Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1509

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

COMPUTER ARCHITECTURE AND ORGANIZATION

(Common to Computer Science and Engineering, Information Technology, Electrical and Electronics Engineering & Electronics and Communication Engineering)

Date : 17 December, 2013 **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 - I

1. a) Draw the functional block diagram of a digital computer and explain functions of its various blocks. 7M
   b) What do you understand by stacks & subroutines? Explain in brief. 8M
2. a) With a neat block diagram, explain the Basic Operational concept of a digital computer. 5M
   b) What is register transfer language? Explain basic symbols used in register transfer. 10M

Unit - II

3. a) For a RISC machine, the effective value of S is 1.25 and the average value of N is 200. If the clock rate is 500 MHz, calculate the total program execution time. 6M
   b) What are the basic differences between a branch instruction, a call subroutine instruction and program interrupt? 9M
4. a) An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register R1 contains the number 200. Evaluate the effective address if the addressing mode of the instruction is 8M
      i. Direct
      ii. Immediate
      iii. Relative
      iv. Register indirect
      v. Index with R1 as the index register
   b) Convert the following numerical arithmetic expression into reverse Polish notation and show the stack operations for evaluating the numerical result (3+4)[10(2+6)+8]. 7M

Unit - III

5. a) Draw a flowchart for adding or subtracting two floating –point binary numbers. 7M
   b) Show the step-by-step multiplication process using Booth algorithm when the following binary numbers are multiplied (+15) x (-13). Assume 5-bit registers that hold signed numbers and draw the flowchart for the corresponding example. 8M
6. a) Define the following : 8M
      i. Microoperation
      ii. Microinstruction
      iii. Microprogram
      iv. Microcode
   b) What is the difference between a microprocessor and a microprogram? Is it possible to design a microprocessor without a microprogram? Are all microprogrammed computers also microprocessors? 7M

Cont…2

Unit - IV

7. a) What do you mean by Direct memory Access? Explain. Differentiate between Burst mode DMA and Cycle stealing DMA. 10M

   b) With a diagram, explain the structure of a typical ROM cell. 5M

8. a) Describe in words and by means of a block diagram how multiple matched words can be read out from an associative memory. 7M

   b) A digital computer has a memory unit of 64K X 16 and a cache memory of 1K words. The cache uses direct mapping with a block size of four words. 8M
      i. How many bits are there in the tag, index, block and word fields of the address format?
      ii. How many bits are there in each word of cache and how are they divided into functions? Include a valid bit.
      iii. How many blocks can the cache accommodate?

Unit - 5

9. a) Describe the following terminology associated with multiprocessor: 8M
      i. Mutual exclusion
      ii. Critical section
      iii. Hardware lock
      iv. Semaphore
      v. Test-and-set instruction

   b) Construct a diagram for a 4X4 omega switching network. Show the switch setting required to connect input 3 to output 1. 7M

10. a) What is cache coherence, and why is it important in shared-memory multiprocessor system? How can the problem be resolved with a snoopy cache controller? 7M

   b) Consider a bus topology in which two processors communicate through a buffer in shared memory. When one processor wishes to communicate with the other processor it puts the information in the memory buffer and sets a flag. Periodically, the other processor checks the flags to determine if it has information to receive. What can be done to ensure proper synchronization and to minimize the time between sending and receiving the information? 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1215

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

ELECTRICAL TECHNOLOGY

(Common to Mechanical Engineering, Aeronautical Engineering & Civil Engineering)

Date : 17 December, 2013 **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 emf equation of a dc generator. An 8 pole lap connected armature driven at 350rpm is required to generate 260V. The useful flux per pole is 0.04wb. If the armature has 100 slots, calculate the number of conductors per slot. 9M

   b) A 4 pole, 220V lap connected dc shunt motor has 36 slots, each slot containing 16 conductors. It draws a current of 40A from the supply. The field resistance and armature resistance are 110Ω and 0.1Ω respectively. The flux per pole is 40mwb. Calculate 6M
   i. Speed
   ii. Torque developed by the armature

2. a) A 250V, 4 pole, series motor with 782 conductors, wave connected developing 8KW and taking 40A with a flux per pole of 25mwb. The armature resistance is 0.75Ω. Find 8M
   i. The total torque developed
   ii. The useful torque

   b) What is the necessity of a starter in case of a dc motor? Also explain the three point starter with a neat diagram. 7M

