

TE INSEM APRIL 2022

TE (E&TC)

POWER DEVICES AND CIRCUITS (304194)

(2019 Pattern) (Semester-II)

Set 1

Time: 1 Hour

Max Marks: 30

Instructions to the candidates:

Date:07/04/22

1. Answer Q. 1 or Q. 2, Q. 3 or Q. 4
2. Neat diagrams must be drawn wherever necessary
3. Figures to the right indicate full marks
4. Use of logarithmic tables, electronic pocket calculator and steam tables is allowed
5. Assume suitable data, if necessary

Question Number	Question	Marks	CO	BL
Q. 1	a) Explain the working of IGBT along with its constructional details. Draw & explain Steady state characteristics of IGBT. Explain "Safe operating area of IGBT". Also explain Gate drive circuit for IGBT.	5	CO1	1
	b) Compare Power BJT, SCR, Power MOSFET & IGBT	5	CO1	5
	c) State true or false. Defend your answer with appropriate justification. a. Forward voltage rating must be used as a criterion while designing SCR circuits. b. The latching current is important only at the time of SCR turn on, whereas holding current is important only at the time of SCR turn off.	5	CO1	2
<b>OR</b>				
Q. 2	a) Explain the working of SCR along with its constructional details. Explain two transistor model of SCR. State the latching action.	5	CO1	1
	b) State true or false. Defend your answer with appropriate justification. a. Inverter grade SCR is suitable for high frequency applications like inverter. b. The value of rate of increase of the forward voltage should be kept below the maximum value specified by the manufacturer.	5	CO1	2
	c) Explain the concept of average value, rms value and true rms Value	5		2

Question Number	Question	Marks	CO	BL
Q. 3	a) Explain the operation of Single phase Semi converter for RL load with necessary waveforms Derive an expression for rms and average o/p voltage.	5	CO2	2
	b) Compare single phase semi and full converter.	5	CO2	4
	c) A single phase semi converter is operated from a 120 V, 60 Hz supply feeding power to a resistive load of $10\Omega$ . If the average output is 25% of maximum possible average output voltage, <b>Calculate:</b> a) The delay angle b) The rms and average output power	5	CO2	5
<b>OR</b>				
Q. 4	a) A single phase full converter is operated from 230 V, 50 Hz AC input and supplies a resistive load of $10\Omega$ . If the firing angle is $45^\circ$ . <b>Calculate:</b> a. Average Output voltage b. RMS Output voltage	5	CO2	5
	b) What is a freewheeling diode? What is the effect of freewheeling diode on converters?	5	CO2	2
	c) <b>Explain</b> active power, reactive power & apparent power. <b>Draw</b> power triangle. What is power factor? on which parameters does it depend?	5	CO2	2

**SPPU In-Sem Offline Examination-April 2022**

Class :TE      Branch: E&TC/ELTX      Semester: II

Subject : Advanced JAVA Programming      (Code: 304195 (C))

Maximum Marks: 30

Duration: 60 Minutes

Date : 08/04/2022

Special Instructions: \_

1. Special Instructions: \_ Answer Q1 or Q2, Q3 or Q4.
2. Neat diagram must be drawn whenever necessary.
3. Assume suitable data if necessary

Q.No.	Question / Description	Marks	CO
1(a)	Explain applet. Write program to create an applet to display any message.	5	1
1(b)	Explain HTML APPLET tag and Passing parameter to Applet with the help of suitable example?	5	1
1(c)	Discuss getDocumentBase() and getCodeBase() with the help of example?	5	1

**OR**

2(a)	What is applet? Explain its lifecycle?	5	1
2(b)	What is Japplet, Icons and Labels Text Fields Buttons, Checkboxes with the help of example?	5	1
2(c)	What is AWT? What are limitations of AWT?	5	1

Q. No.	Question / Description	Marks	CO
3(a)	What is event classes, event listeners explain with suitable example?	5	2
3(b)	What is delegation event mode explain with example?	5	2
3(c)	Explain handling mouse and keyboard events with the help of example?	5	2

**OR**

4(a)	Write a java program to toggle background color on every click of button?	5	2
4(b)	Explain the awt class hierarchy with suitable diagram?	5	2
4(c)	What is layout manager? Explain in detail.	5	2

**SPPU In-Sem Offline Examination-April 2022**

Class :TE      Branch: E&TC/ ELTX      Semester: II

Subject : Advanced JAVA Programming      (Code: 304195 (C))

Maximum Marks: 30

Duration: 60 Minutes

Date : 08/04/2022

Special Instructions: \_

1. Special Instructions: \_ Answer Q1 or Q2, Q3 or Q4.
2. Neat diagram must be drawn whenever necessary.
3. Assume suitable data if necessary.

