

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**DISCRETE MATHEMATICAL STRUCTURES****(Common to Computer Science and Engineering & Information Technology)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) Let $P(x, y)$ be the statement: "x divides y with no remainder". What is the truth value of the predicate logic statement. $\forall x \forall y P(x, y)$ in a universe of discourse of the integers. 7M
- b) Show that $\neg P \wedge (\neg Q \wedge R) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$ without constructing truth table. 8M
2. a) What is the principle disjunctive normal form? Obtain the principle disjunctive normal form of $P \rightarrow ((P \rightarrow Q) \wedge \neg(\neg Q \vee \neg P))$. 7M
- b) Write the converse, contra positive and inverse of the following predicates
- i. $(\forall x)(P(x) \rightarrow Q(x))$ 4M
- ii. $(\forall x)(P(x) \wedge \neg Q(x))$ 4M

Unit - 2

3. a) Determine whether the following relations are injective and / or subjective function.
- i. $A = \{V, W, X, Y, Z\}$ $B = \{1, 2, 3, 4, 5\}$ 2M
 $R = \{(V, Z), (W, 1), (X, 3), (Y, 5)\}$
- ii. $A = \{1, 2, 3, 4, 5\}$ $B = \{1, 2, 3, 4, 5\}$ 2M
 $R = \{(1, 2), (2, 3), (3, 4), (4, 5), (3, 1)\}$
- b) Let $f : R \rightarrow R$ be defined by
- $$f(x) = \begin{cases} 3x - 5 & \text{for } x > 0 \\ -3x + 1 & \text{for } x \leq 0 \end{cases}$$
- i. Determine $f(0)$, $f(-1)$, $f(5/3)$, $f(-5/3)$ 4M
- ii. Find $f^{-1}(0)$, $f^{-1}(3)$, $f^{-1}(6)$ 3M
- iii. What are $f^{-1}([-5, 5])$ and $f^{-1}([-6, 5])$ 4M
4. a) What is the partial order relation? Let $X = \{2, 3, 6, 12, 24, 36\}$ and the relation \leq be such that $x \leq y$ if x divides y. Draw the Hasse Diagram $\langle X, \leq \rangle$ 7M
- b) What is an Equivalence Relation? Give an example for equivalence relation and prove that it is an equivalence relation. 8M

Unit - 3

5. a) Prove that for any commutative monoid $(X, *)$, the set of idempotent elements of M forms a submonoid. 8M
- b) Show that the order of subgroup of a finite group divides the order of a group. 7M

6. a) Show that any group G is abelian if $(ab)^2 = a^2b^2$ for all $a, b \in G$. 8M
 b) Prove that in a Group G , every element has only one inverse. 7M

Unit – 4

7. a) Use the binomial theorem to prove that $3^n = \sum_{r=0}^n C(n, r)2^r$. 9M
 b) How many three-digit numbers are there which are even and have no repeated digits. 6M
8. Consider the word TRIANNUAL. How many arrangements are there?
 a) Altogether 3M
 b) 9 letter words are there with the letters T, I and U separated by exactly 2 of the other letters. 4M
 c) 5 letter words can be formed from the letters of TRIANNUAL with no N;s 4M
 d) Where no two letters A appear together. 4M

Unit – 5

9. a) Find the coefficient of x^{10} in $(x^3 + x^4 + \dots)^2$ 8M
 b) Solve the recurrence relations by substitution 7M
 i) $a_n = a_{n-1} + \frac{1}{(n(n+1))}$ where $a_0 = 1$
 ii) $a_n = a_{n-1} + n^3$ where $a_0 = 5$
10. Solve the following recurrence relations using characteristics roots 15M
 a) $a_n - 4a_{n-1} + 4a_{n-2} = 0$ for $n \geq 2$ and $a_0 = \frac{5}{2}, a_1 = 8$
 b) $a_n - 3a_{n-1} - 4a_{n-2} = 0$ for $n \geq 2$ and $a_0 = a_1 = 1$

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to Computer Science and Engineering & Information Technology)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) Define the term Object Oriented Programming and list the features of Object Oriented Programming. 7M
- b) Write a program in demonstrating the implementation of two dimensional array by displaying the numbers of each element in the array from left to right, top to bottom as shown below: 8M

```
0 1 2 3 4
5 6 7 8 9
10 11 12 13 14
15 16 17 18 19
```

2. a) Illustrate the process of compiling the java program in to the byte code & converting byte code into machine code. 8M
- b) Write a program to demonstrate the usage of parameterized constructors that sets the dimensions of a box as specified by those parameters in finding the volume of a box (Create two objects of type box) 7M

Unit – 2

3. a) What is method overriding? Write a simple program to illustrate how to achieve method overriding. 7M
- b) Write a program to create a file and write data into it using the methods OutputStream class. 8M
4. a) What are packages in JAVA? Write a simple program to illustrate how to write a package program. 7M
- b) Write a program to create automatic type conversions apply to overriding. 8M

Unit – 3

5. a) Discuss different Checked Exceptions defined in java.lang 8M
- b) Write a program to illustrate creation of threads using Runnable class. (start () method start each of the newly created thread. Inside the run() method there is sleep() for suspend the thread for 500 milliseconds) 7M
6. a) Explain different methods in thread creation with example for each. 6M
- b) Write a java program that implements producer, consumer problem using the concept of inter thread communication. 9M

Unit – 4

7. a) Define the term Event. Describe the roles of sources and listeners. 7M
- b) Briefly discuss the class hierarchy for panel and frame in AWT. 8M
8. a) Write a program to show how to create a child frame window from within an Applet. 8M
- b) What is an AWT Event class? Explain any two java AWT Event class. 7M

Unit - 5

9. a) Write a simple swing application that displays a short message. 8M
b) Write a program that has menu bar and also a quit option and if the user clicks the quit option the applet should quit. 7M

10. a) Write a sample program demonstrating the JScrollPane. 8M
b) Write a program to illustrate the use of Java Native Interface (JNI) and discuss the drawbacks of native methods. 7M

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**DIGITAL LOGIC DESIGN****(Common to Computer Science and Engineering, Information Technology, Electronics and Communication Engineering & Electrical and Electronics Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) Using 10's complement, subtract the following 7M
 i. $52532 - 3250$
 ii. $3250 - 72532$
- b) Given the two binary numbers $X=1010100$ and $Y=1000011$, perform the subtraction 8M
 i. $X - Y$
 ii. $Y - X$ by using 2's complement and 1's complement
2. a) Subtract the following hexadecimal numbers using the 1's complement arithmetic 7M
 i. $48_{16} - 26_{16}$
 ii. $45_{16} - 74_{16}$
- b) Derive a logic expression that equals '1' only when the two binary numbers A_1A_0 and B_1B_0 have the same value. Draw the logic diagram and construct the truth table to verify the logic. 8M

Unit - 2

3. a) Reduce the following expression using K-map 7M
 $F = A^1B^1C^1E + A^1B^1C + A^1BCF + A^1BC^1 + AB^1CD + ABC^1F^1$
- b) Use a multiplexer having three data select inputs to implement the logic for the function 8M
 $F = \sum (0, 1, 2, 3, 4, 10, 11, 14, 15)$
4. a) Find all the prime implicants of the function $F(A,B,C,D) = \sum (4, 7, 9, 11, 12, 13, 14, 15)$ using Quine-McCluskey algorithm 7M
- b) Realize the logic diagram of a full subtractor using only 8M
 i. 2-input NAND gates
 ii. 2-input NOR gates

Unit - 3

5. a) Convert a clocked JK flip-flop to a clocked D flip-flop. 7M
- b) Design a synchronous mod-8 binary counter using positive edge triggered JK flip-flops with minimal combinational logic. 8M
6. a) Convert a positive edge triggered D flip-flop into a positive edge triggered JK flip-flop. 7M
- b) Design a mod-77 synchronous counter by cascading two 4-bit binary counters. 8M

Unit – 4

7. Implement the following Boolean function using a PLA with both true and complemented outputs. Map 1s as well as 0s to arrive at a design with minimal number of product terms in the PLA. Write the PLA table. 15M

$$F1(A, B, C) = \sum (0, 1, 2, 5, 7)$$

$$F2(A, B, C) = \sum (3, 4, 5)$$

$$F3(A, B, C) = \sum (3, 4, 5, 6)$$

8. a) Design a combinational circuit using a ROM. The circuit accepts a three-bit number and outputs a binary number equal to the square of the input number. 9M
 b) The message below coded in the 7-bit Hamming code is transmitted through a noisy channel. Decode the message assuming that at most a single error occurred in each code word. 6M

1001001

0111001

1110110

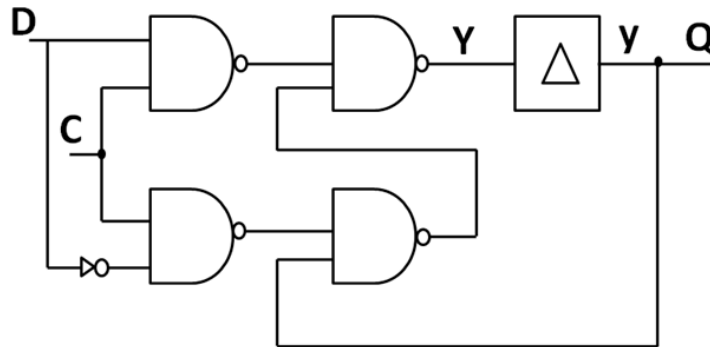
0011011

Unit – 5

9. a) The state table of a digital system is shown below. Draw the state diagram and ASM chart 7M

Present state	Next state		Output
	W=0	W=1	Z
A	A	B	0
B	A	C	0
C	A	0	1

- b) What are hazards? Explain the different types of hazards. 8M
10. a) Explain the different between state diagram and ASM chart with example. 7M
 b) Obtain the excitation table, flow table and state diagram for gate D Latch shown below 8M



--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

ELECTRONIC DEVICES AND CIRCUITS

(Common to Computer Science and Engineering & Information Technology)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) Explain the forward characteristics of PN junction with necessary equations for 7M
 - i. Forward current
 - ii. Dynamic forward resistance
- b) A silicon diode operates at a forward voltage of 0.4 volts. Calculate the factor by 8M
which the current will be multiplied when the temperature is increased from 25°C to 150°C.
2. a) Explain the working of a bridge rectifier. Derive expressions for I_{dc} , I_{rms} and rectifier 7M
efficiency.
- b) Design a full wave rectifier with a capacitor filter to meet the following 8M
specifications. DC output voltage = 15 volts, load resistance = $1k\Omega$, RMS ripple
voltage on capacitor < 1% of DC output voltage. Assume AC supply voltage as 230V,
50Hz.