Unit - 2

3. a) Explain with a neat phasor diagram, transformer on no load. 7M

   b) A 63KVA, 1100/220V single-phase transformer has R_1=0.16 Ω, X_1=0.5 Ω, R_2=0.0064Ω and X_2=0.02 Ω. Find 8M
   i. Equivalent resistance and reactance as referred to primary winding
   ii. Equivalent resistance and reactance as referred to secondary winding

4. a) Why efficiency of a transformer is much higher than that of a rotating electrical machine? Derive condition of maximum efficiency. 7M

   b) A 25KVA, 6600/250V single-phase transformer has the following parameters:R_1=8 Ω, R_2=0.02 Ω, X_1=15 Ω,X_2=0.05 Ω. Find full-load regulation at power factor 8M
   i. 0.8 lagging
   ii. 0.8 leading
   iii. Unity

Unit - 3

5. a) Explain why induction motor never runs at synchronous speed. Also define slip. 8M

   b) A 4-pole, three phase, 50Hz induction motor runs at 4%slip at full load. Determine 7M
   i. The synchronous speed
   ii. Rotor speed
   iii. Frequency of rotor current
   iv. Speed of rotor field with respect to stator

Cont…2

6. a) Give the constructional differences between squirrel cage and slip ring induction motor. 8M
   b) A 10 Hp, 4pole, 50Hz, three-phase induction motor runs at 1450RPM on full load. The stator copper loss is 231W and the rotational loss is 343W. Determine 7M
      i. Shaft torque
      ii. Mechanical power
      iii. Air gap power
      iv. Rotor copper loss
      v. Input power
      vi. Efficiency

Unit – 4

7. a) Derive the emf equation of an alternator. 8M
   b) A 4 pole, 50Hz star connected alternator has a flux per pole of 0.12wb. It has 4 slots per pole per phase and conductors per slot is 4. If the winding coil span is 150^0, find the emf. 7M
8. a) Explain the working principle of a synchronous motor. 8M
   b) Find the no load phase and line voltage of a star connected 3Ø, 6 pole alternator which runs at 1200rpm, having flux per pole of 0.1wb sinsuoidally distributed. Its stator has 54 slots having double layer winding each coil has 8 turns and the coil is chorded by 1 slot. 7M

Unit - 5

9. a) Explain with a neat diagram shaded pole single phase motor. 8M
   b) Explain why single phase induction machine is not self starting. 7M
10. a) How servomotor is different from stepper motor? Explain in detail. 7M
    b) With a neat diagram explain AC tachometer. 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1508

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

OPERATING SYSTEMS

(Common to Computer Science and Engineering & Information Technology)

Date : 19 December, 2013 **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 – I

1. a) What are the advantages of multiprocessor system? 7M
   b) List the operating system responsibilities in connection, with a process management and memory management. 8M
2. a) Illustrate the differences between windows and Linux in the case of thread scheduling and dispatching. 8M
   b) What are system calls? Calling a system call is more time consuming than Calling a function. Justify. 7M

Unit - II

3. What do you mean by busy waiting? What other kinds of waiting are there? Can busy waiting be avoided altogether? Explain your answer. 15M
4. Consider the following snapshot of a system 15M

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following questions based on the bankers algorithm:

a) Define safety algorithm.
b) What are the contents of the matrix NEED?
c) Is the system in a safe state?
d) If a request from process P1 arrives for (0,4,2,0) can the request be granted immediately?

Unit – III

5. a) Consider the following segment table: 8M

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

i. 0, 430
ii. 1, 10
iii. 2, 50
iv. 3, 400

b) Discuss briefly about memory management in LINUX. 7M

Cont…2

6. a) Explain the various schemes used for defining the logical structure of a directory. 8M
   b) Explain the approaches used in free space management. 7M

Unit – IV

7. Consider a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently 15M
   Serving a request at cylinder 53, and the previous request was at cylinder 75.The queue of pending request, in FIFO order is:

   98, 183, 37, 122, 14, 124, 65, 67

   Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?
   i. FCFS
   ii. SSTF
   iii. SCAN
   iv. LOOK
8. a) What is disk scheduling? Explain the different disk scheduling algorithms. 10M
   b) Explain linked allocation and indexed allocation of disk space with a neat diagram. 5M

Unit – V

9. What is a domain structure? Compare and contrast the domain structures of UNIX and Multics. 15M
10. List and explain the various program threats. 15M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1410

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Date : 19 December, 2013 **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) Applying the Gauss's law find Electric flux density in and around an uniformly charged sphere of radius 'a'mts having uniform charge density of ρ_v C/m^3. 7M

   b) Find Electric field intensity at point (1,5,2) m in free space if a point charge of 6μC is located at (0,0,1),the uniform line charge of density ρ_L =180nC/m along x axis and uniform sheet charge with ρ_s=25nC/m^2 over the plane Z= -5. 8M

