University of Mumbai

Summer Examination 2022

Program: BE Electronics Engineering

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: ELX 801 and Course Name: Internet of Things

Time: 2-hour 30 mins Max. Marks:80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Communication Environments in case of data routing over the Web for connected devices are Classified into which of the following options:
Option A:	CoRE Environment and Unconstrained Environment
Option B:	CoRE Environment and Constrained Environment
Option C:	Casual Environment and Bock Environment
Option D:	Free Space Environment and Atmospheric Environment
2.	SOAP is a protocol for:
Option A:	exchange of objects between applications using XML
Option B:	exchange of objects between applications using text
Option C:	exchange of control information between the sender and receiver
Option D:	exchange of KEYS between the sender and receiver
3.	CoAP-MQ broker :
Option A:	Acts as a firewall
Option B:	senses data from various sensors
Option C:	store only control messages intended to other nodes.
Option D:	enables web client publishing of updates to the endpoints
4.	DHCP facilitates:
Option A:	Static IP Addressing in any networks
Option B:	Dynamic IP Addressing in any network
Option C:	MAC ID allotment to all devices connected in the network
Option D:	The generation of IO port numbers
5.	AMQP is designed for:
Option A:	Control data transfer
Option B:	LANs and WANs
Option C:	Business Messaging
Option D:	Spatial co-ordinate node selection in WSN
6.	UDP protocol is used for:
Option A:	acknowledged data flow
Option B:	unacknowledged data flow
Option C:	Reliable communication
Option D:	full duplex secured communication
7.	Observer nodes can:
Option A:	Process information and use it for various applications but they do not perform any control functions.
Option B:	Process information and performs control Actions.

Option C:	Perform only control Actions whenever required.
Option D:	Cannot perform processing operation but acts as a repeater node.
8.	A Home Automation System Application will have following set of services:
Option A:	Controller service, Mode Service ,State Service
Option B:	Controller Service only
Option C:	Mode Service and State Service only
Option D:	Controller service and State Service only
9.	Which sensors will not be used for weather monitoring system
Option A:	Temperature sensor
Option B:	Pressure sensor
Option C:	Acceleration sensor
Option D:	Relative Humidity Sensor
10.	Online Transaction Processing (OLTP) is used in:
Option A:	Internet of automatic chocolate vending machines
Option B:	Internet of ATMs
Option C:	Internet of RFIDs
Option D:	Internet of streetlights

Q2. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i	Draw and explain IoT Level 1, IoT Level 5 and IoT Level 6.
ii	List the various REST Architectural constraints and explain any two in detail
iii	List the features in Xively cloud platform.
B	**Solve any One** **10 marks each**
i	Explain the various design methodology steps in sequence.
ii	Write a short note on i)LPWAN ii) NBIoT

Q3. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i	Explain the various Data Categorizations for storage in IoT Systems.
ii	List the semantics followed by NOSQL instead of ACID rules that are followed in normal databases.
iii	Compare the various types of OLTP available.
B	**Solve any one** **10 marks each**
i	Explain the CoAP and AMQP Protocol.
ii	Draw and detail the deployment design of any weather monitoring IoT System.

Q4. (20 Marks)		
A	**Solve any Two**	**5 marks each**
i	Explain how the following electrical parameters are used as a part of sensing Technology: a) Capacitance and b) reverse saturation current of PN Junction	
ii	What are the Characteristics of IoT?	
iii	What are the advantages and Concerns of Cloud Computing?	
B	**Solve any One**	**10 marks each**
i	Write a short note on i)Server Management ii)Spatial Storage	
ii	Explain the MQTT protocol with respect to any one IoT application.	

University of Mumbai
Examination May-June 2022

Program: **Electronics Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: ELX802 and Course Name: AnalogandMixedVLSIDesign

Time: 2 hours 30Minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 20 Marks**
1.	In current mirror circuit, the first MOSFET (which copy current from reference) is operating in which region?
Option A:	Linear
Option B:	Saturation
Option C:	Cut-off
Option D:	deep triode region
2.	Which of the following statement is true in case of Base to Emitter voltage (V_{BE}) of BJT?
Option A:	It has negative temperature coefficient
Option B:	It has positive temperature coefficient
Option C:	It has both temperature coefficient
Option D:	It is equal to $(I_B)^2$
3.	The condition for MOSFET to be in deep triode region is----------.
Option A:	$V_{DS} << 2(V_{GS}-V_{TH})$
Option B:	$V_{DS} >> 2(V_{GS}-V_{TH})$
Option C:	$V_{DS} << (V_{GS}-V_{TH})$
Option D:	$V_{DS} >> (V_{GS}-V_{TH})$
4.	Thermal noise is generated from MOSFET by ----------
Option A:	Conduction of charge carriers in the channel
Option B:	Electric field across the gate and channel
Option C:	Capacitance of the gate oxide
Option D:	Substrate bias effect
5.	CS amplifier with Source degeneration voltage gain
Option A:	increases
Option B:	decreases
Option C:	moderate
Option D:	zero