Q.No.	Question / Description	Marks	CO
1(a)	What is applet? Explain its lifecycle?	5	1
1(b)	Discuss getDocumentBase() and getCodeBase() with the help of example?	5	1
1(c)	What is AWT? What are limitations of AWT?	5	1

**OR**

2(a)	Define applet. Write program to create an applet to display any message.	5	1
2(b)	Explain HTML APPLET tag and Passing parameter to Applet with the help of suitable example?	5	1
2(c)	What is Japplet, Icons and Labels Text Fields Buttons, Checkboxes with the help of example?	5	1

Q. No.	Question / Description	Marks	CO
3(a)	What is events and event sources?	5	2
3(b)	Explain the awt class hierarchy with suitable diagram?	5	2
3(c)	Explain handling mouse and keyboard events with the help of example?	5	2

**OR**

4(a)	What is event classes and event listeners explain with suitable example?	5	2
4(b)	What is delegation event mode? Explain with example.	5	2
4(c)	What is layout manager? Explain in detail.	5	2

**SPPU In-Sem Offline Examination-April 2022**

Class: TE E&TC

Branch: E&TC

Semester-II

Subject: Project Management (Code: 304193)

Maximum Marks: 30

Duration: 60 Minutes

Date: 5/4/21

Special Instructions:

Answer Q1 or Q2, Q3 or Q4

Neat diagrams must be drawn wherever necessary.

Figures on the right indicate full Marks

Assume suitable data, wherever necessary

Q. No.	Question / Description	Marks	CO
1a	Draw and explain project management life cycle	7	CO1
1b	Explain the Essentials of Project Management Philosophy	8	CO1
OR			
2a	State the difference between a Process and Project. Give suitable example of both	8	CO1
2b	Define Project management. Elaborate the need and objective of Project management	7	CO1
3a	Explain any one method of project selection/evaluation in details. Give example	8	CO2
3b	Explain with example Project break-even point	7	CO2
OR			
4a	Explain various feasibility test needed to be done for a Project	8	CO2
4b	Describe work Break down structure with suitable example.	7	CO2

## SPPU In-Sem Offline Examination- April 2022

Class: TE

Branch: Electronics

Semester: II

Subject: Fundamentals of HDL

(Code):304212

Maximum Marks: 30

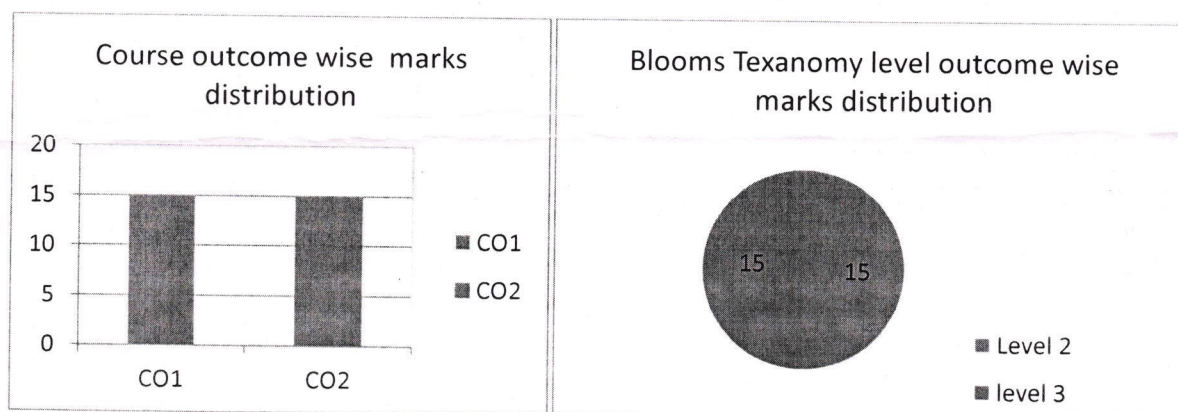
Duration: 60 Minutes

Date: 4/04/2022

Instructions:

- 1) Answer Q1 or Q2, Q3 or Q4
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figure to the right indicates Full marks.
- 4) Assume suitable data if necessary.

Q.No.	Question / Description	Marks	CO	BL	PI
1(a)	Differentiate between VHDL and Verilog	5	1	3	2.2.4
1(b)	Explain scalar and composite data type with examples	5	1	2	2.1.2
1(c)	What is the difference between simulation and synthesis	5	1	2	2.2.4
(OR)					
2(a)	What are the differences between behavioral and structural modeling styles of HDL	5	1	2	2.2.4
2(b)	Classify HDL operators. Explain in detail VHDL operators with example	5	1	2	2.1.1
2(c)	Explain the salient features of VHDL	5	1	2	2.1.1
3(a)	What are the different types of architecture modeling styles in VHDL?	5	2	2	2.2.4
3(b)	Draw the logic block of 8:1 Mux. Write its truth table. Write VHDL code of 8:1 Mux by using concurrent statement "with..... select"	10	2	3	2.2.3
(OR)					
4(a)	Write VHDL code for Full Adder in any Modeling style	5	2	3	2.2.3
4(b)	Draw the logic block of D-FF. Write its truth table. Write VHDL code for D-FF in Behavioral modeling	10	2	3	2.2.3



BL – Bloom's (Revised) Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

**SPPU INSEM OFFLINE EXAMINATION APRIL -2022**

Class:- TE(E&amp;TC)

Branch:- E&amp;TC

Semester:- II

Subject:- Cellular Network

Code(304192)

Maximum Marks:- 30

Duration:-30

Date:- 4/4/2022

Special Instructions:-

- 1) Neat diagrams must be drawn whenever necessary.
- 2) Figure to the right indicate Full marks.
- 3) Assume suitable data if necessary.
- 4) Use of scientific calculator is allowed

