SUBJECT CODE NO:- K-15
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C) Examination Oct/Nov 2016
Computer Communication Network
(Revised)

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

Please check whether you have got the right question paper.
N.B
      i) Q.1 & Q.6 from are compulsory.
      ii) Attempt any two questions from remaining in each section.
      iii) Figures to the right indicate full marks.

Section A

Q.1	a)	Define topology of network with example.	05
	b)	Differentiate between client server model & peer to peer model of network.	05
Q.2	a)	Draw & explain structure of WAN in detail.	08
	b)	Draw & explain TCP/IP reference model.	07
Q.3	a)	Explain various design issues of layers.	08
	b)	Write a note on hierarchical routing.	07
Q.4	a)	Write a short note on DNS.	08
	b)	Explain http & www in detail.	07
Q.5	a)	Write a short note on routing algorithms.	08
	b)	Explain VDP in detail.	07

Section B

Q.6	a)	What are the different services provided by ISDN?	05
	b)	Explain how steganography is used in image system?	05
Q.7	a)	Write a short note ISDN addressing.	08
	b)	Describe primary ISDN interface.	07
Q.8	a)	Write a short note on DLCI.	08
	b)	Write a note on congestion control in frame relay.	07
Q.9	a)	Explain how steganography is used in audio system.	08
	b)	Discuss in brief traditional cryptography techniques.	07
Q.10	a)	Discuss on LMI frame format.	08
	b)	Explain the transmission structure of ISDN.	07

2016

SUBJECT CODE NO:- K-43
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (ECT/EC/E&C) Examination Oct/Nov 2016
Optical Fiber Communication
(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 remaining questions from section A and B each
             iii) Figures to the right indicate full marks.
             iv) Assume suitable data wherever necessary.

Section A

Q.1   Explain the following (attempt any five)   10
       i)   Acceptance cone of a fiber.
       ii)   Total internal reflection.
       iii)   Step index fiber
       iv)   Rayleigh scattering loss
       v)   Quantum efficiency of a photo detectors
       vi)   Multimode fiber
       vii)   LED materials.

Q.2   a) Explain the advantages offered by optical fibers.   08
       b) What are the different types of loss mechanisms involved in optical fibers? Explain any one in detail.   07

Q.3   a) Explain the working and characteristics of a phototransistor.   07
       b) Comment on the following parameters of photo detectors.   08
           i)   Responsivity
           ii)   Quantum efficiency
           iii)   Noise equivalent power
           iv)   Dark current

Q.4   a) A silicon phototransistor of sensitivity 1.5 MA/MW/CM^2 is placed at a distance of 20cm from a   10
           tungsten lamp of power 15W. If the efficiency of the lamp is 80% and the effective irradiance is 22
           percent of the total irradiance, calculate the collector current of the phototransistor.
       b) Photons of wavelength λ=1.3μm and power 7.5 MW are incident on an ideal photodiode of 70%   05
           quantum efficiency. Calculate the current when the detector is used in the photo-conductive mode.
           The reverse bias leakage current is 7.5 nA and the cell area is 1mm^2.

Q.5   Write short notes on the following   15
       i)   Optoisolatars
       ii)   Splices and connectors
       iii)   Reach through APD.

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Section B

Q.6 Explain the following (attempt any five) 10
  i) Bidirectional WDM
  ii) Noise penalties
  iii) Integrated optics
  iv) System margin
  v) Rise time budget
  vi) OTDR
  vii) Photonic switching

Q.7 a) What is optical networking? What are the components used in it? Briefly explain each of these components. 08
  b) Draw and explain the basic set-up for making eye-diagram measurements. 07

Q.8 a) What do you mean by optical performance monitoring? Explain its role in optical communication. Comment on advanced OPM. 08
  b) What are the various standard protocols used in optical networking? Explain 'SDH' in detail. 07

Q.9 a) Discuss the applications of fiber optic switches. 08
  b) How OTDR can be used for the measurement of refractive index profiles? Discuss in detail. 07

Q.10 Write short notes on the following
  i) SONET 05
  ii) Passive optical network 05
  iii) Link power budget 05

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SUBJECT CODE NO:- K-73
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (ECT/E&C) Examination Oct/Nov 2016
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.5 & Q.No.10 are compulsory.
             ii) Solve any two from remaining questions from section A and section B. Each
             iii) Assume suitable data if required.