6.	ro is the internal resistance of a MOSFET is equal to
Option A:	$1/\lambda I_D$
Option B:	λ/I_D
Option C:	I_D/λ
Option D:	λI_D
7.	In Switched Capacitor circuits, to achieve a higher sampling speed, _____& _____must be used.
Option A:	A small aspect ratio, a small capacitor
Option B:	A Large aspect ratio, a large capacitor
Option C:	A small aspect ratio, a large capacitor
Option D:	A Large aspect ratio, a small capacitor
8.	Which of the following is the main advantage of semicustom design approach over full custom design?
Option A:	Use of standard cells to reduce design time and complexity
Option B:	High performance
Option C:	More complexity
Option D:	High Speed
9.	What is the function of low pass filter in phase-locked loop (PLL) circuit?
Option A:	Improves low frequency noise
Option B:	Removes high frequency noise
Option C:	Tracks the voltage changes
Option D:	Changes the input frequency
10.	The resolution of 8-bit DAC/ADC is_____
Option A:	562
Option B:	256
Option C:	625
Option D:	128

Q2	**Solve any Four out of Six 5 marks each**
A	Explain trade-offs in analog design with the help of analog design octagon.
B	What are the disadvantages of basic current mirror circuit and how it is overcome in cascode current mirror?
C	Explain the concept of switched capacitor circuit.
D	Which errors are contributed by charge injection mechanism in MOS sampling circuits?
E	Compare performance parameters of various op-amp topologies.
F	Explain behaviour of g_m as function of below parameters 1. Overdrive voltage with W/L constant. 2. Overdrive voltage with I_D constant

Q3	Solve any two out of three	10 marks each
A	Derive the expression of voltage gain and output resistance of the source follower circuit.	
B	What is a bandgap reference? Describe methods of implementation of band gap references.	
C	Explain AMS design flow in VLSI circuit. Compare full custom and semi-custom design.	

Q4	Solve any two out of three	10 marks each
A	Draw and explain charge pump PLL circuit	
B	What are the various types of ADC architectures? Explain any two architectures in detail.	
C	Derive the equation of Differential gain and Common mode gain of differential amplifier.	

University of Mumbai

Examinations Summer 2022

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester: VIII

Course Code: ELXDLO_8044 Course Name: Digital Image Processing

Time: 2 hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Assuming that a 10m high structure is observed from a distance of 20m. What is the size of retinal image? Assume that the distance between the lens and retina is 17mm.
Option A:	8.5 mm
Option B:	34mm
Option C:	0.118mm
Option D:	34cm
2.	Which of the following is not a point processing operation?
Option A:	Histogram Processing
Option B:	Digital Negative
Option C:	Contrast Stretching
Option D:	Thresholding
3.	If the original image is rotated by 45° in spatial domain the spectrum gets rotated by
Option A:	45°
Option B:	65°
Option C:	0°
Option D:	180°
4.	Thinning operation is used to remove the _____pixels
Option A:	image
Option B:	foreground
Option C:	object
Option D:	back ground
5.	Identify the operator X, Where X=[0 -1 0; -1 4 -1; 0 -1 0]
Option A:	Sobel edge operator
Option B:	Prewitt edge operator
Option C:	Gradient operator
Option D:	Laplacian operator
6.	Mask used for line detection is _____
Option A:	Gaussian
Option B:	Laplacian
Option C:	Ideal
Option D:	Butterworth
7.	Basis images can be generated by _____
Option A:	Symmetric matrices
Option B:	Unitary matrices
Option C:	Non symmetric matrices

Option D:	Circulant matrices
8.	Which of the following transform give multiresolutional analysis?
Option A:	Discrete Fourier Transform
Option B:	Discrete Cosine Transform
Option C:	Fast Fourier Transform
Option D:	Discrete Wavelet Transform
9.	Which block in image processing system introduces lossy compression?
Option A:	Mapper
Option B:	Quantizer
Option C:	Variable length coding
Option D:	negative
10.	IGS code for 100, 110 are
Option A:	1000, 0110
Option B:	0110, 0111
Option C:	0110, 1000
Option D:	0110 , 0111

Q2.	
A	**Solve any Two** **5 marks each**
i.	Explain digital image sampling and quantization.
ii.	Explain Hough transform for edge linking.
iii.	Give Laplacian operator and explain how it is used to detect edges.
B	**Solve any One** **10 marks each**
i.	Apply the following image enhancement techniques for the given 3 bits per pixel image segment**.** (i) Digital Negative (ii) Thresholding (T = 5) (iii) Intensity level slicing with and without background with r_1=2 and r_2=4.