Unit – 2

3. a) Explain briefly the various specifications of BJT. 7M
- b) Determine the quiescent currents and the collector to emitter voltage for a silicon 8M
transistor with $\beta = 50$ in the self biasing arrangement. The circuit component values
are $V_{cc} = 20V$, $R_c = 2K$, $R_E = 0.1 K$, $R_1 = 100K$ and $R_2 = 5K$. Also find Stability factor (S).
4. a) Explain the input and output characteristics of Common base configuration of an NPN 7M
transistor.
- b) What is the need for transistor biasing? Explain the working of voltage divider bias. 8M
Derive an expression for stability factor $(S) = \frac{\partial I_c}{\partial I_{C_0}}$.

Unit – 3

5. a) Explain a method of determining the h parameters from the static characteristics of a 7M
common emitter transistor.
- b) For a CE configuration, obtain A_v , Z_i , A_v and Z_o in terms of h parameters. 8M

6. a) Explain how amplification of current and voltage is achieved in a CE transistor amplifier. 7M
 b) The transistor amplifier shown in Figure.1 uses a transistor whose h parameters are $h_{ie} = 1.1 \text{ K } \Omega$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$, $1/h_{oe} = 40 \text{ K } \Omega$. Calculate $A_i = I_o/I_i$, A_v , R_i and R_o . 8M

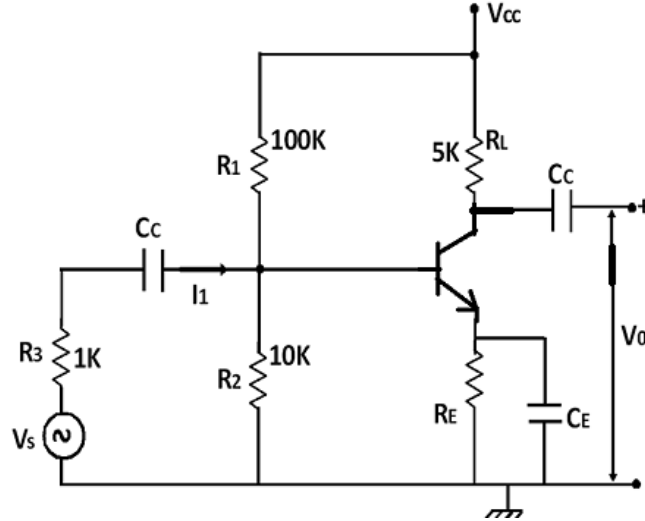


Figure.1

Unit – 4

7. a) Compare JFET with BJT. 5M
 b) Explain the construction and operation of Enhancement MOSFET. 10M
8. a) Explain the operation of JFET with the help of drain characteristics. 7M
 b) Sketch the complete equivalent circuit for a JFET in common source configuration. Identify each component of the circuit and discuss its origin. Also sketch a simplified form of the FET equivalent circuit for low and medium frequency applications. 8M

Unit – 5

9. a) A negative feedback amplifier has an open loop gain of 60,000 and a closed loop gain of 300. If the open loop upper cut-off frequency is 15KHZ, estimate the closed loop upper cut-off frequency. Also calculate the total harmonic distortion with feedback if there is 10% harmonic distortion without feedback. 7M
 b) Explain the operation of crystal oscillator. List the advantages of Crystal oscillator. 8M
10. a) List the four possible topologies of feedback amplifier? State the effect of each topology of R_{if} and R_{of} . 7M
 b) Design an RC phase shift oscillator to generate a frequency of 1 KHz. Also calculate the minimum h_{fe} requirement for the BJT, assuming the collector resistor $R_c = 2.2 \text{ K } \Omega$. 8M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013
(Regulations: VCE-R11)

ELEMENTS OF ELECTRICAL ENGINEERING
(Common to Computer Science and Engineering & Information Technology)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) State Superposition theorem. 7M
 b) Determine the current which flows through 12 ohm resistor in the circuit shown in figure.1. Use superposition theorem. 8M

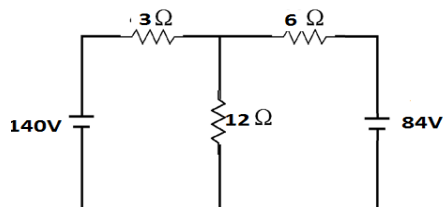


Figure.1

2. a) Derive current and voltage relationship in a star-connected balanced three phase system. 8M
 b) The delta-connected load of $(15 + j20) \Omega$ is connected to a 3-phase supply with a line voltage of 415V 7M
 i. Find the current in each line
 ii. What is the power consumed in each phase?

Unit - 2

3. a) Explain briefly about the various types of DC Generators. 8M
 b) An 8-pole lap-connected armature has 960 conductors, a flux of 40mwb per pole and a speed of 400 rpm. Calculate the EMF generated on open circuit. If the armature were wave connected, at what speed must it be driven to generate 400 Volts. 7M
4. a) Explain how the speed of various types of DC Motors is controlled? 10M
 b) A 4-pole, 500 V shunt motor has 720 wave connected conductors on its armature. The full-load armature current is 60 A, and the flux per pole is 0.03 wb. The resistance of the armature is 0.2Ω and the contact drop is 1 Volt per brush. Calculate speed at full load. 5M

Unit - 3

5. a) Explain the operation of a single phase transformer under loaded conditions. 7M
 b) Derive the expression for regulation of a single phase transformer. 8M
6. a) In a 25KVA single phase transformer the iron and full load copper losses are 350W and 400W respectively. Calculate efficiency at 7M
 i. Full load, UPF
 ii. Half full load 0.89 lag
 b) Draw and explain the equivalent circuit of a single phase transformer under no load. 8M

Unit – 4

7. a) Explain different starting methods of 3-phase induction motor. 8M
b) A Squirrel Cage Induction Motor at 290 rpm is on full load when connected to a 50-Hz supply. Calculate the number of poles and the slip. 7M
8. Explain 15M
a) The principle of operation of a stepper motor
b) Working of shaded pole motor

Unit – 5

9. a) Derive expression for regulation of an alternator. 8M
b) What are V and inverted V curves. Draw the relevant graphs. 7M
10. a) Explain the construction and working principle of synchronous motor. 8M
b) Derive the EMF equation of an alternator. 7M

Hall Ticket No

--	--	--	--	--	--	--	--	--	--

Question Paper Code : AHS11T02

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**(Common to Computer Science and Engineering, Information Technology,
Electrical and Electronics Engineering, Aeronautical Engineering & Civil Engineering)**

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. Managerial economics is the integration of economic theory with business practices for the purpose of facilitating decision making. Explain and comment. 15M
2. Domestic petrol prices raised regularly due to increase in import price of crude oil which increase fuel expenditure. What can you say about price elasticity of demand. 15M

Unit – 2

3. Economics of scale may be either internal or external, they may be technical, managerial, financial or risk bearing. Elucidate. 15M
4. With the increase in output of the firms average total cost and average variable cost curves come closer and closer but they never meet. Why? 15M

Unit - 3

5. The state of competition in the market invariably affects the pricing and output decisions of the producer. What do you mean by perfect competition? What are the features of perfect competition? 15M
6. The success of business depends to a great extent on pricing policies. What are the objectives of pricing polices? Explain the concept of cost plus pricing? 15M

Unit – 4

7. A project cost on initial investment of Rs. 40000 and is expected to generate annual cash inflow of Rs. 16000 for 4 years. Calculate IRR. 15M
8. A firm has two investment choices, each costing Rs. 10000 and each having an expected profits given below:
15M

Year		1	2	3	4
Project X	(Rs.)	50000	40000	30000	10000
Project Y	(Rs)	20000	40000	50000	60000

Management evaluate project A @ 10 % cost of capital and project B at 15 % cost of capital. Compare the NPV and suggest course of action for management if , (a) projects are independent and (b) projects are mutually exclusive.

Cont...2

Unit – 5

9. How ratios are used for analyzing financial statement of a firm? 15M

10. The following ratios are of M/s National Trading Corporation 15M

Debtors velocity (months) 3

Stock velocity (months) 8

Creditors velocity (Months) 2

Gross profit ratio (%) 25

Gross profit for the current year 2012 is Rs. 400000 and closing stock Rs. 10000 above opening stock. Bills receivable Rs. 25000 and bills payable Rs. 10000. Find out sales, debtors and sundry creditors.

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**MATHEMATICS-III****(Common to Electronics and Communication Engineering &
Electrical and Electronics Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) Prove that $\int_0^{\frac{\pi}{2}} \sin^2 \theta \cos^4 \theta d\theta = \frac{\pi}{32}$ 7M
- b) Prove that $\beta\left(m + \frac{1}{2}, m + \frac{1}{2}\right) = \frac{\pi}{m \beta(m, m) 2^{4m-1}}$ 8M
2. a) Prove that $\frac{d}{dx} [x J_n(x) J_{n+1}(x)] = x [J_n^2(x) - J_{n+1}^2(x)]$ 8M
- b) Obtain the first three terms of the following function in terms of Legendre polynomials, $f(x) = \begin{cases} 0, & \text{if } -1 \leq x < 0 \\ x, & \text{if } 0 \leq x \leq 1 \end{cases}$ 7M

Unit - 2

3. a) Determine p such that the function $f(z) = \frac{1}{2} \log(x^2 + y^2) + i \tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function 5M
- b) If $f(z) = u + iv$ is an analytic function of z and if $u - v = e^x (\cos x - \sin x)$, then find $f(z)$ in terms of z 10M
4. a) If $\tan[\log(x + iy)] = a + ib$, where $a^2 + b^2 \neq 1$, then show that $\frac{2a}{1 - a^2 - b^2} = \tan[\log(x^2 + y^2)]$ 8M
- b) If $(x + iy)^{\frac{1}{3}} = a + ib$, then prove that $4(a^2 - b^2) = \frac{x}{a} + \frac{y}{b}$ 7M

Unit - 3

5. a) Evaluate $\int_{(0,0)}^{(1,3)} 3x^2 y dx + (x^3 - 3y^2) dy$ along the curve $y = 3x$ 7M
- b) Evaluate $\int_C \frac{4-3z}{z(z-1)(z-2)} dz$ where C is the circle $|z| = \frac{3}{2}$ using residue theorem 8M
6. a) Evaluate $\int_C \frac{\sin^2 z}{(z - \frac{\pi}{2})^2} dz$, $C: |z| = 1$ 7M
- b) Find Taylor's expansion for the function $f(z) = \frac{1}{(1+z)^2}$ with centre at $z = -i$ 8M

Unit - 4

7. a) Evaluate $\int_C \frac{dz}{(z^2+4)^2}$ $C: |z-i| = 2$ 7M
 b) Evaluate $\int_0^{2\pi} \frac{\sin^2 \theta \, d\theta}{5-4\cos\theta}$ 8M
8. a) Evaluate $\int_0^\infty \frac{(\log x)^2}{1+x^2} dx$ 7M
 b) show that $\int_{-\pi}^{\pi} \frac{d\theta}{5+4\cos\theta} = \frac{2\pi}{3}$ 8M