Section A

Q.1	a)	Explain the specification of mobile handset.	08
	b)	Write a brief notes on android technology.	07
Q.2	a)	Explain the working of antenna and enlist its different features.	08
	b)	Explain working of HDTV and enlist its Applications.	07
Q.3	a)	Explain working of vacuum cleaner.	07
	b)	Enlist different applications of microwave oven.	08
Q.4	a)	Explain how gesture technique in TV is used.	07
	b)	Explain working and application of DTH TV.	08
Q.5		Write short notes on two of the following.	
	a)	LCD TV	05
	b)	LED TV	05
	c)	I-phone	05

Section B

Q.6	a)	Explain working principle and different features of Inkjet printer.	08
	b)	Explain Blue Ray DVD Player.	07
Q.7	a)	Explain the applications of Biometric sensor.	07
	b)	Compare between CFL and LED lamp.	08
Q.8	a)	Explain the Block diagram of solar lamp.	07
	b)	Explain the water purifier & electronics used in it.	08
Q.9	a)	Enlist different product safety issues.	08
	b)	Discuss the standards related to electrical safety & standards related to fire hazards.	07
Q.10		Write short notes on any two	
	a)	EVM	05
	b)	LASER	05
	c)	Applications of LED	05

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Total No. of Printed Pages:1

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

Please check whether you have got the right question paper.

N.B
    i) Q.No.5 from section A and Q.No.10 from section B are compulsory.
    ii) Attempt any two questions from the remaining questions in each section.
    iii) Assume suitable data, if necessary & state it clearly.

Section A

Q.1	a)	What is decimation? Why is an anti-aliasing filter required?	07
	b)	Consider the discrete time signal. $x(n)=[1,2,3,4]$	08
		Determine the up sampled version of signals for the sampling rate multiplication factor.	
		i) I=2 ii) I=3	
Q.2	a)	Explain the configuration of adaptive filters.	08
	b)	Explain state-space Kalman filter.	07
Q.3	a)	Explain LMS adaptive algorithm & implementation.	07
	b)	Explain in brief why is the AR model widely used.	08
Q.4	a)	Explain how noise introduced in the system can be cancelled using adaptive filters.	08
	b)	Describe Lattice structers.	07
Q.5		Write short notes (any two)	10
	a)	ARMA model	
	b)	Need of adaptive filter	
	c)	QMF bank	

Section B

Q.6	a)	Define Periodogram. Explain various non-parametric methods of power spectrum estimation.	07
	b)	Explain Blackman & Turkey method for power spectrum estimation.	08
Q.7	a)	Explain SHARC process & VLSI Architecture of DSP algorithms.	08
	b)	Explain estimation of auto correlation & power spectrum of random signal.	07
Q.8	a)	Explain Harvard architecture & pipelining concept of DSP process.	07
	b)	Describe in detail applications of DSP in audio system.	08
Q.9	a)	Explain equalization of digital audio signals in audio processing.	07
	b)	Explain application of adaptive filters in biomedical (EEG,ECG)	08
Q.10		Write short notes on (any two)	10
	a)	Selection criteria of DSP processor	
	b)	Characterization of random signals	
	c)	Barrel shifter	

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SUBJECT CODE NO:- K-117
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (ECT/E&C/EC) Examination Oct/Nov 2016
Satellite Communication [Elective-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 Q. No 6 are compulsory.
           ii) Solve any two questions from Q. No. 2,3,4 & 5 in section A and solve any two questions from Q. No
           7, 8, 9 and 10. in sections B.

Section A

Q.1   Answer the following questions. (Any five)   10

   a)   What is satellite? State the three types of satellite systems.
   b)   A satellite is orbiting in the equatorial plane with a period from perigee of 12 h. Given that the
        eccentricity is 0.002, calculate the semi major axis. The earth's equatorial radius is 6378,1414 km.
   c)   What is Atmospheric loss?
   d)   What is G/T ratio?
   e)   State keppler's third law of planetary motion.
   f)   What is single Access? Where it is used?
   g)   What is reference burst?

Q.2   A) Explain different satellite links and show how satellite helps in extending the coverage.   08
        B) A LEO satellite is at 1000km from the sub-satellite point on the earth. Determine the angular   07
            velocity and time of orbit, assuming ideal orbiting conditions. If this satellite has to scan from
            20^0 south east to 40^0 north-east. Estimate the number of satellites required for communication
            throughout 24 hours.