4	6	0	3	7
2	1	5	0	3
4	2	7	0	7
1	5	4	6	0
4	7	5	4	1

ii. The grey level distribution of an image is shown in table below. Perform Histogram equalization and plot histograms of original and equalized images. Explain need of histogram equalization.

Gray Level	0	1	2	3	4	5	6	7
Frequency of Occurrence	100	250	100	300	150	0	0	0

Q3.		
A	**Solve any Two**	**5 marks each**
i.	Explain Hit - and - Miss Transform.	
ii.	Write short note on Homomorphic filtering.	
iii.	Explain the following morphological operations:- i. Opening ii. Closing	
B	**Solve any One**	**10 marks each**
i.	What is image segmentation? Explain with example segmentation based on similarities.	
ii.	Name and explain different types of data redundancies in digital image. Classify the following compression techniques in to lossy and loss less:- (i) IGS coding (ii) Run length coding (iii) Transform coding (iv) DPCM coding	

Q4.		
A	**Solve any Two**	**5 marks each**
i.	Explain the procedure of Huffman coding.	
ii.	State the expression for one dimensional Discrete Cosine Transform. Give the importance of DCT in image compression.	
iii.	Explain Discrete Wavelet Transform.	
B	**Solve any One**	**10 marks each**
i.	What is Hadamard Transform? State its properties. Calculate the Hadamard Transform of following image.	
ii.	Explain with block diagram JPEG encoder and decoder.	

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

University of Mumbai
Examinations Summer 2022
Program: Electronics Engineering
Curriculum Scheme: Rev 2016
Examination: BE Semester VIII

Course Code: ELX DLO8042 Course Name: MEMS Technology
Time: 2-hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	DMD Stands for _____.
Option A:	Discrete Mirror Device
Option B:	Digital Mirror Device
Option C:	Digital Micromirror Device
Option D:	Discrete Micromirror Device
2.	Which of the following is not a piezo electric sensor?
Option A:	PZT
Option B:	Roscelle salt
Option C:	Quartz
Option D:	Microheater
3.	What is Piezo resistivity?
Option A:	Electrical voltage changes in response to mechanical stress
Option B:	Electrical resistance changes in response to mechanical stress
Option C:	Electrical current changes in response to mechanical stress
Option D:	Producing an electric field when subjected to an external force
4.	An Alloy that can be deformed when cold but returns to its pre-deformed shape when heated?
Option A:	Polymers
Option B:	Metal
Option C:	Shape memory alloy
Option D:	Quartz
5.	The ratio of Maximum deflection of cantilever beam to its ---------- is called stiffness of the beam.
Option A:	Load
Option B:	Span
Option C:	Slope
Option D:	reaction at the support.
6.	Lorentz forces are useful for closed-loop feedback in systems employing -------- sensing.
Option A:	Magnetic
Option B:	Electromagnetic
Option C:	Piezoresistive
Option D:	Electrostatic
7.	Product after etching of Si wafer with KoH is-------- shape.
Option A:	Square

Option B:	Circular at the end
Option C:	Trapezoidal
Option D:	Oval
8.	To deposit polymers which deposition method is used?
Option A:	CVD
Option B:	LPCVD
Option C:	HPCVD
Option D:	PECVD
9.	What is Sputtering?
Option A:	Process of Cleaning
Option B:	Process of Deposition
Option C:	Process of Diffusion
Option D:	Process of Oxidation
10.	The principal microfabrication process used in bulk manufacturing is
Option A:	Etching
Option B:	chemical vapour deposition
Option C:	physical vapour deposition
Option D:	Diffusion

Q2 (20 Marks)	**Solve any Four out of Six** **5 marks each** (All Questions carry equal marks)
A	Discuss the role of SU8 in MEMS applications.
B	What is MEMS? What is significant difference between Microelectronics and Microsystem?
C	Explain Air-Bag deployment system in brief.
D	Differentiate between bulk and surface micro machining.
E	What are different types of pressure sensors
F	Define the term TCR. Also describe the method of characterization of TCR.