2. a) Using Laplace's equation, find the capacitance per unit length of Co-axial cable of inner conductor radius 'R_1' m and outer conductor radius of 'R_2' m. Assume V=V_0 at r=R_1, and V=0 at r=R_2. 7M

   b) Given the potential field $V = 80r^2 \cos\theta$ at a point p (2.5, 30^0, 60^0) in free space. Find (i) Electric field intensity E (ii) Flux density D (iii) Volume charge density ρ_v. 8M

Unit – 2

3. a) State Biot Savart Law and apply the same for a uniform infinite wire along z axis, carrying current I and obtain the expression for a point on z=0 plane. 8M

   b) Define self inductance and mutual inductance and calculate the self inductance and mutual inductances between two co-axial solenoids of radius r_1 and r_2 , r_1<r_2, carrying currents I_1 and I_2 with n_1 and $n_2$turns/m respectively. 7M

4. a) State Ampere's Circuit Law and obtain H for an infinitely long co-axial line carrying uniformly distributed total current I in the center conductor and –I in the outer conductor. 8M

   b) Explain the term Magnetic Flux density and obtain the same for which the magnetic field intensity is 1300A/m and relative permeability is 1.006. 7M

Unit – 3

5. a) Explain and derive modified Ampere's law applied for time varying fields. 7M

   b) Do the Fields $E = E_m \sin x \sin t\, \hat{a}_y$ and $H = \frac{E_m}{\mu_0} \cos x \cos t\, \hat{a}_z$ satisfy Maxwell's equations? 8M

6. a) Explain and derive the boundary conditions for a dielectric- dielectric interface in electro static fields. 7M

   b) Z=0 plane separates two lossless dielectric regions with ε_{r1} =2 and ε_{r2} =3. If we know that electric field E_1 in the region of ε_{r1} is $2y\hat{a}_x - 3x\hat{a}_y + (5+z)\hat{a}_z\ V/m$, what do we know about E_2 and D_2 in region of ε_{r2}. 8M

Cont…2

Unit – 4

7. a) Explain the skin depth in conductors, deriving the necessary relationship. 6M
   b) A uniform plane wave with 10MHz frequency has average poynting vector 1W/m^2. If the medium is perfect dielectric with μ_r=2 and ε_r =3. Find (i) Velocity of propagation (ii) wavelength (iii) intrinsic impedance (iv) rms value of Electric field. 9M
8. a) Explain the propagation of plane wave incident normally on an interface between two different media. 7M
   b) In a nonmagnetic medium; $E = 4\sin(2\pi \times 10^7 t - 0.8x)a_z V/m$. Find (i) ε_r ,η (ii) The time- average power carried by the wave (iii)The total power crossing 100cm^2 of plane $2x + y = 5$. 8M

Unit – 5

9. a) Define Voltage reflection coefficient and standing wave ratio. Obtain the relation between them. 8M
   b) A distortion less line has Z_0=60Ω, α=20 mNp/m, μ=0.6C, where C is the speed of light in a vacuum. Find R,L,G,C and λ at 100 MHz. 7M
10. a) Explain the application of Transmission line as "Quarter-wave Transformer". 7M
    b) Using smith chart find (i) reflection coefficient Γ. (ii) standing wave ratio S (iii) input impedance Z_{in} for the following specifications of the line: Z_0=50Ω; length l=30m; f=2MHz, Z_L=(60+j40)Ω, μ=0.6C where C is the speed of light. 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1211

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

ELECTRO MAGNETIC FIELDS

(Electrical and Electronics Engineering)

Date : 19 December, 2013 **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 – I

1. a) Derive the relationships between unit vectors of rectangular and circular cylindrical coordinate systems. 7M
   b) Transform the vector $\vec{A} = (xz/y)a\hat{x}$ into spherical coordinate system. 8M
2. a) State and prove the Gauss's Law for static fields. 7M
   b) A point charge 'Q' is located at the origin of a spherical coordinate system. Find the electric flux which crosses the portion of a spherical shell described by $\alpha \le \theta \le \beta\ (\beta > \alpha)$. What is the result if $\alpha = 0$ *and* $\beta = \pi/2$? 8M