Q.3   A) Discuss in detail the factors that affect the link design of s satellite.   08
        B) A satellite at a distance of 36,000 km from the surface of the earth received by an antenna of gain 07
            15dB. Find the Flux density and power received by an antenna of effective area 12 m^2. If the
            receiving antenna has a gain of 50 dB, then also calculate the received power.

Q.4   A) Explain with next figure how three earth stations transmits and receives simultaneously through   08
            the same satellite transponder using fixed.assignment FDMA.
        B) Explain the Direct sequence CDMA system with block diagram.   07

Q.5   Write notes on,   15
        a) Orbit Perturbations
        b) Link Power Budget
        c) SDMA

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Section B

Q.6   Answer the following questions (any five)   10
- a) What is thermal control in satellite?
- b) What is ground segment and space segment?
- c) What is meant by the term redundant earth station?
- d) What is meant by polarization interleaving?
- e) What is meant by a distance insensitive communication system?
- f) What is GRAMSAT?
- g) Give reasons why the ku band is used for the DBS service.

Q.7   A) Explain what is meant by satellite attitude and briefly describe two forms of attitude control.   08
       B) What is transponder? Explain.   07

Q.8   A) Draw and explain the sub-systems of earth station.   08
       B) Draw and explain block diagram of home terminal DBS-TV receiving system.   07

Q.9   A) Describe the operation of a typical VSAT system and lists some of the shortcomings of present day   08
           VSAT system.
       B) What is GPS and what information a GPS signal carries? State the three interacting components of   07
           GPS.

Q.10   Write notes on,   15
- a) Satellite antenna subsystems
- b) An Introduction to Non Geostationary orbit satellite systems.
- c) INMARSAT

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SUBJECT CODE NO:- K-119
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC) Examination Oct/Nov 2016
Wireless & Mobile Communication (EC) [Elective-II]
(Revised)

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

Please check whether you have got the right question paper.

N.B
i) Question No.1 and question No. 6 are compulsory.
ii) Solve any two questions from Q. 2, Q. 3, Q.4 and Q.5.
iii) Solve any two questions from Q.7, Q.8, Q.9 and Q.10.
iv) Figures to the right indicate full marks.
v) Assume suitable data wherever necessary.

Section A

Q.1	Attempt any two:	10
	(a) Comment on different wireless mobile communication technologies used around the world.	
	(b) What is multiplexing? List out the types & give practical examples of multiplexing.	
	(c) Explain the concept of Handoff. State its necessity & advantages.	
	(d) Explain ISDN services in short.	
Q.2	(a) Explain the cellular system architecture with its operation with the help of MTC.	08
	(b) Draw the radio frequency spectrum. How spectrum allocation is controlled in India & by whom?	07
Q.3	(a) Explain the concept of frequency reuse & how to find out the nearest co-channel neighbour of a cell?	08
	(b) Comment on the interference & System Capacity. Compare the types of interferences in cellular system.	07
Q.4	(a) Compare & contrast 1G, 2G, 3G & 4G wireless networks with reference to duration, features, and examples.	08
	(b) List out the features of SS#7. Explain its protocol stack in detail.	07
Q.5	(a) What is DECT? List out its features & explain its architecture.	08
	(b) What are the different Channel Assignment Strategies? Compare & contrast them.	07

Section – B

Q.6	Attempt any two:	10
	(a) List the features & mobile services offered by GSM.	
	(b) Define a protocol & explain Mobile IP.	
	(c) Define mobile operating system. Draw the mobile OS general architecture & explain in short.	
	(d) State working principles of DTH service? List of the features & draw its architecture.	
Q.7	(a) Draw the GSM architecture & explain the functions of each section in detail.	08
	(b) What are the types of handover in GSM? Explain process of Intra-MSC handover in GSM.	07
Q.8	(a) What are IEEE 802.11a, 802.11b standards? Compare & contrast them.	08
	(b) Explain Wireless Application protocol (WAP) in details.	07
Q.9	(a) Explain CDMA principle with neat diagram & suitable examples. List the features of CDMA.	08
	(b) Compare & contrast Symbian & RIM mobile operating systems.	07
Q.10	(a) GSM uses what type of multiple access schemes (s)? Explain with suitable examples & diagrams.	08
	(b) Explain Zigbee protocol architecture in short.	07

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

Please check whether you have got the right question paper.

N.B
I. Q.No.5 and Q.No.10 are compulsory.
II. Answer any two questions from the remaining questions from each section.
III. Figures to the right indicate full marks.
IV. Assume suitable data if necessary.