Q3 (20 Marks)	**Solve any Two Questions out of Three** **10 marks each** (All Questions carry equal marks)
A	Discuss the process flow of Photolithography. Explain the types of photoresists used.
B	What are micro-actuators pertaining to MEMS Technology? Give two examples.
C	Describe the representative process flow for fabricating the micro-heater. Also explain the operating principle of this MEMS device in detail with its analytical expression.

Q4 (20 Marks)	**Solve any Two Questions out of Three** **10 marks each** (All Questions carry equal marks)
A	What is MEMS micromachining? Explain in details fabrication process flow of LlGA. Why electroplating is necessary in LlGA process.
B	What do you mean by wafer bonding? Explain with neat diagram, different wafer bonding techniques.
C	List and explain all the types of failure mechanisms used in MEMS.

University of Mumbai

Examination June 2021

Examinations Commencing from 15th May 2022

Program: **_B.E (Mechanical Engineering)__**

Curriculum Scheme: **Rev2016**

Examination: **BE Semester VIII**

Course Code: **_ILEC II_** and Course Name: **_Finance Management__**

Time: 2 hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The long-run objective of financial management is to
Option A:	Maximize earnings per share
Option B:	Maximize the value of the firm's common stock
Option C:	Maximize return on investment
Option D:	Maximize market share
2.	The regulator for Primary and secondary market is
Option A:	IRDA
Option B:	SEBI
Option C:	RBI
Option D:	CRISIL
3.	A low risk-taking individual will most probably invest in which of these instruments:
Option A:	Equity
Option B:	Debt
Option C:	Fixed Deposits
Option D:	Mutual Funds
4.	Axis Bank, PNB, SBI, ICICI are:
Option A:	Foreign Banks
Option B:	Public Sector Banks
Option C:	Commercial Banks
Option D:	Private Sector Banks
5.	With a well-diversified portfolio, an investor can reduce
Option A:	Unsystematic risk
Option B:	systematic risk
Option C:	Market Risk
Option D:	finance risk
6.	Relationship between annual nominal rate of interest and annual effective rate of interest, if frequency of compounding is greater than one

Option A:	Effective rate < Nominal rate
Option B:	Effective rate = Nominal rate
Option C:	Effective rate > Nominal rate
Option D:	can't be determined
7.	Patents, Copyrights and Trademarks are
Option A:	Current assets
Option B:	Fixed assets
Option C:	Intangible assets
Option D:	Investments
8.	Working capital management is concerned with the inter-relationship existing between
Option A:	Total assets and total liabilities
Option B:	Total assets and current liabilities
Option C:	Current assets and total liabilities
Option D:	Current assets and current liabilities
9.	The Internal Rate of Return is defined as
Option A:	the discount rate which causes the payback to equal one year.
Option B:	the discount rate which causes the NPV to equal zero.
Option C:	the ROE when the NPV equals 0
Option D:	the ROE associated with project maximization
10.	Which of the following are NOT functions of a financial system?
Option A:	The operation of a payments system.
Option B:	Providing the means of portfolio adjustment.
Option C:	Helping to reduce unemployment.
Option D:	Channelling funds between lenders and borrowers.

Q2 **Attempt any two** **10 marks each**

a). Distinguish between equity & debt instruments. (10 marks)

b). The expected cash flows of a project are as follows

Year	0	1	2	3	4	5
Cash flow	-100000	20000	30000	40000	50000	30000

The cost of the capital is 12 percent. Calculate the NPV and IRR of the project (10 marks)

c). What are leverage ratios? Explain any two types of the same.

Q3 **Attempt any two** **10 marks each**

a). Financial statements of XYZ company reveals following information.

Balance sheet (10 marks)

Liabilities	2019	Assets	2019
Current Liabilities		Current Assets	

Accounts payable	60	cash and equivalents	10	
Accruals	140	Accounts Receivble	375	
Notes Payable	110	Inventories	615	
Total CL	**310**	**Total CA**	**1000**	
Long Term Bonds	750	Net Fixed Assets		
Total Liabilities	**1060**	Plant and equipment	1000	
Common equity		less depri	0	
Common stock(50 million shares)	130	Other assets	0	
Retained Earnings	810	**Total Assets**	**2000**	
Total Common Equity	940			
Total Liabilities and equity	**2000**			

P & L statement

	2019
Net Sales	**3000**
Operating cost except depreciation and amortization	2616.2
Depreciation and Amortization	100
Total operating cost	**2716.2**
Operating income EBIT	**283.8**
less Interest	88
EBT	**195.8**
Less Tax(40%)	78.32
Net Income	**117.48**
less Retained earnings	60
Total Dividend	57.48

Find out following ratios from the given data.

a) Current Ratio
b) Inventory Turn Over Ratio
c) Debt – Equity Ratio.
d) Net Profit Margin Ratio
e) Interest coverage Ratio.

b). Briefly explain the types of financial services

c). Differentiate between ordinary annuity and annuity due with examples.