Q.NO	QUESTION	MARKS	CO
1(a)	What is Friss Free space equation, what is conclusion from Friss equation? Also write equations of EIRP and free space path loss. Give conditions of validity of Friss Model. Explain about antenna regions along with formula for Fraun-hofer region	8	CO1
1(b)	List different propagation models in wireless communication, Explain Hata model along with equations for Path loss	7	CO1
	OR		
2(a)	Find median path loss using Okumura's model for $d=50\text{km}$ , $h_{te}=100\text{m}$ , $h_{re}=10\text{m}$ . Find total Path loss. Take $A_{mu}(900\text{Mhz}(50\text{ km}))= 43\text{ db}$ and $G_{AREA} = 9\text{dB}$ .	8	
2(b)	What is diversity in wireless communication explain different diversity techniques in wireless communication	7	CO1
3(a)	How OFDM achieve higher data rates? Explain concept of OFDM, along with advantages of OFDM. Also explain in detail OFDM transmitter and receiver along with its block diagram	8	CO2
3(b)	How diversity in space is achieved in space diversity technique? Model MIMO system having $t$ transmit antennas and $r$ receive antennas	7	CO2
	OR		
4(a)	Explain MIMO OFDM transmitter schematic along with its block diagram	8	CO2
4(b)	Compute MIMO zero forcing receiver for channel matrix $H$ given as $\begin{bmatrix} 2 & 3 \\ 1 & 3 \\ 4 & 2 \end{bmatrix}$	7	CO2

**SPPU INSEM OFFLINE EXAMINATION APRIL -2022**

**Class:- TE**

**Branch:- Electronics**

**Semester:- II**

**Subject:- Fiber Optic communication**

**Code(304215)**

**Maximum Marks:- 30**

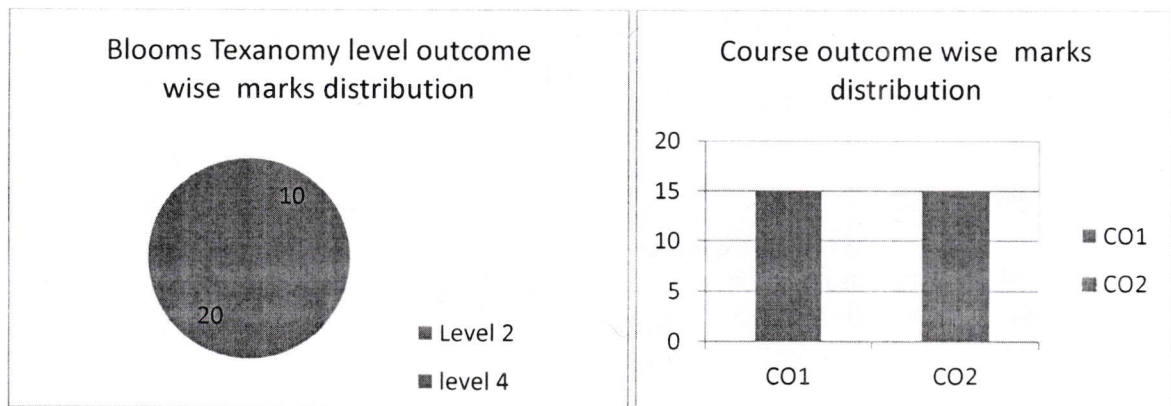
**Duration:-60**

**Date:- 8/4/2022**

**Special Instructions:-**

- 1) Answer Q1 or Q2, Q3 or Q4
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figure to the right indicate Full marks.
- 4) Assume suitable data if necessary.

Q.NO	QUESTION	MARKS	CO	BL	PI
1.(a)	Derive equation of phase velocity.	5	CO1	4	2.1.3
1.(b)	Explain acceptance angle with derivation	5	CO1	2	1.2.1
1.(c)	A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine: (a) the critical angle at the core-cladding interface; (b) the NA for the fiber; (c) the acceptance angle in air for the fiber	5	CO1	4	2.1.3
OR					
2.(a)	Derive equation of cutoff wavelength.	5	CO1	4	2.1.3
2.(b)	Explain critical angle with derivation	5	CO1	2	1.2.1
2.(c)	let $n = 1$ , $n_1 = 1.46$ and $n_2 = 1.45$ in the of the optical fiber system. Find a) the critical angle $\theta_c$ at the core - cladding interface. b) the numerical aperture N.A. of the optical fiber c) the angle of acceptance $\alpha_{max}$ of the the optical fiber system	5	CO1	4	2.1.3
3.(a)	Distinguish step-index from graded index fibers.	5	CO2	4	1.3.1
3.(b)	Define the attenuation coefficient of a fiber	5	CO2	2	1.2.1
3.(c)	Determine the signal attenuation per Km for the optical fiber of length 10Km, assuming no splices and connector ,when the mean optical power launched is 100uW and output power is 5uW	5	CO2	4	2.1.2
OR					
4.(a)	Explain mode field diameter	5	CO2	4	1.2.1
4.(b)	What is intermodal dispersion explain in detail	5	CO2	2	1.2.1
4.(c)	Calculate attenuation in dB/Km in an optical fiber of length 600m, in which 80% of optical signal is lost while propagating through fiber.	5	CO2	4	2.1.2



BL – Bloom's (Revised) Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

**SPPU In-Sem Offline Examination-April 2022**

Class: TE Electronics

Branch: Electronics

Semester-II

Subject: Embedded Processors and Applications (Code: 304213)

Maximum Marks: 30

Duration: 60 Minutes

Date: 5/4/21

Special Instructions:

Answer Q1 or Q2, Q3 or Q4

Neat diagrams must be drawn wherever necessary.