Unit - 5

9. a) Show that the relation $w = \frac{5-4z}{4z-2}$ transform the circle $|z|=1$ into a circle of radius 8M
 unity in the w - plane
 b) Find the bilinear transformation which maps the points $(-i, 0, i)$ into the points $(-i, i, 1)$ respectively. 7M
10. a) Define Multiple, Complete and Planar Graphs with examples and neat diagrams. 8M
 b) Find the minimal spanning tree of the graph G given below, using Krushkal's Algorithm. 7M

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

ELECTRONIC DEVICES

(Common to Electronics and Communication Engineering &
Electrical and Electronics Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

- | | | |
|----|--|-----|
| 1. | a) Derive an expression for electrostatic deflection sensitivity. | 7M |
| | b) List few applications of Cathode Ray Oscilloscope (CRO). | 8M |
| 2. | Determine the concentration of free electrons and holes in a sample of germanium at 300 ^o K which has a concentration of donor atoms equal to 2×10^{14} atoms/cm ³ and concentration of acceptor atoms equal to 3×10^{14} atoms/cm ³ . Is this P- or n- type germanium? | 15M |

Unit - 2

- | | | |
|----|--|----|
| 3. | a) Discuss energy band diagram for PN diode for the following cases | 9M |
| | i. Unbiased | |
| | ii. Forward biased | |
| | iii. Reverse biased | |
| | b) Determine the forward resistance of a PN diode, when the forward current is 5mA at T = 300K. Assume the diode is silicon. | 6M |
| 4. | a) Derive an expression for diffusion capacitance of a diode. | 7M |
| | b) Explain the temperature dependence diode V-I characteristics. | 8M |

Unit - 3

- | | | |
|----|---|-----|
| 5. | a) With circuit and necessary waveforms explain the operation of Bridge Rectifier. | 7M |
| | b) Design a filter for FWR circuit with LC filter to provide an output voltage of 10Volts with a load current of 200mA and the ripple is limited to 3%. | 8M |
| 6. | Explain the operation and functioning of Tunnel diode using energy band diagrams. | 15M |

Unit - 4

- | | | |
|----|--|----|
| 7. | a) With neat sketch explain the different current components of transistor. | 7M |
| | b) In an NPN transistor emitter is grounded, base is connected with 5 Volts supply in series with 100 K ohms resistor and collector base is connected with 200 K ohms. Assume $V_{CC}=12$ Volts, $V_{BE}=0.65$ Volts, $\beta=100$. Find I_B , I_C and I_E . | 8M |
| 8. | a) With neat structure explain the principle of operation of depletion MOSFET. | 8M |
| | b) Explain drain characteristics of JFET. | 7M |

Unit - 5

9. a) Explain diode compensation circuit for variations in I_C for self bias circuit. 8M
b) How self bias circuit will eliminate drawbacks in fixed bias circuit. 7M
10. a) Describe the different types biasing techniques used for JFET. 7M
b) In an N-channel JFET based voltage divider common drain configuration, determine the value of resistor R_S so as to have the operating point as $I_{DQ}=5\text{mA}$, $V_{DSQ}=10\text{V}$. Given that $V_{DD}=28\text{V}$, $R_1=1\text{ M ohms}$, $R_2=0.5\text{ M ohms}$, saturation drain current of the FFET is 10mA and gate source pinch off voltage is $'-5\text{v}'$. 8M

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

SIGNALS AND SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

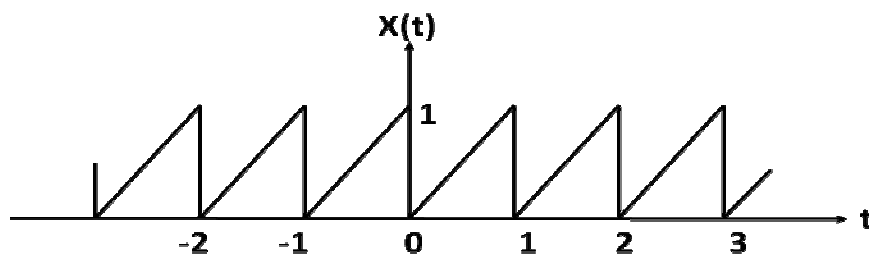
1. a) Consider the periodic signal with fundamental period = 4, given by 10M

$$x(t) = \begin{cases} 1, & |t| < T_1 \\ 0, & T_1 < |t| < 2 \end{cases}$$

Find its Fourier series coefficients and also find the sketch of the signal $y(t)$ with period

4 whose Fourier series coefficients are $y(k) = (-1)^k \frac{\sin \frac{\pi}{8}}{2k\pi}$

- b) Derive trigonometric Fourier series representation from complex Fourier representation. 5M
2. a) State and prove the following of Fourier series 7M
 i) Time differentiation property
 ii) Parseval's theorem
- b) Find the exponential Fourier series for the continuous time signal $x(t)$ shown in fig. 2. 8M
 Draw the amplitude and phase spectra



Unit - 2

3. a) State and prove the following properties of Fourier transforms 7M
 i. Linearity
 ii. Frequency shift
- b) Find the Fourier transform of the signum function $x(t) = \text{sgn}(t)$. Also draw its magnitude and phase spectra 8M
4. a) Find the inverse Fourier transforms of the following signals 7M
 (i). $X(\omega) = \frac{j\omega}{(2 + j\omega)^2}$
 (ii). $X(\omega) = \frac{1}{j\omega(j\omega + 1)} + 2\pi\delta(\omega)$
- b) What is the energy of the signal $x(t) = e^{-at}u(t)$. Also find its energy in the frequency band $|\omega| \leq 0.5$ rad/sec 8M

Unit - 3

5. a) Determine the output $y(t)$ of a LTI system with impulse response 10M
 $h(t) = u(t+1) - 2u(t) + u(t-1)$ and input $x(t) = 1; |t| \leq 2$
 $= 0; |t| > 2$
- Sketch the signals $x(t)$, $h(t)$ & $y(t)$
- b) Determine whether the following system is 5M
 i) Linear
 ii) Time Invariant
 iii) Memory
 iv) Causal
 v) Stable
 $y(t) = \frac{d}{dt} \{e^{-t} x(t)\}$
6. a) Compare the convolution of the two discrete time signals given below 10M
 $x(t) = e^{at} u(t)$
 $h(t) = e^{-at} u(-t), 0 < a < 1$
- b) Check the system given below for 5M
 i) Linearity
 ii) Time invariant
 iii) Memory
 iv) Causality
 v) Stability
 $y(t) = x(-t + 2)$

Unit - 4

7. a) Find the Laplace transform of the signal $x(t) = \sin^2 \omega_0 t u(t)$ 7M
 b) Solve the simultaneous differential equations using Laplace transformation technique 8M
 $dx/dt + y = \sin t$ $dy/dt + x = \cos t$
 given that $x(0) = 2, y(0) = 0$
8. a) Verify the convolution theorem for the functions $f(t) = t$ & $g(t) = e^t$ 7M
 b) Find the inverse Laplace transform of the function given below 8M

$$X(s) = \frac{5s - 2}{s^2 (s + 2)(s - 1)}$$

Unit - 5

9. a) State and prove the sampling theorem for lowpass signals 7M
 b) Using the complex inversion integral, find the inverse Z-transform of $X(z)$ given as 8M
 follows

$$X(z) = \frac{z^2}{\left(z - \frac{1}{2}\right)\left(z - \frac{1}{4}\right)} \quad \text{ROC: } |z| > \frac{1}{2}$$
10. a) Specify the Nyquist intervals for the following signals 7M
 $g(t) = \text{sinc}^2(200t)$
 $g(t) = \text{sinc}(200t) + \text{sinc}^2(200t)$
 b) Summarize the properties of ROC with respect to Z-transforms 8M

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**PROBABILITY THEORY AND STOCHASTIC PROCESSES****(Electronics and Communication Engineering)**

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit**All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) For a certain binary communication channel the probability that a transmitted 0 is received as a '0' is 0.95 and the probability that a transmitted '1' is received as '1' is 0.9. If the probability that a '0' is transmitted is 0.4, find the probability that
- A '1' is received
 - A '1' was transmitted given that a '1' was received.
- b) A random variable x has density function give by 8M
- $$f(x) = \begin{cases} 2e^{-2x}, & x \geq 0 \\ 0, & x < 0 \end{cases} \text{ find}$$
- MGF
 - The first four moments about origin
2. a) Find the MGF of a Binomial distribution and hence find mean and variance. 7M
- b) The increase in sales per day in a shop is exponentially distributed with Rs.800 as the average. If the sales tax is levied at the rate of 6%, find the probability that the increase in sales tax return from that shop will exceed Rs.30 per day. 8M

Unit - 2

3. a) The joint distribution function for two random variable X and y is 7M
- $$F_{x,y}(x, y) = u(x)u(y)(1 - e^{-ax} - e^{-ay} + e^{-a(x+y)})$$
- Where $u(\cdot)$ is the unit-step function and $a > 0$. Determine the joint density function and marginal density functions.
- b) Statistically independent random variables X and Y have respective means 8M
- $$\bar{X} = 1, \bar{Y} = -0.5$$
- Their second moments are $\bar{X}^2 = 4, \bar{Y}^2 = 2.75$. Another random variable is defined as $W = 3X^2 + 2Y + 1$. Find R_{XY}, C_{XY}, \bar{W} and R_{WY} .
4. a) Given the function 10M
- $$f_{xy}(x, y) = \begin{cases} b(x+y)^2, & -2 < x < 2; -3 < y < 3, \\ 0, & \text{otherwise} \end{cases}$$
- Find the constant b such that this is a valid joint density function
 - Determine the marginal density functions $f_X(x)$ and $f_Y(y)$.
- b) In a control system, a random voltage X is known to have a mean value of $-2V$ and a second moment of $9V^2$. If the voltage X is amplified by an amplifier that gives an output $Y = -1.5X + 2$, find the variance of Y . 5M

Unit - 3

5. a) Let a random process be given as $z(t) = x(t) \cos(\omega_0 t + \theta)$, where $x(t)$ is stationary random process with $E[x(t)] = 0$ and $E[x^2(t)] = \sigma_x^2$. If $\theta = 0$, find $E[z(t)]$ and $E[z^2]$. Is $z(t)$ stationary if θ is a random variable independent of $x(t)$ and uniformly distributed over the interval $(-\pi, \pi)$ then show that $E[z(t)] = 0$ and $E[z^2(t)] = \sigma_x^2 / 2$. 9M
- b) Given a random variable y with characteristic function $\phi(w) = E[e^{iwy}]$ and a random process defined by $x(t) = \cos(\lambda t + y)$ then show that $\{x(t)\}$ is stationary in the wide sense. 6M
6. a) Given $x(t)$ is a random process with mean $\mu(t) = 3$ and autocorrelation function $R(t_1, t_2) = 9 + 4 \text{Exp}[-0.2|t_1 - t_2|]$. Determine mean, variance and covariance of the random variables $y = x(5)$ and $z = x(8)$ where y, z are any two random variables. 6M
- b) Two random variables are defined by $x(t) = A \cos \omega_0 t + B \sin \omega_0 t$ and $y(t) = B \cos \omega_0 t - A \sin \omega_0 t$, where A and B are random variables and ω_0 is a constant. Show that $x(t)$ and $y(t)$ are wide-sense stationary if A and B are uncorrelated zero mean random variables with same variance. Also prove that $x(t)$ and $y(t)$ are jointly wide sense stationary by finding the cross correlation function. 9M