SECTION A

Q.1
a) Consider the image shown below. a⌋Let .V= {0, 1}, compute D_4, D_8 and D_m distances between p and q. Repeat for V= {1, 2}. 08

```
    3   1   2   1  (q)
    2   2   0   2
    1   2   1   1
(p) 1   0   1   2
```

b) Discuss fast Fourier transform. 07

Q.2
a) Explain method of image sharpening. Give its applications. 08
b) Describe fundamental steps in digital image processing. 07

Q.3
a) Find the resultant when 3×3 averaging mask is applied to following image. Why Zero padding is needed? 08

```
    3   4   2   3
    1   7   3   2
    4   6   3   8
    2   3   1   7
```

b) What is discrete cosine transform? Explain its applications. 07

Q.4
a) What is image digitizer? Explain with the help of image digitizing components. 08
b) Explain Homomorphic filtering and its applications. 07

Q.5 Write Notes on (Any two) 10
a) Classification of images.
b) Separable transforms.
c) Mean and median filter.

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Section B

Q.6	a)	Explain edge linking using Hough transform.	08
	b)	Describe image compression model in detail.	07

Q.7	a)	What is opening and closing? Explain with suitable diagrams.	08
	b)	Describe fidelity criteria useful in compression.	07

Q.8	a)	Discuss regional descriptors and their significance.	08
	b)	Explain medical applications of image processing.	07

Q.9   a)   For following 3 bit binary code which is used to represent 8 gray levels, assign variable length code   08
to the same. Find average length of code, compression ratio and Relative redundancy.

1_k	0	1	2	3	4	5	6	7
P_{rK}	0.19	0.25	0.21	0.16	0.08	0.06	0.03	0.02

         b)   Describe various operators used for edge detection.   07

Q.10   Write notes on (<u>Any two</u>)   10
       a)   Boundary descriptors.
       b)   Lossless predictive coding.
       c)   JPEG.

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Total No. of Printed Pages:2

SUBJECT CODE NO:- K-330
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(ECT/ E&C) Examination Oct/Nov 2016
Elective-I: Wireless Mobile Communication (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 Q.2, Q.3, Q.4 and Q.5 in section A.
                       iii) Solve any two questions from Q.7, Q.8, Q.9 and Q.10 in section B.
                       iv) Figures to the right indicate full marks.
                       v) Assume suitable data wherever required.

Section A

Q.1   Attempt any two: 10
       a) What is Mobile communication? List out any 10 wireless mobile communication technologies used
           around the world with the respective operating frequency bands.
       b) Define multiplexing? Differentiate between TDMA, FDMA, and CDMA.
       c) What is trunking & Grade of Service (GOS), explain in short.
       d) Explain traffic routing concept in wireless networks.

Q.2   a) With neat diagram, explain the cellular system architecture & its operation.   08
       b) Draw the radio frequency spectrum. How spectrum allocation is controlled in India & by whom?   07

Q.3   a) How to find out the nearest co-channel neighbour of a cell? Explain the concept of frequency reuse.   08
       b) Comment on the interference & system Capacity. Compare the types of interferences in cellular   07
           system.

Q.4   a) Explain GSM Radio interface & frame structure in detail   08
       b) List out CDPD features & explain its network architecture.   07

Q.5   a) What is DECT? Explain its architecture.   08
       b) What are the Channels Assignment Strategies? Compare & contrast them.   07

Section B

Q.6   Attempt any two: 10
       a) List the features & mobile services offered by GSM.
       b) Define a protocol & explain Mobile IP.
       c) Define mobile operating system. Draw the mobile OS general architecture & explain in short.
       d) Explain IEEE 802.11 wireless standard.

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Q.7	a)	Draw the GSM architecture & explain the functions of each section in detail.	08
	b)	What are the types of handover in GSM? Explain process of Intra-MSC handover in GSM.	07
Q.8	a)	What are IEEE 802.11a, 802.11b standards? Compare & contrast them.	08
	b)	Explain Wireless Application Protocol (WAP) in details.	07
Q.9	a)	Explain CDMA principle with neat diagram & suitable examples. List the features of CDMA.	08
	b)	Explain Android operating system with different versions in detail.	07
Q.10	a)	GSM uses what type of multiple access scheme(s)? Explain with suitable examples & diagrams.	08
	b)	Explain Zigbee protocol architecture in short.	07

2016

SUBJECT CODE NO:- K-220
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EC/ECT/E&C) Examination Oct/Nov 2016
Embedded Systems
(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 2 questions from remaining from each section.
              iii) Assume suitable data wherever necessary.
              iv) Figures to right indicate full marks.