Figures on the right indicate full Marks

Assume suitable data, wherever necessary

Q. No.	Question / Description	Marks	CO
1a	Draw the format of Status register of MSP430 and state the function of Each bit	5	CO1
1b	Draw and explain the architecture of MSP430FX5XX	5	CO1
1c	With the help of diagram explain clock system of MSP430	5	
OR			
2a	Draw the block diagram of Timer A of MSP430 and explain different modes of operation	5	CO1
2b	Explain in detail various low power modes of MSP430FX5XX	5	CO1
2c	Write a program to interface 4 LEDs to MPS430, The LED should blink on and off with a delay	5	CO1
3a	What is TDMI? Draw and explain data flow model of ARM7 in detail.	8	CO2
3b	Draw and explain the format of CPSR register in ARM	7	CO2
OR			
4a	Draw and explain the complete ARM register set with concept of changing mode on exception.	8	CO2
4b	Comparer ARM7, ARM9 and ARM 11	7	CO2

## SPPU In-Sem Offline Examination- April 2022

**Class: TE**

**Branch: Electronics**

**Semester: II**

**Subject: Industrial Management (Code: 304214)**

**Maximum Marks: 30**

**Duration: 60 Minutes**

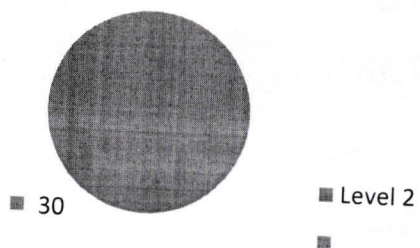
**Date: 7/4/2022**

**Instructions for Submission:**

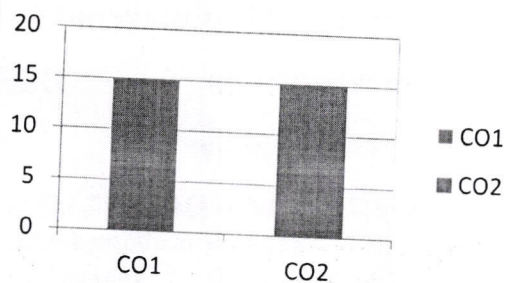
1. Attempt Questions Q1 or Q2, Q3 or Q4....
2. Scientific calculator is allowed wherever necessary
3. Each questions carry 10 marks

Q.no.	Question / Description	Marks	CO	BL	PI
1	a) Outline and explain any 4 principles of scientific management by F.W.Taylor	6	1	2	7.2.1
	b) What are the activities to be performed at different levels of Management	5	1	2	6.1.1
	c) Discuss merits and demerits of Scientific Management	4	1	2	12.2.1
	<b>OR</b>				
2	a) Define Management and discuss characteristics of management	6	1	2	7.2.1
	b) What do you mean by scientific management and describe contribution of Henry Fayol towards scientific management	5	1	2	7.1.2
	c) Differentiate between leadership and management	4	1	2	12.1.2
3	a) Draw and explain Human Resource System	6	2	2	12.2.2
	b) Write a short note on i) HR planning ii) Selection process	5	2	2	7.2.1
	c) State the functions of Human Resource Management department	4	2	2	6.1.1
	<b>OR</b>				
4	a) Describe process of recruitment and sources of recruitment.	6	2	2	11.3.1
	b) What do you mean by performance appraisal? State the objective & types of performance appraisal	5	2	2	8.1.1
	c) Elaborate the challenges faced by HR manager	4	2	2	12.2.2

Blooms Taxonomy level outcome wise marks distribution



Course outcome wise marks distribution



**SPPU In-Sem Offline Examination-April 2022**

Class: TE Electronics      Branch: Electronics      Semester-II

Subject: Embedded Processors and Applications      (Code: 304213)

Maximum Marks: 30

Duration: 60 Minutes

Date: 5/4/21

Special Instructions:

Answer Q1 or Q2, Q3 or Q4

Neat diagrams must be drawn wherever necessary.

Figures on the right indicate full Marks

Assume suitable data, wherever necessary

Q. No.	Question / Description	Marks	CO
1a	<b>Draw</b> the format of Status register of MSP430 and <b>state</b> the function of Each bit	7	CO1
1b	<b>Draw</b> the block diagram of Timer A of MSP430 and <b>explain</b> different modes of operation	8	CO1
OR			
2a	List the features of MSP430 and explain its architecture	8	CO1
2b	State and explain different registers of MSP430 microcontroller	7	CO1
3a	What is TDMI? <b>Draw and explain</b> data flow model of ARM7 in detail.	8	CO2
3b	<b>Draw and explain</b> the format of CPSR register in ARM	7	CO2
OR			
4a	<b>Draw and explain</b> the complete ARM register set with concept of changing mode on exception.	8	CO2
4b	<b>Compare</b> ARM7, ARM9 and ARM 11	7	CO2