Unit - 4

7. a) Derive a relation between power spectrum and auto correlation function of a random process. 10M
- b) For the process having $R(\tau) = ae^{-b|\tau|}$, find the spectral density function. 5M
8. a) If $x(t)$ and $y(t)$ are uncorrelated random processes then find the power spectral density of z if $z(t) = x(t) + y(t)$. Also find the cross spectral density $S_{xz}(w)$ and $S_{yz}(w)$. 10M
- b) State any five properties of power density spectrum. 5M

Unit - 5

9. Define effective noise temperature. If two different resistors at different physical temperatures are placed in series then find the effective noise source. If we allow a capacitor across one resistor then find mean squared voltage. Also find the output impedance of the network as an overall source by imaging the noise source to zero. 15M
10. Develop a mathematical model of narrow band noise and explain its related properties. 15M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

PRINCIPLES OF ELECTRICAL ENGINEERING
(Electronics and Communication Engineering)

Time: 3 hours

Max Marks: 75

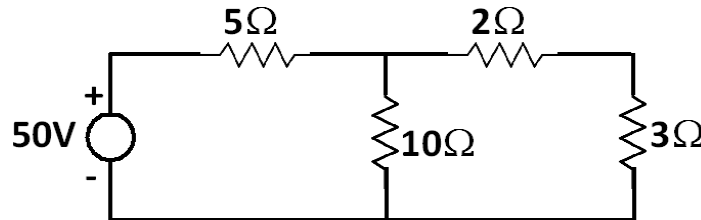
Answer ONE question from each Unit

All Questions Carry Equal Marks

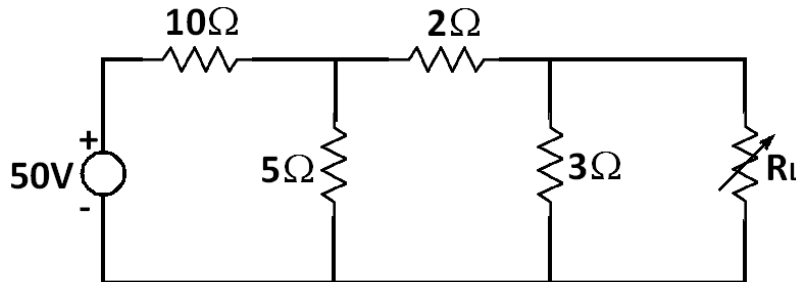
All parts of the question must be answered in one place only

Unit - 1

1. a) State and explain Millman's theorem 7M
 b) Use Thevenin's Theorem to find the current in 3Ω resistor in fig (1) 8M



2. a) Determine the Maximum Power delivered to the load on the circuit shown in fig (2) 10M



- b) State Tellegen's theorem. 5M

Unit - 2

3. a) Derive the expression for transient response of an DC, R-L series circuit? 7M
 b) For the circuit shown in figure.3, determine the current in the circuit when the switch is closed at $t=0$. Assume that there is no initial charge on the capacitor or current in the inductor, using Laplace transform method. 8M

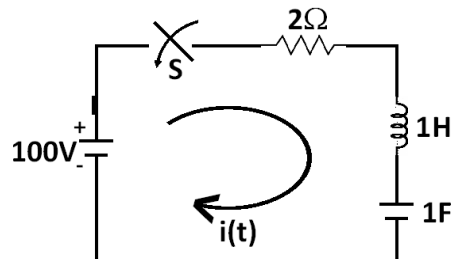


Figure.3

4. a) In the circuit shown in figure.4 determine the complete solution for the current, when the switch 'S' is closed at $t=0$, applied voltage is $V(t)=100\cos(10^3t+\pi/2)$. Resistance $R=20\Omega$ and inductance $L=0.1H$. 8M

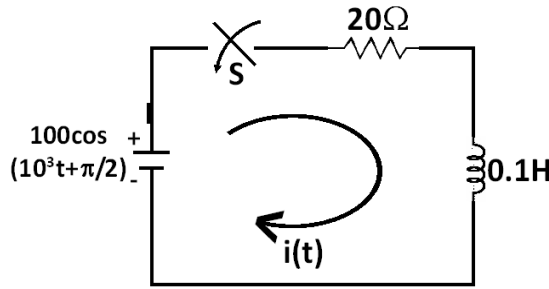


Figure.4

- b) For the circuit shown in figure.5, determine the current in the 10Ω resistor when the switch is closed at $t=0$, assume initial current through the inductor is zero. Use the Laplace transform method. 7M

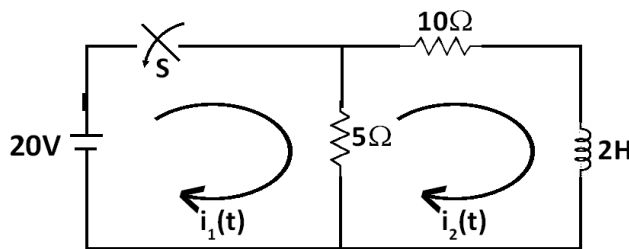


Figure.5

Unit - 3

5. a) Explain the types of D.C. generators with neat circuit diagrams? 6M
 b) A 4 pole, lap wound, dc shunt generator has a useful flux per pole of 0.07 wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50 A. 9M
6. a) Derive the torque equation of a D.C. motor? 7M
 b) Explain with neat diagrams about the Swinburne's test? Write its advantages and disadvantages. 8M

Unit - 4

7. a) With a neat sketch explain the constructional details of a single phase transformer (both core type and shell type). 8M
 b) A 30 KVA, 2400 / 120V, 50Hz transformer has a high voltage winding resistance of 0.1Ω and a leakage reactance of 0.22Ω . the low voltage winding resistance is 0.03Ω and the leakage reactance is 0.012Ω . find the equivalent winding resistance, reactance and impedance referred to the
 i) High voltage side and
 ii) The low voltage side 7M
8. a) Explain the principles of operation of transformer on load condition 7M
 b) A 230/230V, 3 kva transformer gave the following results: 8M
 O.C test: 230V, 2.0 Amps, 100W
 SC test: 15V, 13 Amps, 120 W
 Determine the regulation and efficiency at full load 0.8 pf lagging.

Unit - 5

9. a) Explain the production of rotating field with three phase supply? 7M
 b) Explain the principle of operation of a shaded pole single phase motor with neat diagrams. 8M
10. a) Draw the torque-slip characteristics of a three phase induction? 6M
 b) Explain the operation of capacitor starts and run of a single phase motor with circuit connection and torque speed curves? 9M

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

MACHANICS OF SOLIDS

(Common to Mechanical Engineering & Aeronautical Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit – 1

- | | | | |
|----|----|---|----|
| 1. | a) | Explain the stress strain relations for brittle and ductile materials. | 7M |
| | b) | A 20mm diameter brass rod was subjected to a tensile load of 40kN. The extension of the rod was found to be 254 divisions in the 200mm extension meter. If each division is equal to 0.001mm find the elastic modulus of brass. | 8M |
| 2. | a) | A steel bar 15mm in diameter is pulled axially by a force of 10KN. If the bar is 250mm long. Calculate the strain energy stored per unit volume of the bar and the total strain energy stored by the bar. (Take $E = 2 \times 10^5$ MPa). | 8M |
| | b) | Define volumetric strain and derive an expression for volumetric strain of a sphere. | 7M |

Unit – 2

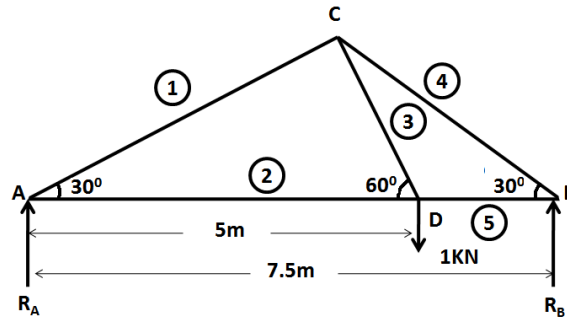
- | | | | |
|----|----|--|-----|
| 3. | a) | Draw the shear force and bending moment diagrams for a cantilever of length “l” carrying a UDL of ‘w’ per unit run over the whole length. | 7M |
| | b) | Draw the shear force and bending movement diagrams for a cantilever of length “l” carrying load whose intensity varies uniformly from zero at the free end to “w” per unit run at the fixed end. | 8M |
| 4. | | Draw the shear force and bending moments diagrams for a simply supported beam carrying a load whose intensity varies uniformly from zero at each end to w per unit run at the mid span. | 15M |

Unit - 3

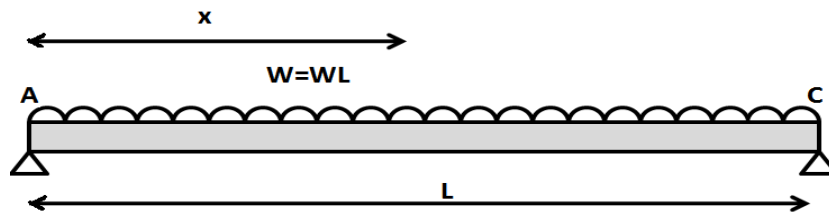
- | | | | |
|----|----|--|-----|
| 5. | a) | A timber beam is freely supported on supports 6 meters apart. It carries a UDL of 12kN per meter run and a concentrated load of 9kN at 2.5meters from the left support. If the stress in timber is not to exceed 8 N/mm ² . Design a suitable section making the depth twice the width. | 10M |
| | b) | What are the assumptions made in theory of simple design? | 5M |
| 6. | | A beam of I section is 250mm deep. The flanges are 15mm thick 100mm wide, while the web is 8 mm thick. Compare the flexural strength of this beam section with a rectangular section of the same material and area whose width is two thirds the depth. | 15M |

Unit – 4

7. a) Derive the expression for slope and deflection as functions of distance from the fixed end, for a cantilever beam with a point load at the free end? Also determine the maximum deflection and its location. 7M
- b) A truss of span 7.5m carries a point load of 1kN at the joint D as shown in the figure below. Find the reactions and forces in the members of the truss. 8M



8. a) Discuss about the method of joints and method of sections with a suitable examples. 7M
- b) Determine the max deflection and slope at free ends in a simply supported beam of length L carrying uniformly distributed load as shown below. 8M



