. 15

i) Bi CMOS inverter
ii) CLM
iii) Stick diagram.
iv) Noise margin & delay calculation

Total No. of Printed Pages:2

SUBJECT CODE NO: H-408
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (ECT/E&C)
Microwave & Radar Engg.
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1) Q.1 and Q.6 are compulsory.
2) Solve any two from Q.2 to Q.5.
3) Solve any two from Q.7 to Q. 10.
4) Assume suitable data if necessary.

Section A

Q.1 Write a short note on any two. 10

i) Microwave Imaging
ii) MW attenuator.
iii) Varactor diode
iv) Distinguish between Waveguides s& Transmission Lines.

Q.2 a) Derive the expression for cut – off Frequencies. Phase velocity and phase current, constant. 07

b) What are S – parameters? Derive its expressions. 08

Q.3 a) Explain the working of Tunnel diode amplifier with suitable circuit diagram and I - V characteristics. 07

b) A two cavity klystron operate at 5GHz with dc beam voltage 10Kv and cavity gap 2mm. for a given input voltage and magnitude of gap voltage is 100V. Calculate the transit time at the cavity gap angle and the velocity of electrons leaving the gap. 08

Q.4 a) Explain EMI and EMC in detail. 07

b) Explain the working of magic tee with its scattering matrix. 08

Q.5 a) Explain RFMEMS for microwave components. 07

b) Explain 08
i) Re fly klystron oscillator
ii) Multi cavity klystron tube.

Section B

Q.6 Write short notes on <u>any two</u> 10

i) Applications of Radar.
ii) Staggered Frequencies
iii) Sequential Lobbing
iv) Non – Coherent MTI radar.

Q.7 a) Derive the simple form of radar range equations with factors governing it. 08

b) Enlist and explain the different antenna parameters in radar. 07

Q.8 a) Explain phase array and planner array in a tracking system. 07

b) Draw and explain diagram of MTI Radar why DLC are used in such radars. 08

Q.9 a) Explain the different types of system losses in Radar. 07

b) Explain the working of coherent AMTI Radar with help of block diagram. 08

Q.10 a) Explain low angle tracking system. 07

b) A radar operates at 10 GHz. Has peak power of 500 KW. The power gain of antenna is 5000 and min. power of receiver is 10^{-14} calculate max. Range of radar if effective area of antenna is $10m^2$ and radar cross section is $4m^2$. Give factors involved in equation. 08

Total No. of Printed Pages:2

SUBJECT CODE NO: H-409
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC)
Robotics
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1) Assume suitable data if necessary.
2) Q. No. 1 & Q. No.6 are compulsory. Then solve any two questions from each section A & section B.

Section A

Q.1 Answer the following questions. 10

a) What is kinematics of robotic arm?
b) What do you understand by homogeneous coordinates?
c) What is dynamic constraints?
d) State classification of robotic arm?
e) Define hard & soft automation.

Q.2 a) Explain specification of robotic arm, with typical values. 08

b) Explain components of robotic arm. 07

Q.3 a) What do you understand by present & future trends in robotics? 08

b) Explain robotic man distribution & inertia tensor. 07

Q.4 a) What are vector operations & matrix operations? 08

b) Consider a vector $\overline{v} = 2i + 3j + 4k$. Give its homogeneous representation with $s = -10, 2, 1, \& 0$. 07

Q.5 a) A frame F has been moved nine units along X axis & five units along Z axis of a ref. frame. Find the new location of the frame F : 08

$$F = \begin{bmatrix} .527 & -.574 & .628 & 4 \\ .369 & .819 & .439 & 2 \\ -.766 & 0 & .643 & 7 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

b) If $\overline{x} = 1 + j + k$ & $\overline{y} = 3i + 4j + 5k$ find $\overline{x}.\overline{y}$ & $\overline{x} \times \overline{y}$ in homogenous coordinate system. 07

Section B

Q.6 Answer the following questions. 10

a) What are sensors for acquisition of image?
b) What is fuzzy controller?
c) What are internal sensors?
d) What are different actuators?
e) What are different types of grippers?

Q.7 a) What is image processing & analysis? Explain. 08

b) What is object recognition in robotics? 07

Q.8 a) Explain fuzzy controller in detail. 08

b) Explain obstacle avoidance system in robotics. 07

Q.9 a) What is vacuum gripper? Explain. 08

b) What are different stepper maters? Explain any one in detail. 07

Q.10 a) Explain mechanical gripper in detail. 08

b) What are different acceleration & force sensors? Explain any one? 07