## SPPU In-Sem Offline Examination- April 2022

Class: TE

Branch: Electronics

Semester: II

Subject: Fundamentals of HDL

(Code ):304212

Maximum Marks: 30

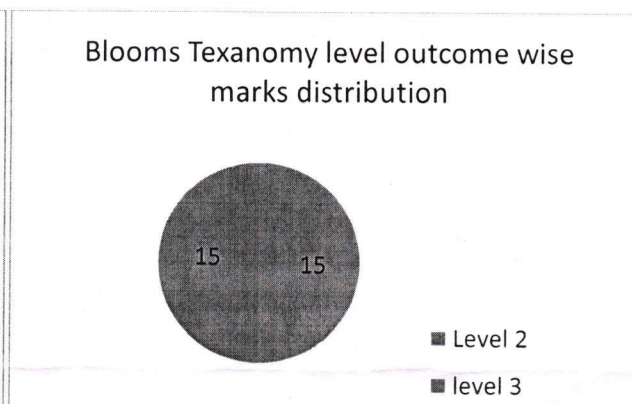
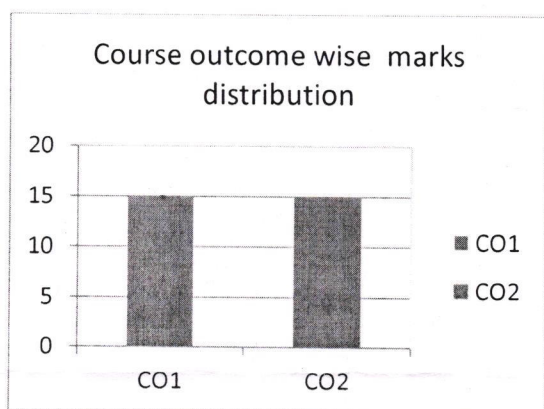
Duration: 60 Minutes

Date: 4/04/2022

Instructions:

- 1) Answer Q1 or Q2, Q3 or Q4
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figure to the right indicates Full marks.
- 4) Assume suitable data if necessary.

Q.No.	Question / Description	Marks	CO	BL	PI
1(a)	Differentiate between VHDL and Verilog	5	1	3	2.2.4
1(b)	Classify HDL operators. Explain in detail VHDL operators with example	5	1	2	2.1.1
1(c)	What is the difference between simulation and synthesis	5	1	2	2.2.4
(OR)					
2(a)	What are the differences between behavioral and structural modeling styles of HDL	5	1	2	2.2.4
2(b)	Explain scalar and composite data type with examples	5	1	2	2.1.1
2(c)	Explain the salient features of VHDL	5	1	2	2.1.1
3(a)	Write VHDL code for 3 bit binary counter in any modeling style	5	2	3	2.2.3
3(b)	Draw logic gate circuit of half adder. Write VHDL code of half adder in data flow style.	10	2	3	2.2.3
(OR)					
4(a)	What are the different types of architecture modeling styles in VHDL?	5	2	2	2.1.1
4(b)	Draw the logic block of SR Flipflop. Write its truth table. Write VHDL code of SR Fliflop	10	2	3	2.2.3



BL – Bloom's (Revised) Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

## SPPU In-Sem Offline Examination- April 2022

**Class: TE**

**Branch: Electronics**

**Semester: II**

**Subject: Industrial Management (Code: 304214)**

**Maximum Marks: 30**

**Duration: 60 Minutes**

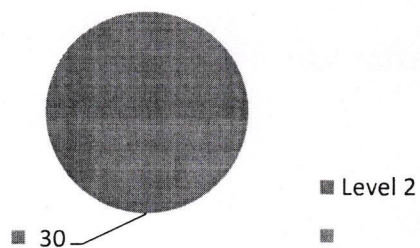
**Date: 7/4/2022**

**Instructions for Submission:**

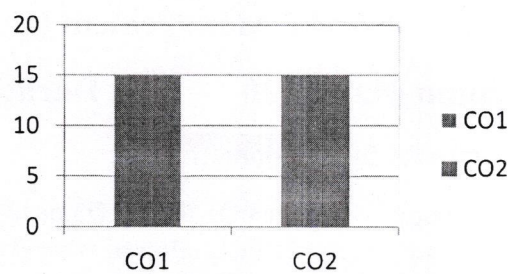
1. Attempt Questions Q1 or Q2, Q3 or Q4....
2. Scientific calculator is allowed wherever necessary
3. Each questions carry 10 marks

Q.no.	Question / Description	Marks	CO	BL	PI
1	a) Define Management and explain functions of management	6	1	2	7.2.1
	b) Enlist 14 principles of scientific management proposed by F.W. Taylor	5	1	2	7.2.1
	c) Differentiate between administration, organisation and management	4	1	2	7.2.1
	<b>OR</b>				
2	a) Write a brief note on contribution of Henry Fayol towards scientific management	6	1	2	12.2.1
	b) Explain skills required to become a successful Manager	5	1	2	7.2.1
	c) Describe coordinating and controlling activities to be performed by Manager	4	1	2	6.1.1
3	a) Explain the Roles, Responsibilities and Objectives of HRM	6	2	2	6.1.1.
	b) Describe different stages of recruitment process	5	2	2	11.3.1
	c) What do you mean by talent selection and talent acquisition explain in brief.	4	2	2	12.1.2
	<b>OR</b>				
4	a) Describe objectives and process of Human resource planning.	6	2	2	11.3.1
	b) Discuss strategic importance of Human Resource Management	5	2	2	11.3.1
	c) List and explain social welfare schemes available for Employees	4	2	2	6.1.1