Unit – 5

9. a) Derive the appropriate equations for changes in length (δl), diameter (δd) and volume (δV) of a thin cylinder closed at both ends. 7M
- b) A thin cylindrical vessel of diameter 1200mm is subjected to an internal pressure of 20bar. If the permissible hoop stress is 48Mpa and the permissible longitudinal stress is 30Mpa, find the suitable thickness of the vessel. What will be the % increase in volume under the above pressure? $E = 210\text{Gpa}$ and Poisson's ratio=0.3. 8M
10. a) Differentiate thick cylinders from thin cylinders with suitable examples. 7M
- b) A cylinder closed at ends is subjected to the pressure of 'P' in addition to an axial tensile load of 500kN. If the cylinder has an internal diameter of 15cm and wall thickness of 2.5cm. Find the value of 'P' in order that the maximum stress (compression or tension) in the cylinder wall does not exceed 63MN/m^2 . 8M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

BUILDING MATERIALS AND CONSTRUCTION
(Civil Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

- | | | | |
|----|----|---|----|
| 1. | a) | Discuss briefly the properties of principles of building stones. | 7M |
| | b) | Enumerate the characteristics of a good brick. With a neat sketch explain the bricks manufactured using any one kiln. | 8M |
| 2. | a) | Explain the precautions to be taken in the process of blasting. | 7M |
| | b) | How tiles are classified? Explain qualities of good tiles and their uses. | 8M |

Unit – 2

- | | | | |
|----|----|---|-----|
| 3. | a) | List and explain any four tests conducted on cement. | 10M |
| | b) | Write the objectives of seasoning of timber. | 5M |
| 4. | | Write a short note on Galvanized Iron, Fibre – reinforced plastics, steel, Plasticizers, defects in timber. | 15M |

Unit – 3

- | | | | |
|----|----|--|----|
| 5. | a) | Compare brick and stone masonry. | 8M |
| | b) | List various types of foundations and explain one type from each foundation with the help of sketch. | 7M |
| 6. | a) | What do you understand by raft foundation? When do you prefer this? Explain with the help of sketch. | 7M |
| | b) | Explain with neat sketch (Plan) of an English bond for 1 ½ brick and 2 brick thick walls. | 8M |

Unit – 4

- | | | | |
|----|----|---|----|
| 7. | a) | What are the stairs? Write requirements of stairs. | 6M |
| | b) | List different types of floors? Briefly explain materials used for flooring. | 9M |
| 8. | a) | Write short note on the following:
i. Lintels
ii. Arches
iii. Vaults | 9M |
| | b) | Write the objectives of roofing. | 6M |

Unit – 5

- | | | | |
|-----|----|---|----|
| 9. | a) | Explain the objects of plastering and requirements of good plaster. | 7M |
| | b) | Define under pinning. What are the methods of underpinning? Explain any one method. | 8M |
| 10. | a) | What are the defects that may occur in painting works? | 7M |
| | b) | Write the various causes of dampness in buildings? | 8M |

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**NETWORK ANALYSIS****(Electrical and Electronics Engineering)**

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) State and explain with example Millman's Theorem. 7M
 b) Find the Thevenin's equivalent circuit for the circuit shown in figure.1. 8M

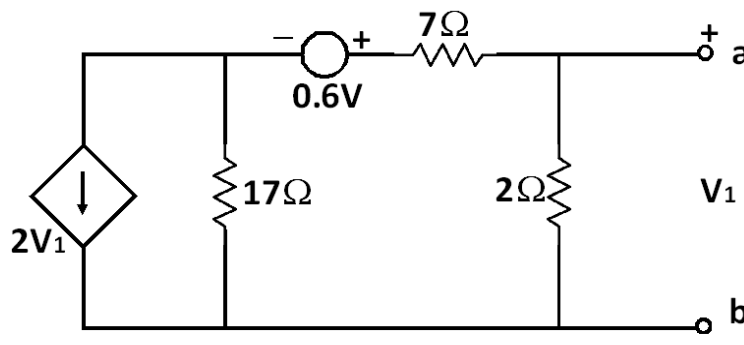


Figure.1

2. a) State Compensation Theorem 7M
 b) Verify the reciprocity theorem for the circuit shown in figure.2 8M

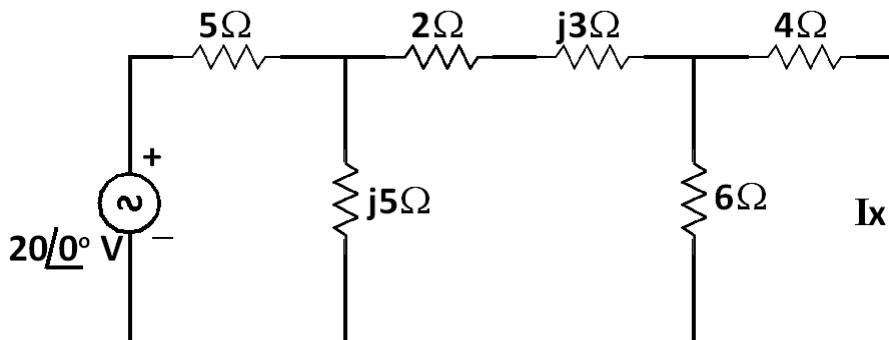


Figure.2

Unit - 2

3. a) Obtain the relationship between line voltage and phase voltage in case of a 3 phase star connected balanced load. Also draw the phasor diagram 7M
 b) On a symmetrical 3-phase system, phase sequence RYB, a capacitance reactance of $8\ \Omega$ is across YB, and a coil $R+jx$ across RY. Find R and X such that current in line Y is zero. 8M
4. a) With the help of a neat phasor diagram explain how 3 phase unbalanced power is measured using two watt meters method. 7M
 b) A balanced three phase star connected load of 150 KW takes a leading current of 100A with a line voltage of 1100 V, 50 Hz. Find the circuit constants of the load per phase 8M

Unit - 3

5. a) What is the time constant of R-C circuit? Derive an expression for the transient current of an R-C circuit 7M
- b) For the circuit shown in fig 3, find the expression for current when the switch S is opened at $t = 0$. 8M

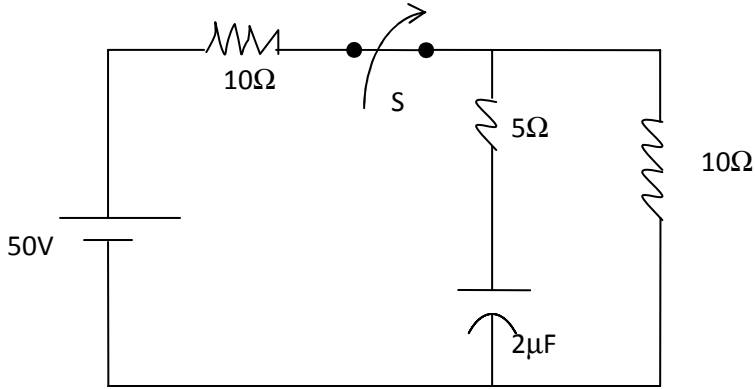


Figure. 3

6. a) Derive an expression for the current in R-C series circuit connected through a switch 'S' with an a.c. excitation of $V \cos(\omega t + \theta)$ where θ is the phase angle 7M
- b) In the circuit shown in fig. 4, determine the current expression when the switch 'S' is closed at $t = 0$ sec 8M

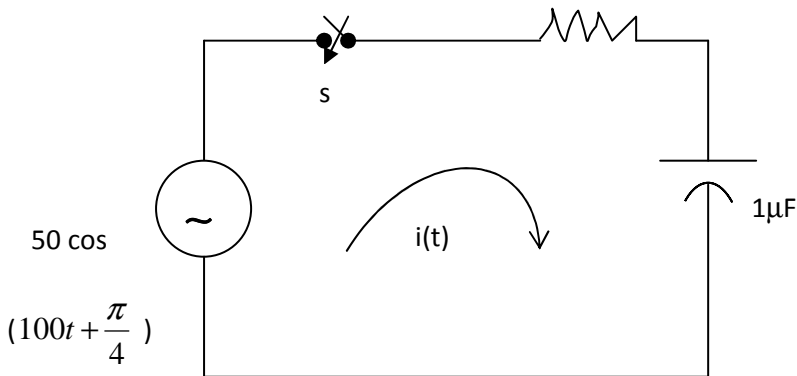


Figure. 4

Unit - 4

7. a) Design a m- derived T and π sections of a high pass filter having design impedance of 600Ω , cut off frequency of 5 kHz and $m = 0.35$. Find also the frequency of infinite attenuation. 10M
- b) Design a low pass filter of the constant K type to have cutoff at 1kHz and a nominal characteristic impedance of 500Ω . 5M
8. a) Design a prototype section of band pass filter having cut off frequencies of 1000Hz and 6000Hz and a design impedance of 500Ω 9M
- b) Design a low pass filter having a design impedance $R_0 = 600 \Omega$ and cut off Frequency = 2000Hz and also find the frequency at which the section will have an attenuation of 10 dB. 6M

Unit – 5

9. a) A circuit has a fixed inductor in series with a variable resistor R. Prove that the current locus is circular if a constant alternating voltage at constant frequency is applied to the circuit 7M
- b) A reactance of 1Ω is applied with a voltage of 100V. Draw a number of current vectors for various values of R and note that the extremities of the current vectors is a circle. 8M
10. Determine the Fourier series of the wave shown in Fig 5 15M

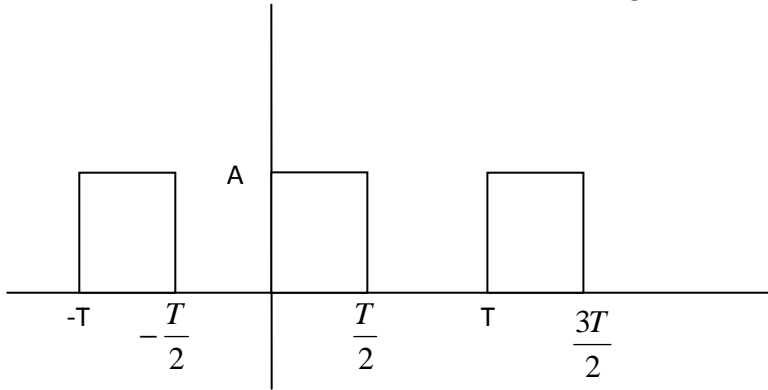


Figure. 5

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

DC MACHINES

(Electrical and Electronics Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit – 1

1. a) Explain the energy flow in electromechanical systems with energy flow diagrams. 7M
 b) Derive an expression for co-energy densities in a singly excited system in terms of magnetic field intensity and flux density. 8M

2. a) Briefly explain the various phenomena useful for electromechanical energy conversion in rotating machines. 8M
 b) The self and mutual inductances of the two exciting coils of a multiple excited translatory system are

$$L_{11} = L_{22} = 4/1+2x, L_{21} = L_{12} = 2/1+2x$$
 Calculate the time average force and coil currents at $x=0.5$ m, when both the coils are connected in series across a voltage source of $120 \cos 314t$.