Q4 Attempt any two 10 marks each

a). Explain various Financial Instruments in detail

b). Define risk and return. Explain Measurement of Historical Returns and Expected Returns of a Single Security and a Two-security Portfolio

c). What is Capital Budgeting? Discuss the various factors that influence the capital budgeting decisions.

University of Mumbai

Examinations Summer 2022
Program: IT01028
Curriculum Scheme: Rev2016
Examination: BE Semester VIII
Course Code: 52965 and Course Name: Environmental Management

Time: 2 hour 30 minutes **Max. Marks: 80**

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The Bhopal gas Tragedy in 1984 is related to--
Option A:	Nuclear disaster
Option B:	Earthquake disaster
Option C:	Man-made disaster
Option D:	Floods
2.	The government of India enacted EPA of 1986 under article___ of the constitution
Option A:	253
Option B:	251
Option C:	249
Option D:	51A
3.	The primary agenda of the Kyoto protocol is:
Option A:	Regulation of hazardous wastes
Option B:	Regulate the production of nuclear energy
Option C:	Control anthropogenic sources of greenhouse gases
Option D:	Control of the worldwide Energy consumption
4.	Which of the following is a prime health risks associated with greater UV radiation through the atmosphere due to depletion of ozone layer?
Option A:	Damage to digestive system
Option B:	Increased liver cancer
Option C:	Increased skin cancer

Option D:	Neurological disorder
5.	P-D-C-A stands for:
Option A:	Plan-Do-Check-Act
Option B:	Plan-Do-Correct-Act
Option C:	Proceed-Do-Check-Act
Option D:	Proceed-Do-Correct-Act
6.	The combination of all factors that act to limit the growth of a population is:
Option A:	Carrying capacity
Option B:	Environmental resistance
Option C:	Biotic potential
Option D:	Logistic growth
7.	In acid rain PH of water is:
Option A:	Less than 5.6
Option B:	Around 7
Option C:	More than 7
Option D:	around 14
8.	Environment Impact assessment (EIA) is done
Option A:	Before the project
Option B:	After the project
Option C:	During the project
Option D:	Any time in life cycle of project
9.	Energy conversation act was formed in year
Option A:	1997
Option B:	2000

Option C:	2001
Option D:	1999
10.	The Minamata Disease was caused due to:
Option A:	Methyl Isocyanate
Option B:	Mercury
Option C:	Benzene
Option D:	Lead

Q.2 (A)	**Solve any two of the following: (10M)**
i)	*What are the aspects of Environment Management & challenges faced in it?*
ii)	*Write a note on loss of Bio-diversity.*
iii)	*Discuss the EMS certification.*
(B)	**Solve any one of the following: (10M)**
i)	Discuss the Environmental issues relevant to India.
ii)	Write a note on the role of government as a planning & regulating agency.

Q3 (A)	**Solve any two of the following: (10M)**
i)	*Define: Limiting factors & Carrying capacity. Discuss their relation with the environment.*
ii)	*What are the features of Environment Protection Act,1986.*
iii)	Discuss the role of Central Pollution Control Board (CPCB) in pollution monitoring.
(B)	**Solve any one of the following: (10M)**
i)	*What is ISO-14000? How does adoption of ISO-14000 practices benefit the Industries as well as the Environment?*
ii)	*What is Hazardous Waste? Note the different health risk caused by it. How does it affect the environment?*

Q4. (A)	**Solve any two of the following: (10M)**
i.	*Write a note on the Water(Prevention& control of Pollution)Act.*
ii.	*Define Ecosystem. What are the components of Ecosystem?*
iii.	Differentiate between: Industrial Disasters & Man-made disasters
B	**Solve any One (10M)**
i.	*What is sustainable development? Is sustainable development necessary? What are the parameters affecting it?*
ii.	*Write a note on; Total Quality Environmental Management & Corporate Environment Responsibility.*