Blooms Texanomy level outcome wise marks distribution



Course outcome wise marks distribution



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**SPPU In-Sem Offline Examination-April 2022**

**Class:T.E.**

**Branch: E & TC**

**Subject : Network security(Elective II)**

**Semester: 6th**

**Maximum Marks: 30**

**Duration: 60 Minutes**

**(Code:304195)**

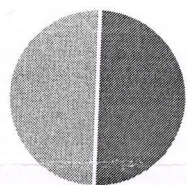
**Date : 08/04/2022**

**Special Instructions:**

- 1) Answer Q1 or Q2, Q3 or Q4
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figure to the right indicate Full marks.
- 4) Assume suitable data if necessary.

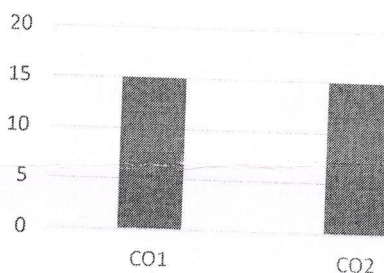
Q. No.	Question / Description	Marks	CO	BL	PI
1(a)	Explain any 4 principles of Security.	8	1	2	1.2.1
1(b)	What is a worm? What is the significant difference between a worm and a virus?	7	1	3	1.2.1
OR					
2(a)	Explain the terms: Interception, fabrication, Modification and Interruption	8	1	2	1.2.1
2(b)	What do you mean by a passive attack? Explain the categories of it.	7	1	2	1.2.1
3(a)	What is plain text? What is cipher text? Give an example of transformation during encryption and decryption.	8	2	3	2.2.3
3(b)	What do you mean by Columnar transposition cipher? Explain the process. Apply the encryption concept with plain text: K K WAGH INSTITUTE OF ENGINEERING EDUCATION & RESEARCH Ignore the spaces in between.	7	2	3	2.1.3
OR					
4(a)	Explain the terms:1.Cipher-text only attack 2.Known plain text attack.	8	2	2	1.2.1
4(b)	Discuss the algorithm for Rail Fence Technique. What would be the transformation of a message 'HAPPY BIRTH DAY TO YOU' using Rail Fence technique? Ignore the spaces in between.	7	2	3	2.1.3

**Bloom's levelwise marks distribution**



■ Level 2 ■ Level 3

**Course Outcome Wise Marks Distribution**



BL – Bloom's (Revised) Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

**SPPU In-Sem Offline Examination-April 2022**

Class:T.E      Branch: Electrical      Semester: II

Subject: Electric Mobility (Code: 303151B)

Maximum Marks: 30

Duration: 60 Minutes

Date: 8/4/2022

Special Instructions:

- *Solve Ques.1 or Ques.2 and Ques.3 or Ques.4*
- *Draw neat diagrams whenever necessary.*
- *Use of non-programmable calculator is allowed.*

Q. No.	Question	Marks	CO
1	a] Define Hybrid Electric Vehicles and state its classification based on hybridization.	6	1
	b] Which are various performance parameters for EV? Describe them in detail.	5	1
	c] Describe advantages and challenges of EV?	4	1
	<b>OR</b>		
2	a] Which are the different components of EV? Explain role of Motors and Converters in detail.	6	1
	b] Mention environmental importance of electric vehicle.	5	1
	c] Differentiate between mild and micro type of hybrid vehicle.	4	1
3	a] Explain working principle of fuel-cell EV.	5	2
	b] Explain construction of super capacitor.	5	2
	c] State the importance of hybridization of energy storage.	5	2
	<b>OR</b>		
4	a] Mention merit demerits of aluminium air battery.	5	2
	b] Classify various lithium ion batteries.	5	2
	c] Discuss selection criteria of energy storage as battery.	5	2

**SPPU In-Sem Offline Examination-April 2022**

Class: T.E. Electrical Engineering    Branch: Electrical Engineering    Semester: II

Subject : Power System-II (2019-Course)    (Code: 303148)

Maximum Marks: 30

Duration: 60 Minutes

Date: 04.4.2022

Special Instructions:

1. Neat diagrams must be drawn wherever necessary.
2. Figures to the right indicate full marks.
3. Use of pocket calculator is allowed.