Unit – 2

3. a) What is meant by commutation? What are the reasons for bad commutation? Discuss the methods to improve commutation process in DC machines. 8M
 b) Develop the winding table, winding diagram, sequence diagram and then fix up the brushes for a DC machine with 4 – pole, 24 slot single layer Lap winding. 7M

4. a) A 6 pole Dc armature with 16 slots having two coil sides/slot and single turn coils. Calculate the winding pitches then develop the winding table, winding diagram and then fix up the brushes for a wave winding. 8M
 b) In a 120 volt compound generator, the resistance of armature shunt and series field windings are 0.06 ohm, 25 ohm and 0.04 ohm respectively. Load current is 100 Amps at 120 volts. Find the induced e.m.f and armature current when the machine is connected as long shunt and short shunt 7M

Unit – 3

5. a) What are the reasons for a shunt generator not to build up voltage? Explain the remedial measures. 6M
 b) Two shunt generators have regulation of 5% and 4% and both are rated at 200KW and 400V. For a load current of 800A what is the current output of each generator? Find the terminal voltage for a load resistance of 0.5Ω . 9M

6. a) A d.c series generator, having an external characteristic which is a straight line through zero to 50V at 200A is connected as a booster between a station bus bar and a feeder of 0.3Ω resistance. Calculate the voltage difference between the station bus bar and the far end of the feeder at a current of 200A and 50A 7M

- b) The magnetic station characteristics of a d.c shunt generator at 1500rpm is 8M

$I_f(A)$	0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.0
$E(v)$	6	60	120	172.5	202.5	221.0	231	237	240

Draw the OCC and determine the voltage induced for a shunt field resistance of 100Ω . Draw the OCC at 1200rpm and find the voltage induced for a field circuit resistance of 100Ω . Find the critical field resistance at 1500rpm.

Unit – 4

7. a) With a neat sketch explain the construction and working of a 3 point starter. What are the limitations of 3 point starter? 7M

- b) A 440V DC shunt motor is running at 1500rpm and it takes a line current of 30A. The output is 15Hp. The load torque varies as the square of speed. Calculate the resistance to be connected in series with the armature for reducing the motor speed to 1300rpm. 8M

8. a) Draw and explain the speed / load characteristics of DC motors. 6M

- b) A DC series motor drives a load, the torque of which varies as the square of the speed. The motor takes a current of 15A when the speed is 600rpm. Calculate the speed and current when the motor field winding is shunted by a diverter of the same resistance as that of field winding. 9M

Unit – 5

9. a) The Hopkinson's test on two similar DC shunt machines gave the following data: 8M

Line voltage :230V

Line current excluding both the field currents 40A

Motor Armature current 350A

Field currents are 5A & 4.2A

Find the efficiency of the generator and motor, Armature resistance of each machine is 0.02Ω .

- b) Explain the retardation test of determining efficiency of a DC machine. 7M

10. a) A 400V, 20KW dc shunt motor takes 2.5A when running light. Armature resistance is 0.5Ω and field resistance is 800Ω . The brush drop = 2V, find the full load efficiency. 8M

- b) Explain Field's test to determine the efficiency of series motors. 7M

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**MACHANICS OF FLUIDS****(Common to Mechanical Engineering, Aeronautical Engineering & Civil Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) Define precisely what is a fluid and Derive an expression for Pascals Law. 7M
 b) A tank of 0.9m square in plan, contains water to a depth of 0.6m on top of which was oil of specific gravity 0.85 to a depth of 0.3m. Determine the total pressure exerted on one of the vertical faces of the tank and the position at which it may be taken as acting. 8M
2. a) Define what is absolute pressure, atmospheric pressure and vacuum pressure. Derive an expression for pressure variation in a fluid at rest. 7M
 b) A trapezoidal plate 3 m wide at base and 6m at the top is 3m height. Determine the total pressure exerted on the plate and the depth to the center of pressure when the plate is immersed normally in water up to the upper edge. 8M

Unit – 2

3. a) Define & explain free vortex and forced vortex 7M
 b) Determine whether the continuity equation for steady state incompressible flow is satisfied for the following velocity components 8M
- $$u = 2x^2 - xy + z^2$$
- $$v = x^2 - 4xy + y^2$$
- $$w = -2xy - yz + y^2$$
4. a) Explain the terms: 7M
 i. path line
 ii. Streak line
 iii. Stream line and
 iv. Stream tube
 b) Derive Euler equation of motion for one dimensional flow stating the assumptions made 8M

Unit – 3

5. a) Distinguish between Minor loses and Major losses. 7M
 b) Derive an expression for discharge through a venturimeter in terms of inlet, throat areas, coefficient of discharge, head etc. 8M

Cont...2

6. a) Derive an expression for head loss when 3 pipes are connected in parallel as shown in figure.1. 7M

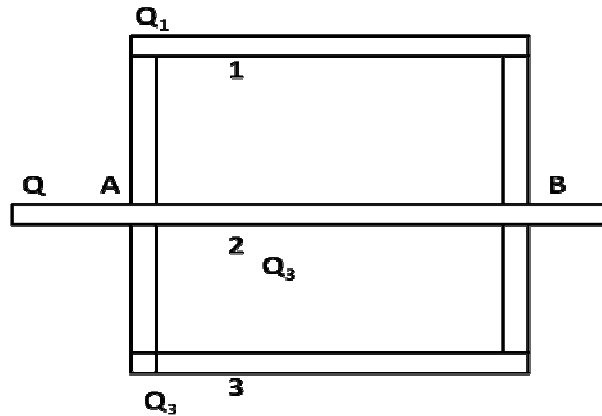


Figure.1

- b) Draw a neat sketch of a pitot static tube and name all the parts 8M

Unit – 4

7. a) What are the causes leading to separation of boundary layer? 8M
 b) Water flows through a tube of 2 cm ID at a rate of 1.5 lit/min. Taking kinematic viscosity of water as $1 \times 10^{-6} \text{ m}^2/\text{s}$, determine whether the flow is laminar or turbulent. If the pipe is transporting water through a distance of 3000 m. Determine the head loss and power required to maintain this flow rate. 7M
8. With the help of a neat sketch explain the development of a boundary layer when a fluid is following with a velocity on a flat plate. 15M

Unit – 5

9. a) Define stagnation enthalpy and stagnation temperature, do these quantities define stagnation state. Argon is stored in a reservoir at 300 K, determine stagnation enthalpy and velocity of sound in it. $\gamma = 1.658$ and the molecular weight of argon is 39.94. 7M
 b) Define Mach angle, explain with suitable sketches propagation of sound waves in a subsonic, sonic and supersonic flows. 8M
10. a) Compare the final values of the pressure in a duct generated by sudden closure of the exit valve with 7M
 i. Hydrogen, $\gamma = 1.4$, $R = 4125 \text{ J/kgK}$
 ii. Air $\gamma = 1.4$, $R = 287 \text{ J/kgK}$
 iii. Freon $\gamma = 1.2$, $R = 135 \text{ J/kgK}$
 The initial flow conditions in each case are pressure 10 bar, temperature 400K and velocity 100 m/s.
- b) Air ($C_p = 1.05 \text{ kJ/kgK}$, $\gamma = 1.38$) at a pressure 3 bar and temperature 500K flows with a velocity 200 m/s in a 30 cm diameter duct. Calculate 8M
 i. Mass flow rate
 ii. Stagnation temperature
 iii. Mach number
 iv. Stagnation pressure

Hall Ticket No

--	--	--	--	--	--	--	--	--	--

Question Paper Code : AME11T05

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

METALLURGY & MATERIAL SCIENCE

(Mechanical Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) Define a crystal. With neat sketches describe the different crystal systems. 7M
- b) Define a solid solution. Describe the different types of solid solutions with sketches. 8M
2. a) Discuss the effect of grain boundaries on the properties of materials. 8M
- b) What are Hume Rothery rules? List them and write a brief note on the same. 7M

Unit – 2

3. a) What is a phase diagram? Briefly discuss the importance of studying the phase diagrams. 8M
- b) Describe the lever rule. Briefly explain how phase percentages of liquid and solid are calculated considering an Isomorphous system. 7M
4. a) List down the different types of binary phase diagrams. Explain any two of them with neat sketches. 8M
- b) Draw neatly iron, iron carbide equilibrium phase diagram. Label all the regions phases and temperature lines. 7M

Unit - 3

5. a) What is the classification of cast iron? Explain the application of each of cast iron with their properties. 8M
- b) What are the procedures for selection of proper tool steel for an application? And what are the general classifications of tool steel? 7M
6. a) Draw a T-T-T diagram for a eutectoid steel and briefly explain the various phases associated with it. 9M
- b) What is meant by heat treatment? And what are its objectives? 6M

Unit – 4

7. a) What are copper alloys? Explain the application of each alloy in the industry. 7M
- b) What are the advantages of non ferrous metals/alloys over the ferrous metals/alloys? 8M
8. a) Explain the property and application of widely used following ceramic materials. 10M
 - i. Alumina
 - ii. Diamond silica
 - iii. Silicon carbide
 - iv. Titanium dioxide
- b) What do you mean nano materials? What are their applications? 5M

Cont...2

Unit – 5

- | | | | |
|-----|----|---|----|
| 9. | a) | What are composite materials? What are their importance and advantage over other materials? | 9M |
| | b) | With a neat sketch explain the hand layup method of fabricating FRP. | 6M |
| 10. | a) | What are the applications of composites? | 6M |
| | b) | What are the methods to manufacture metal matrix composites? List them. | 9M |

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)
MACHINE DRAWING
(Mechanical Engineering)

Time: 3 hours

Max Marks: 75

Answer TWO questions from Unit - 1

Unit - 2 is compulsory

All parts of the question must be answered in one place only

Unit - 1

1. Draw the stud bolt with the nominal diameter of stud is 25 mm. 15M
2. Draw top view and sectional front view of double riveted, double strap, chain butt joint to join plates of 10 mm thickness and rivet diameter of 10mm. 15M
3. Draw the sectional view from the front and view from the side of Oldham coupling, indicating proportions, used to connect two shafts, each of diameter 30 mm. 15M

Unit - 2

4. The details of PLUMMER BLOCK are shown in the figure. Draw the following views of the assembled Plummer Block. 45M
 - a) Half sectional front view
 - b) Top view