Section A

Q.1	Solve any 2 questions from following	10
	a) Explain hardware design of ES.	
	b) Write a short note on features of ARM processor.	
	c) What do you mean by instruction set? Write down its significance?	
Q.2	a) Explain communication protocols in detail.	07
	b) List & explain applications of embedded system in various areas.	08
Q.3	a) Explain the architecture of ARM processor in detail.	07
	b) Explain different special purpose & general purpose registers available in ARM core.	08
Q.4	a) Explain the following on chip features of ARM based LPC 2148 microcontroller	08
	i) ADC & DAC	
	ii) PWM	
	b) Write an ALP for ARM 7 to add two 32 bit numbers & store the result in memory locations.	07
Q.5	Write short note on	15
	a) ARM processor modes & states	
	b) On chip peripherals	
	c) Design challenges in ES.	

Section B

Q.6	Answer any two from following	10
	a) Explain in detail porting of RTOS.	
	b) Explain in detail RTOS kernel architecture.	
	c) Explain different services provided by RTOS in contrast with traditional OS.	
Q.7	a) Write an embedded 'C' program to blinks the LED's continuously with a small delay. The LED's are connected to the port 1 pins Pl.24 to Pl.31.	08
	b) Discuss in detail need of interfacing & interfacing technique.	07
Q.8	a) What is task scheduling? List & explain task scheduling algorithms.	08
	b) Explain in detail semaphore & its types in RTOS.	07
Q.9	a) Discuss features of μcos II RTOS.	07
	b) Explain the time delay function call under microC/os-II.	08
Q.10	Write short note on	15
	a) Semaphore relation function under MUCOS-II	
	b) Task state	
	c) Mail box & message queues	

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SUBJECT CODE NO:- K-251
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EC/ECT/E&C) Examination Oct/Nov 2016
VLSI Design
(Revised)

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

Please check whether you have got the right question paper.
N.B
    i) Q.No.1 from section A and Q.No.6 from section B 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) Figures to the right indicate full marks.
    v) Assume suitable data, if necessary & state it clearly.

Section A

Q.1	Attempt any two from the following.	10
	a) State and explain Moore's law.	
	b) Differentiate between CPLD and FPG.	
	c) What is testability? Explain the need of design for testability.	
	d) Explain block statement with example.	
Q.2	a) Explain how data types are classified in HDL. Mention the advantages of VHDL over verilog.	07
	b) Write a VHDL code for full adder using two half adder in structural style of modelling.	08
Q.3	a) What is test bench? Write a test bench to verify design of AND gate?	08
	b) With the help of neat sketch explain architecture of XC 4000 FPGA.	07
Q.4	a) Draw and explain TAP controller state diagram.	07
	b) Write a VHDL code for a 1:8 demultiplexer using when-else.	08
Q.5	Write short notes on (any three)	15
	a) Registers and bidirectional bus	
	b) EDA tools	
	c) Stuck at 1 and 0 fault	
	d) JTAG technology	

Section B

Q.6	Attempt any two from the following.	10
	a) Define noise margin and power delay product.	
	b) Explain in brief on Pass Transistor logic.	
	c) I-V characteristics of ideal n MOS transistor.	
	d) Explain self aligned process in CMOS.	
Q.7	a) Describe velocity saturation and mobility degradation.	07
	b) Draw and explain NAND, NOR gate using CMOS.	08

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Q.8　　a)　Explain transmission gate and design X-OR and OR logic gate using transmission gate.　　08
　　　　b)　Explain the steps in N-well process of CMOS fabrication.　　07

Q.9　　a)　Explain the layout design rules in CMOS processing technology.　　07
　　　　b)　Explain in detail analysis of CMOS inverter with parasitic.　　08

Q.10　Write short notes on (any three)　　15
　　　　i)　　Boundary scan check
　　　　ii)　 CLM
　　　　iii)　Body effect
　　　　iv)　Stick diagram

2016

SUBJECT CODE NO:- K-284
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(ECT/E&C) Examination Oct/Nov 2016
Microwave & Radar Engg. (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 & 6 are compulsory.
- II.   Attempt any two questions from the remaining questions for each section.
- III. Assume suitable data if necessary.