Q. No.	Question / Description	Marks	CO
1. a	Derive equations for sending end voltage and current for long transmission line using symbols as usual.	6	CO1
b.	Define surge impedance loading and give its significance.	4	CO1
c.	A 200 km long, 3-phase transmission line has following distributed line constants per km length  $r = 0.15 \Omega/\text{phase}$ , $L = 1.2 \text{ mH}/\text{phase}$ , $C = 8 \times 10^{-9} \text{ Farad}/\text{phase}$ . Determine A, B, C, D constants.	5	CO1
	OR		
2. a	Derive the equation for receiving end complex power using proper notations. Clearly mention the units of the symbols used.	6	CO1
b.	Explain the reactive compensation requirement for the long transmission at various conditions.	4	CO1
c.	A three phase 220 kV overhead line delivers 100 MVA and power factor of 0.8 lagging at its receiving end. The constants of line are $A = 0.98 \angle 3^\circ$ , and $B = 110 \angle 75^\circ \text{ ohms per phase}$ . find  1. Sending end voltage and 2. Power angle	5	CO1
3.a	Clearly explain the factors affecting the corona loss.	6	CO2
b.	Define disruptive critical voltage and visual critical voltage.	4	CO2
c.	Estimate the corona loss using Peek's formula for a three phase 110 kV, 50 Hz, 150 km long transmission line consisting of three conductors each of 10 mm dia, and spaced 2.5 m apart in equilateral triangle formation. The temp. of air is $30^\circ\text{C}$ and atmospheric pressure is 75 cm of mercury. Take surface factor of 0.85. The ionization of air may assumed to take place at a	5	CO2

	maximum voltage gradient of 30 kV/cm.		
	OR		
4.a	Explain power handling capacity and derive the equation for % power loss in EHV AC transmission lines with usual notations.	6	CO2
b.	Explain the role of EHV AC transmission lines.	4	CO2
c.	A three phase 220 kV, 50 Hz, 200 km long transmission line consists of 3 conductors spaced 3.8 m apart triangularly each conductor has a diameter of 19.53 mm. The surrounding air is at a temp. at 30°C and barometric pressure of 75 cm of mercury. If breakdown strength of air is 30 kV per cm and surface factor is 0.85 determine the disruptive critical voltage and visual critical voltage.	5	CO2

**SPPU In-Sem Offline Examination-April 2022**

Class: T.E.    Branch: Electrical Engineering    Semester: II

**Subject: Computer Aided Design of Electrical Machines ( 2019 Course) (Code: 303149)**

Maximum Marks: 30

Duration: 60 Minutes

Date : 05.4.2022

Special Instructions:

1. Answer Q1 or Q2, Q3 or Q4
2. Neat diagrams must be drawn wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data, if necessary
5. Use of calculator is allowed.

Q. No.	Question / Description	Marks	CO
1.a.	Derive the equation for heating curve with usual notations and hence define the heating time constant.	5	CO1
b.	Explain the role of tapping in power transformers. On which winding of transformer the tappings are provided generally. Why?	4	CO1
c.	The heat dissipating surface of a 7.5 kW of induction motor can be approximated as a cylinder of 0.6 m diameter and 0.9 m in length. The motor can be considered to be made up of homogeneous material weighing 375 kg and having a specific heat of $725 \text{ J/kg-}^{\circ}\text{C}$ . the specific heat dissipation from its surface is $12 \text{ W/m}^2\text{-}^{\circ}\text{C}$ .  Find the temp. rise of the machine at full load if the efficiency is 90%. Also find the thermal time constant of the machine.	6	CO1
	OR		
2.a.	What are the various modes of heat dissipation? In oil immersed transformers by which mode most of the heat dissipates explain with justification.	5	CO1
b.	What are the various specifications of the transformers as per IS 2026?	4	CO1
c.	Explain the Location, Working and the Role of breather and conservator in ° oil immersed power transformers.	6	CO1
Q3.a	Derive the equation for output in kVA for single phase transformers with usual notations.	5	CO2
b.	Derive the condition for optimum design of transformers for minimum costs.	4	CO2

c.	Determine the mail dimensions of the core of a 100 kVA, 2200/480 V, single phase transformer to operate at a frequency of 50 Hz. Assuming following data: Voltage per turn = 7.5 V, Max. flux density = $1.2 \text{ Wb/m}^2$ , ratio of net cross sectional area of core to the square of diameter of circumscribing circle = 0.6, $H_w/W_w = 2$ , window space factor = 0.28, current density = $2.5 \text{ A/mm}^2$ , stacking factor = 0.9. Assume that yoke section is 20% larger than core section.	6	CO2
	OR		
Q4.a	Derive the equation $E_t = K\sqrt{Q}$	5	CO2
b.	Derive the condition for optimum design of transformers for minimum losses.	4	CO2
c.	Determine the mail dimensions of the core of a 200 kVA, single phase transformer to operate at a frequency of 50 Hz. A cruciform core is used with distance between the adjust limbs equal to 1.5 times the width of core laminations. Assume Voltage per turn = 14 V, Max. flux density = $1.2 \text{ wb/m}^2$ , window space factor = 0.30, current density = $2.5 \text{ A/mm}^2$ , stacking factor = 0.9. The net iron area is $0.56 \text{ d}^2$ in a cruciform core where d is diameter of circumscribing circle. the width of largest stamping is 0.85 d.	6	CO2

# SPPU In-Semester Offline Examination- April 2022

Class: TE (2019 Course) Branch: Electrical Engineering Semester: II (Even) 2021-22  
Subject: Control System Engineering (Code): 303150