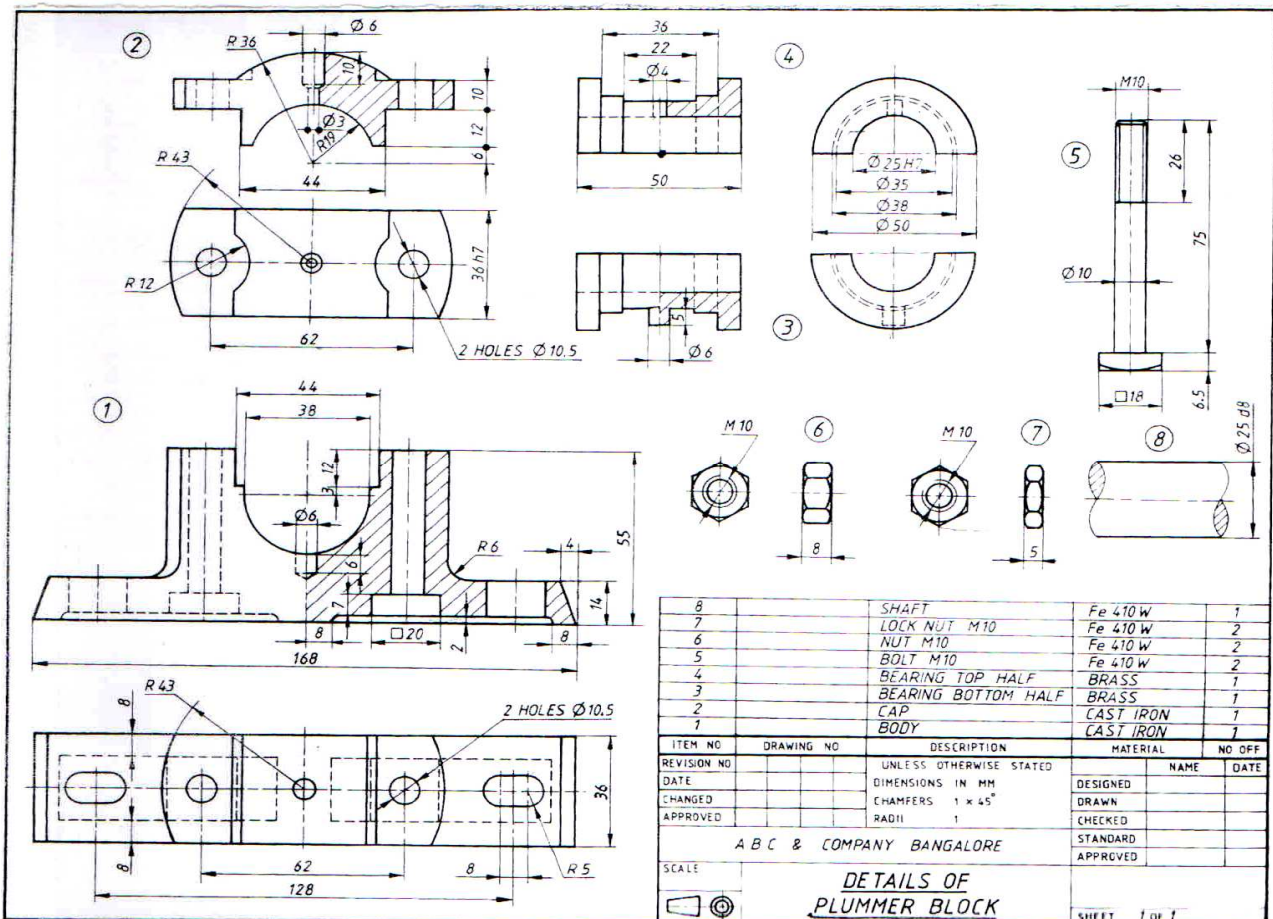


Fig - Details of PLUMMER BLOCK

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

MATHEMATICS FOR AEROSPACE ENGINEERING

(Aeronautical Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) Show that $\int_0^{\pi/2} \sqrt{\tan \theta} d\theta = \frac{1}{2} \Gamma\left(\frac{1}{4}\right) \Gamma\left(\frac{3}{4}\right)$ 7M
- b) Prove that $\beta\left(m, \frac{1}{2}\right) = 2^{2m-1} \beta(m, m)$ 8M
2. a) Show that $J_2'(x) = \left(1 - \frac{x}{x^2}\right) J_1(x) + \frac{2}{x} J_0(x)$ 7M
- b) Show that $x P_n'(x) = n P_n(x) + P'_{n-1}(x)$ 8M

Unit - 2

3. a) If $f(x, y) = \begin{cases} \frac{x^2 - y^2}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$ discuss the continuity of $f(x, y)$ at the origin. 7M
- b) Determine p such that the function $f(z) = \frac{1}{2} \log(x^2 + y^2) + i \tan^{-1}\left(\frac{yx}{x^2 - y^2}\right)$ be analytic function. 8M
4. a) Show that $u = \frac{x}{x^2 + y^2}$ is harmonic 7M
- b) If $v = x^2 - y^2 + \frac{x}{x^2 + y^2}$ is imaginary part of an analytic function, find the analytic function and its real part. 8M

Unit - 3

5. a) Evaluate $\int_{(0,0)}^{(1,3)} 3x^2 y dx + (x^3 - 3y^2) dy$ along the curve (i) $y = 3x$ (ii) $y = 3x^2$ 7M
- b) Verify Cauchy's theorem for the integral of z^3 taken over the boundary of the rectangle with vertices $-1, 1, 1+i, -1+i$ 8M
6. a) Evaluate $\int_C \frac{z^2 - 2z - 2}{(z^2 + 1)^2 z} dz$, where C is $|z - i| = \frac{1}{2}$ using Cauchy's Integral Formula. 7M
- b) Obtain the Laurent's series expansion of $f(z) = \frac{e^z}{z(1-z)}$ about $z = 1$. 8M

Unit - 4

7. a) Find the Poles and the corresponding Residue of $\frac{2z+1}{1-z^4}$ 7M
- b) Evaluate $\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos \theta} d\theta$ using Residue theorem. 8M

8. a) Use the method of contour integration to evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2 + a^2)^3} dx$ 7M
- b) Use the method of contour integration to prove that $\int_0^{2\pi} \frac{d\theta}{1 + a^2 - 2a \cos \theta} = \frac{2a\pi}{1 - a^2}$, 8M
 $0 < a < 1$.

Unit - 5

9. a) Show that the transformation $w = e^z$ transforms the region between real axis and line parallel to real axis $y = \pi$ into upper half of the plane. 7M
- b) Find the bilinear transformation that maps the points 2, i, -2 into 1, i, -1 8M
10. a) Find the bilinear transformation that maps the points $z_1 = \infty, z_2 = i, z_3 = 0$ into the points $w_1 = 0, w_2 = i, w_3 = \infty$ 7M
- b) Prove that the covariant vector g^{ij} is zero. 8M

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

DATA STRUCTURES THROUGH C
(Mechanical Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. Differentiate between the recursion and iteration. Write a recursive program in C to find nth Fibonacci number. 15M
2. Write a C program to search for an item using recursive binary search technique. 15M

Unit – 2

3. Illustrate the working of bubble sort by taking an example. 15M
4. Analyze the worst case performance of quick sort. 15M

Unit – 3

5. Explain different stack operations: push(), pop(), display() by taking an example for each. 15M
6. Illustrate different operations performed by circular queues. 15M

Unit – 4

7. List out any two applications of linked list and any two advantages of doubly linked list over single linked list. Write a C program to create a linked list. When each element is added, arrange them in descending order in the linked list. 15M
8. Write an algorithm and explain the merging of two single linked lists. Write a function to display the contents of each single list for following options 15M
 - i. Create a link list,
 - ii. Display link list and
 - iii. Merge link list

Unit - 5

9. What is a Binary Search Tree? Explain different operation of Binary Search Tree. 15M
10. a) Given the adjacency matrix, draw the weighted graph. 8M

	A	B	C	D	E	F
A	0	623	345	0	0	0
B	623	0	200	548	0	0
C	345	200	0	360	467	0
D	0	548	360	0	245	320
E	0	0	467	245	0	555
F	0	0	0	320	555	0

- b) Explain the following statement by drawing a graph with 5 vertices with no self loops. 7M
 - i. What is the maximum number of edges if graph is undirected?
 - ii. What is the maximum number of edges if graph is directed?
 - iii. Are the results of (i) and (ii) different? Why or why not?

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**THERMODYNAMICS****(Common to Mechanical Engineering & Aeronautical Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) Explain Thermodynamic Equilibrium. 7M
 b) A fluid system undergoes a non-flow frictionless process following the pressure volume relation as $P = \frac{E}{V} + 1.5$ where P is in bar and V is in m³. During the process the volume changes from 0.15 m³ to 0.05 m³ and the system rejects 45 kJ of heat. Determine : 8M
 i. Change in internal energy
 ii. Change in enthalpy
2. a) What is Thermodynamic property? Explain intensive and extensive properties with 7M examples?
 b) Air at 1.02 bar, 22°C, initially occupying a cylinder volume of 0.015m³, 8M is compressed reversibly and adiabatically by a piston to a pressure of 6.8 bar. Calculate:
 i. The final temperature
 ii. The final volume
 iii. The work done

Unit – 2

3. a) State and prove Carnot's theorem. 7M
 b) A house requires $2 \times 10^3 \text{ kJ/hr}$ for heating in winter. Heat pump is used to absorb 8M heat from cold air outside in winter and send heat to the house. Work required to operate the heat pump is $3 \times 10^4 \text{ kJ/hr}$ Determine :
 i. Heat abstracted from outside
 ii. Co-efficient of performance
4. a) Explain clausius inequality. 7M
 b) Source 1 can supply energy at the rate of 12000 KJ/min at 320°C. A second source 2 8M can supply energy at the rate of 120000 KJ/min at 70°C. Which source (1 or 2) would you choose to supply energy to an ideal reversible heat engine that is to produce large amount of power if the temperature of the surroundings is 35°C?

Unit – 3

5. a) Describe with a neat sketch a separating – throttling calorimeter for measuring dryness 7M fraction of steam.
 b) Steam at a pressure of 1.1 bar and 0.95 dry is passed into a tank containing 90 kg of 8M water at 25°C. The mass of tank is 12.5 kg and specific heat of metal is 0.42 kJ/kg K. If the temperature of water raises to 40°C after the passage of the steam, determine the mass of steam condensed. Neglect radiation and other losses.