Section A

Q.1	Attempt any two	10
	a) S-Parameters.	
	b) Microwave frequency band.	
	c) Varactor diode.	
	d) Microware imaging.	

Q.2 a) An air filled rectangular waveguide has dimensions of 2.5 cm x 1 cm. The frequency is 8.6 GHz. find. 08
  i)   Cutoff frequency.
  ii)   Guide wavelength.
  iii) Characteristic impedance.
  Assume TE_{10} mode of propagation.

  b) What do you mean by waveguide? Explain which is the dominant mode of propagation in rectangular waveguide and why? 07

Q.3 a) Explain the working of directional coupler. Also explain coupling factor & directivity of a directional coupler. 08

  b) Describe the basic operating mechanism of IMPATT diode. Using suitable sketch. Also explain disadvantages of IMPATT diode oscillator. 07

Q.4 a) Draw the schematic diagram of cylindrical multicavity magnetron and describe its principle of operation. 08

  b) Explain the mechanism of operation of 2- cavity klystron amplifier. Along with velocity modulation mechanism. 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 Attempt any two- 10
  a) Pulse repetition frequency.
  b) Low angle tracking.
  c) Non-coherent MTI radar.
  d) Radar display system.

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Q.7	a)	What do you mean by radar? Explain the block diagram of radar in detail.	07
	b)	Radar operates at 10 GHz, has peak power of 500KW. The power gain of antenna is 5000 & min. power of receiver 10^{-14}. Calculate max. Range of radar if effective area of antenna is $10m^2$ and radar cross-section is $4m^2$.	08

Q.8	a)	What are the differences between MTI radar and pulse Doppler radar? Also explain the block diagram of MTI radar.	08
	b)	Explain the detection of signal in noise for radar. Also explain the concept of false alarm and miss change in radar.	07

Q.9	a)	Explain the limitations of MTI radar in detail.	08
	b)	What do you mean by digital MTI processing? Explain the advantages of digital MTI processing over analog MTI processing.	07

Q.10	a)	Explain the working of monopulse tracking radar.	07
	b)	Explain conical scanning method of tracking. How is this an improvement over lobe switching?	08

2016

SUBJECT CODE NO:- K-285
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EC) Examination Oct/Nov 2016
Robotics (EC)
(Revised)

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

Please check whether you have got the right question paper.
N.B   i) Assume Suitable data if necessary.
            ii) Q.No.1 & Q.No.6 are compulsory. Then solve any two questions out of four from Sec A as well as
            Sec B.

Section A

Q.1   a) What do you understand by kinematics of Robotic arm?   10
          b) What are different matrix operations?
          c) What is a dynamic & dynamic constraint?
          d) What are component of Robot system?
          e) What are different joint?

Q.2   a) Explain the classification of robotic arm.   08
          b) Give specification of robotic arm.   07

Q.3   a) What is present & future trends in robotics?   08
          b) Explain Newton's & Euler's equations.   07

Q.4   a) What is D-H matrix? Give details.   08
          b) Consider a vector $\bar{v}$= 3i+4j+5k. Give its representation in terms of homogenous system with S=0, 1, 2,   07
              &-10.

Q.5   a) A frame has been moved nine units along the x axis & five units along the z axis of the reference   08

              frame. Find the new location of the frame if given frame F=$\begin{bmatrix} .527 & -.574 & .628 & 5 \\ .369 & .819 & .439 & 3 \\ -.766 & 0 & .643 & 8 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

                                                                                                                07
          b) If $\bar{x} = i + 2j + 3k$ & $\bar{y} = 4i + 5j + 6k$
              Find $\bar{x}.\bar{y}$ & $\bar{x} \times \bar{y}$ in homogenous coordinate system.

Section B

Q.6   a) What are different grippers?   10
          b) State different proximity sensors.
          c) What is image processing?
          d) What are different electrical actuators?
          e) What is object recognition?

Q.7   a) What are different applications of machine vision system?   08
          b) What is image description, sensing & digitization?   07

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Q.8	a)	Explain fuzzy controller.	08
	b)	Explain obstacle avoidance system in Robotics vision.	07
Q.9	a)	What are different force sensors? Explain any one in detail.	08
	b)	What are different touch & slip sensors? Explain any one in detail.	07
Q.10	a)	Explain in detail magnetic gripper.	08
	b)	Explain adhesive gripper in detail.	07

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