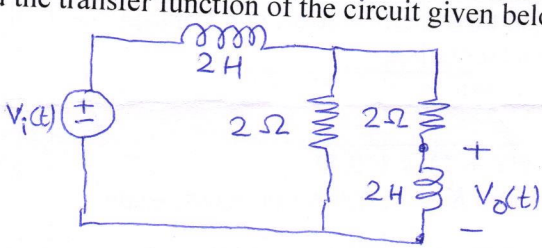
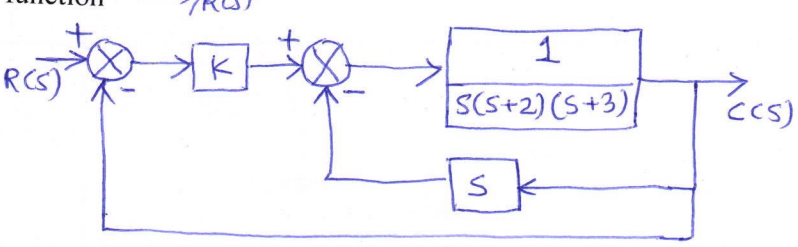
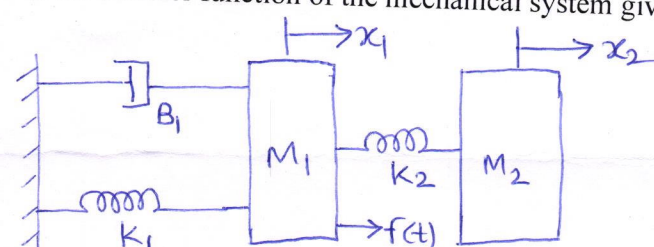
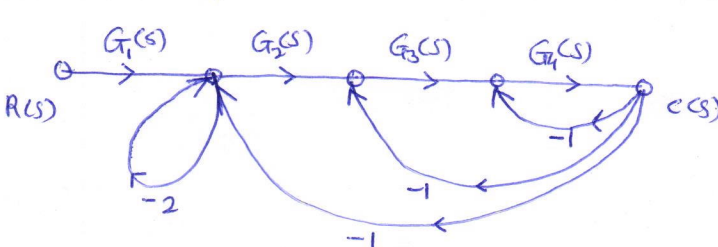
Maximum Marks: 30

Duration: 60 Minutes

Date: 07/04/2022

## Instructions to candidates:

1. Attempt Q. 1 or Q. 2, and Q. 3 or Q. 4
2. Figures to right indicate full marks.

Q. No.	Question	Marks	CO
1 a)	Compare feedback and feed-forward control system	4	1
1 b)	Find the transfer function of the circuit given below $\frac{V_o(s)}{V_i(s)}$ 	5	1
1 c)	Reduce the following block diagram to get the overall transfer function $C(s)/R(s)$ 	6	1
2 a)	Define tracking control system, regulating control system, transfer function, and poles and zeros.	5	1
2 b)	Find the transfer function of the mechanical system given below $\frac{x_2(s)}{F(s)}$ 	5	2
2 c)	Solve the following signal flow graph to get the final transfer function $C(s)/R(s)$ 	5	2

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3 a)	Derive an expression for the steady-state error of the simple closed-loop system	5	2
3 b)	<p>A unity feedback control system has the following transfer function.</p> $G(s) = \frac{1000(s+8)}{(s+7)(s+9)}$ <p>Determine the type of the system, <math>K_p</math>, <math>K_v</math> and <math>K_a</math></p>	5	2
3 a)	<p>For the 2<sup>nd</sup> order system given below, determine the damping ratio, the natural frequency of oscillation, settling time, and percentage overshoot.</p> $G(s) = \frac{16}{s^2 + 3s + 16}$	5	3
4 a)	State different test signals with their mathematical and Laplace expressions and graphical representation.	5	3
	For the unity feedback control system		
4 b)	$G(s) = \frac{K}{s(s+1)(s+0.4)}$ <p>For the ramp input <math>r(t) = 4t</math> and <math>K = 2</math>, determine steady-state error</p>	5	3
4 c)	Define delay time, rise time, peak time, peak overshoot, and settling time for an underdamped second-order system with unit step input	5	3

**SPPU In-Sem Offline Examination-April 2022 SET A**

Class: TE

Branch: Mechanical/Electrical

Semester: VI

Subject: e-Vehicle System Design

Code: 302033MJ

Time : 1 Hour

Max. Marks: 30

Date: 11/04/2022 Monday

**Instructions to the candidates:**

- 1) Answer Q1 or Q2, Q3 or Q4
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Assume suitable data if necessary.

Course Outcomes

Course Outcome	Blooms Taxonomy Level	After successful completion of course, student will be able to
302033MJ 1	3	DISCOVER wheel based steering systems
302033MJ 2	4	CLASSIFY and EVALUATE suspension systems

Ques. No	Sub	Question	Marks	CO	BL
1	a	With suitable diagram explain in short Dicycle, Tricycle and Quadracycle Layouts	8	CO 1	2
	b	Illustrate working of Recirculating ball steering gear with neat diagram	7	CO 1	3
Or					
2	a	Explain concept of Positive & Negative Chamber, Toe in and Toe out with diagram?	8	CO 1	2
	b	Illustrate working of Rack and pinion steering gear with neat diagram	7	CO 1	3
3	a	Analyze Topology Optimization of Front Upright of Racing Suspension with flow chart	8	CO 2	3
	b	Explain double wishbone suspension system	7	CO 2	2
Or					
4	a	Illustrate different types of coil spring used in vehicle? Explain with neat sketch?	8	CO 2	3
	b	Explain Struck and Link Type Suspension System with diagram?	7	CO 2	2