Cont...2

6. a) Define the following terms: 7M
 i. Sensible heat of water
 ii. latent heat
 iii. Dryness fraction
 b) A pressure cooker contains 1.5 kg of saturated steam at 5 bar. Find the quantity of heat which must be rejected so as to reduce the quality to 60% dry. Determine the pressure and temperature of the steam at the new state. 8M

Unit – 4

7. a) State and explain Avagadro's law and Dalton's law of partial pressure 8M
 b) A Vessel contains 11kg of oxygen, 9kg of nitrogen and 20kg of carbon dioxide at 370K temperature and 4 bar. Determine capacity of the vessel, partial pressure of each constituent and total pressure in the vessel when the temperature in the vessel is increased to 430K. 7M
8. a) Write the equations of internal energy, enthalpy and entropy of a gas mixture 7M
 b) Determine the gas constant, density and partial pressures of the constituents of a gas mixture having 10 mass of air, 1 mass of liquefying gas. Take density of liquefying gas as 0.5 kg / m^3 at 101325 N/cm^2 and 273 K. 8M

Unit – 5

9. a) Derive an expression of the air standard thermal efficiency of diesel cycle. 7M
 b) In a constant volume "Otto cycle" the pressure at the end of compression is 15 times that at the start, the temperature of air at the beginning of compression is 38°C and maximum temperature attained in the cycle is 1950°C . Determine:
 i. Compression ratio
 ii. Thermal efficiency of the cycle
 iii. Work done take γ for air = 1.4 8M
10. a) Explain Otto and Diesel cycles with the help of P-V and T – S diagrams 7M
 b) The stroke and cylinder diameter of a compression ignition engine are 250 mm and 150 mm respectively. If the clearance volume is 0.0004 m^3 and fuel injection takes place at constant pressure for 5 per cent of the stroke determine the efficiency of the engine. Assume the engine working on the diesel cycle 8M

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**SURVEYING-I****(Civil Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

1. a) What are the different sources of errors in chain surveying? 7M
 b) A chain was tested before starting the survey and was found to be exactly 20m. At the end of the survey, it was tested again and was found to be 20.12m. Area of the plan of the field drawn to a scale of 1cm=6m was 50.4Sq.cm. Find the area of the field in Sq.m. 8M
2. a) Explain the terms 8M
 i. Check line
 ii. Base line
 iii. Tie line
 iv. Oblique offset
 b) Compare the advantages and disadvantages of plane table surveying with those of chain surveying. 7M

Unit - 2

3. a) What is the local attraction? How is it detected and eliminated? 7M
 b) Find which stations do you suspect local attraction and workout the correct bearings 8M

Line	FB	BB
AB	124 ⁰ 30'	304 ⁰ 30'
BC	68 ⁰ 15'	246 ⁰ 0'
CD	310 ⁰ 30'	135 ⁰ 15'
DA	200 ⁰ 15'	17 ⁰ 45'

4. a) Define 8M
 i. Magnetic Declination
 ii. Dip
 iii. Isogonic line
 iv. Magnetic bearing
 b) The magnetic bearing of a line AB is 528⁰30'E. Calculate the true bearing if the declination is 7⁰30' west. 4M
 c) What are the essential differences between chain surveying and compass surveying? 3M

Unit - 3

5. The following consecutive readings were taken with a level and 5m reading staff on continuously sloping ground at a common interval of 20; 0.305; 1.030; 1.925; 2.825; 3.730; 4.685; 0.625; 2.005; 3.110; 4.485; the reduced level of the first point was 208.125m. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points by raise and fall method and also the gradient of the line joining the first and the last R.L. 15M

Cont....2

6. a) Briefly explain the characteristics of contours with the help of sketches. 8M
 b) In leveling between two points A and B on opposite banks of a river, the level was setup near A, the staff readings on A and B were 1.285 and 2.860m respectively. The level was then moved and setup near B and the respective readings on A and B were 0.860 and 2.220m. Find the true difference of level between A and B. 7M

Unit - 4

7. a) State and explain the Simpson's Rule. How does it compare with other rules. 8M
 b) A road embankment 10m wide at the formation level with side slopes of 2 to 1 and with an average height of 5m is constructed with an average gradient 1 in 40 from contour 220m to 280m. Find the volume of earth work. 7M
8. A railway embankment 400m long is 12m wide at the formation level and has the side slope 2 to 1. The ground levels at every 100m along the entire line are as follows 15M

Distance(m)	0	100	200	300	400
R.L.(m)	204.8	206.2	207.5	207.2	208.3

The formation level at zero chainage is 207.00 and the embankment has a rising gradient of 1 in 100. The ground is level across the centre line. Calculate the volume of earthwork.

Unit - 5

9. a) Draw a neat sketch of a transit theodolite and explain the functions of various components. 7M
 b) Define 8M
 i. Face left and face right readings
 ii. Telescope normal and telescope inverted
 iii. Swinging the telescope
 iv. Line of collimation
10. The following lengths and bearings were recorded in running a theodolite traverse. Determine the omitted observations, the length and bearing of SP 15M

Line	Length (m)	W C B
AP	255	14 ⁰ 42"
QR	656	35 ⁰⁰ "
RS	120	338 ⁰ 42'
SP	?	?

--	--	--	--	--	--	--	--	--	--

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)

STRENGTH OF MATERIALS-I

(Civil Engineering)

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Unit - 1

1. a) Derive the relation between the 'Three Elastic Moduli'. 7M
 b) A bar 30mm in diameter is subjected to a 'Tensile load' of 54kN and the extension measured on 300mm gauge length is 0.112mm and the change in diameter is 0.00366mm. Calculate the 'Poisson's ratio' and the values of 'Three Moduli'. 8M

2. a) Derive the expression for the stress induced in a body, if a load 'P' is applied with an impact. 8M
 b) Calculate the 'Strain Energy' in a bar 3m long and 40mm in diameter when it is subjected to a 'Tensile load' of 100kN. Take $E=2.05 \times 10^5 \text{N/mm}^2$. What will then be the 'Modulus of Resilience' of the material of the bar? 7M

Unit - 2

3. a) Define beam. Name any two types of supports and explain them in detail. 6M
 b) Construct shear force and bending moment diagrams for an overhang beam of total length 12m with equal overhangs 2m on each side subjected to a udl of 36kN/m over the entire length. 9M

4. a) Explain the relation between shear force and bending moment along with an example. 6M
 b) Construct shear force and bending moment diagrams for a propped cantilever beam of span 6m subjected to udl 12kN/m over a length of 4m from fixed end and whose prop reaction is 70/9kN. 9M

Unit - 3

5. a) Show that the Hoop stress is twice that of longitudinal stress for a thin cylindrical shell of diameter d and thickness t subjected to internal pressure p . 6M
 b) A thin cylindrical shell of 800mm diameter and 3 meters long has thickness of shell of 10mm. If the shell is subjected to a pressure of 2.5Mpa, determine the change in the diameter, length and change in the volume. Assume $E = 2 \times 10^5$. 9M

6. a) Distinguish between thin and thick cylinders. 5M
 b) Derive lame's formulae for the distribution of hoop stress and radial stress for thick cylinder with internal and external radii r_1 and r_2 respectively and length l when subjected to internal pressure p . Draw neat sketch of the distribution of hoop stress and radial stress across the cross section. 10M

Unit - 4

7. a) What are the assumptions made in the theory of simple bending? Derive the Bernoulli's equation in the theory of pure bending. 12M
 b) Determine the ratio of stress induced at the vertex to the base of a triangular cross section subjected to bending. 3M

8. a) Develop the shear stress distribution for a square cross section of a beam with one of its diagonal horizontal when subjected to lateral loads. 9M
b) Determine the position and magnitude of maximum shear stress for the above. 6M

Unit - 5

9. a) Explain the terms uniform bending, curvature and radius of curvature as are applicable to the flexural behavior of beams. 3M
b) Determine the deflection at the free end and maximum deflection between A and B for the beam shown in the figure.1. Take the value of $E = 200 \times 10^6 \text{KN/m}^2$ and $I = 4.5 \times 10^{-6} \text{m}^4$. 12M

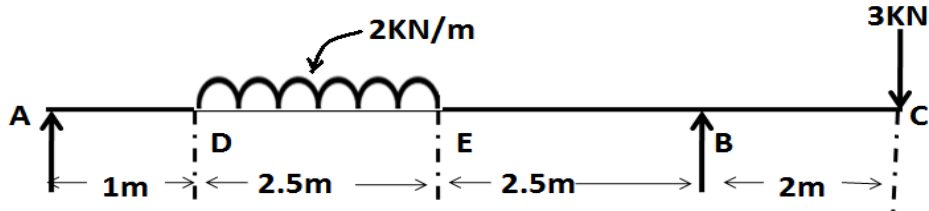


Figure.1

10. a) A 300mm long cantilever of rectangular section 48mm wide and 36mm deep carries a uniformly distributed load. Calculate the value of the load 'w', if the maximum deflection in the cantilever is not to exceed 1.5mm. Take $E = 70 \text{GN/m}^2$. 7M
b) A 3.5m long cantilever carries a uniformly distributed load over the entire span. If the slope at the free end is 1° , what is the deflection at the free end? 8M

VARDHAMAN COLLEGE OF ENGINEERING**(AUTONOMOUS)**

Four Year B. Tech III Semester Supplementary Examinations June - 2013

(Regulations: VCE-R11)**CONCRETE TECHNOLOGY****(Civil Engineering)****Time: 3 hours****Max Marks: 75****Answer ONE question from each Unit****All Questions Carry Equal Marks****All parts of the question must be answered in one place only****Unit - 1**

- | | | | |
|----|----|--|----|
| 1. | a) | What is meant by ordinary port land cement 53 grade? What is the chemical composition of port land cement? | 7M |
| | b) | Explain the grading of aggregates and its significance. | 8M |
| 2. | a) | Explain the setting action of cement and role of each compound formed during setting. | 8M |
| | b) | What is alkali-aggregate reaction. Explain in detail. | 7M |

Unit - 2

- | | | | |
|----|----|---|----|
| 3. | a) | List the tests which are commonly employed to measure the workability of concrete. Describe any one of these with a sketch. | 8M |
| | b) | Why is curing necessary? Describe in brief various methods of curing. | 7M |
| 4. | a) | Explain the steps involved in the manufacture of concrete. Differentiate between segregation and bleeding. | 8M |
| | b) | How different setting times are determined in laboratory? | 7M |

Unit - 3

- | | | | |
|----|----|--|-----|
| 5. | a) | Write the relation between compressive strength and Tensile strength. | 6M |
| | b) | List out the various Non-Destructive Testing methods. Explain any one NDT. | 8M |
| 6. | | List the factors affecting creep and explain the different types of shrinkage. | 15M |

Unit - 4

- | | | | |
|----|----|---|-----|
| 7. | | Using IS method design the concrete mix with moderate exposure and for the following data $f_{ck}=30\text{Mpa}$, $d_{max}=20\text{mm}$, slump 75 to 100mm, OPC cement with sp gr 3.15, sp gr of CA = 2.75, sp gr of FA = 2.65, value of SD = 5, w/c ratio = 0.55, minimum cement content = 290Kg/m^3 , zone III of FA. | 15M |
| 8. | a) | Briefly explain the durability of concrete. | 7M |
| | b) | What is mix design? What are the factors affecting the mix design of concrete. | 8M |

Unit - 5

- | | | | |
|-----|----|--|---------------------|
| 9. | a) | Briefly explain the factors affecting the properties of Fibre Reinforced Concrete. | 8M |
| | b) | Bring out the differences between HPC & NSC. | 7M |
| 10. | | Write short notes on the following (any three) | 15M |
| | a) | High strength concrete | b) Polymer concrete |
| | c) | Self compacting concrete | d) Nofines concrete |