Unit – II

3. a) Explain the Biot-Savart's Law in the vector form. 5M
   b) Derive the relationship between magnetic flux and magnetic flux density. 5M
   c) Given magnetic flux density $\vec{B} = \rho a\hat{\phi}$, find the total flux crossing the surface $\phi = \frac{\pi}{2}, 1 \le \rho \le 2m, 0 \le z \le 5m$. 5M
4. a) An infinitely long current element on x-axis carries a current of 1.0mA in a_x direction. Determine $\vec{H}$ at the point P(5, 2, 1). 8M
   b) A current filament of 5.0Amps in the $\hat{a}_y$ direction is parallel to the y-axis at x = 2m, z = -2m. Find $\vec{H}$ at the origin. 7M

Unit – III

5. a) Derive Poisson's and Laplace's equation. Also find the capacitance of a parallel plate capacitor using Laplace's equation. Assume V=0 at x=0 and V=V_0 at x=d. 10M
   b) Define inductance in terms of energy stored in a magnetic field. 5M
6. a) Obtain the boundary condition for electric fields for different dielectric materials. 5M
   b) Obtain point from of continuity equation. 6M
   c) If $\vec{H} = 2y^2\hat{a}_x A/m$, find the current density. 4M

Cont…2

Unit – IV

7. a) Explain the concept of vector magnetic potential. 5M
   b) A rectangular loop of wire in free space joins points A(1,0,1) to B(3,0,1) to C(3,0,4) to D(1,0,4) to A. The wire carries a current of 6mA, flowing in the $\hat{a}_z$ direction from B to C. A filamentary current of 15A flows along the entire z axis in the $\hat{a}_z$ direction, 10M
      i. Find the force $\vec{F}$ on side BC
      ii. Find $\vec{F}$ on side AB
8. a) Obtain an expression for the force between the differential current elements. 7M
   b) Consider a rectangular loop, carrying a current of 4mA in the direction of A to B is placed along xy plane at A(0,0,0), B(1,0,0), C(1,2,0), D(0,2,0). Calculate the torque if a uniform magnetic field is of $\vec{B}_0 = -0.6\hat{a}_y + 0.8\hat{a}_z\tau$ is present. Neglect the magnetic effect due to the 4mA current. 8M

Unit – V

9. a) Derive Maxwell's equation from Faraday's law. 7M
   b) Find the amplitude of displacement current density within large oil filled power capacitor where 8M
   $\varepsilon_r = 5$ and $\vec{E} = 0.9\cos\left[1.257\times10^{-6}(3\times10^{8}t - z\sqrt{5}\right]\hat{a}_x$
10. a) Express and explain the Poynting theorem. 7M
   b) Write Maxwell's equation for a general medium for time varying fields in differential and integral forms. 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1314

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

HYDRAULIC MACHINERY AND SYSTEMS

(Mechanical Engineering)

Date : 19 December, 2013 **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 force exerted by the jet on a stationary vertical plate. 8M
   b) A jet of water of diameter 75mm moving with a velocity of 30m/s strikes a curved plate tangentially at one end at an angle of 30^0 to the horizontal. The jet leaves the plate at an angle of 20^0 to the horizontal. Find the force exerted by the jet on the plate in the horizontal and vertical direction. 7M
2. a) Derive an expression for efficiency of propulsion. 10M
   b) Find the propelling force acting on a ship which takes water through inlet orifices which are at right angles to the direction of motion of the ship and discharges at the back through the orifice having effective areas of $0.04m^2$. The water is flowing at the rate of 1000 liters /sec and the ship is moving with a velocity of 8m/s. 5M

Unit – 2

3. a) Define the following terms 4M
      i. Gross Head
      ii. Net Head
   b) Draw a neat sketch and explain the construction and working of any radial flow reaction turbine. 11M
4. a) With the help of velocity triangles derive an expression for force, power and efficiency of a Pelton turbine assuming no frictional losses. 6M
   b) A Pelton turbine has a water supply rate of 5 m^3/s at a head of 256 m and runs at 500 rpm. Assuming a turbine efficiency of 0.85, a coefficient velocity for nozzle as 0.985 and a speed ratio of 0.46, calculate 9M
      i. Power output
      ii. Specific speed
      iii. Number of Jets
      iv. Diameter of the wheel
      v. Jet diameter
      vi. Number of Pelton cups and
      vii. Cup dimensions

Unit – 3

5. a) Write short notes on water hammer. 4M
   b) A pelton wheel turbine develops 3000kW under a head of 300m. The overall efficiency of the turbine is 83%. If the speed ratio = 0.46, C_v = 0.98 and specific speed is 16.5, then find 11M
      i. Diameter of the turbine
      ii. Diameter of the jet

Cont…2

6. a) Derive an equation for discharge through a reciprocating pump. 6M
   b) A single acting reciprocating pump, running at 50 rpm, delivers $0.01m^3$ of water per sec. The diameter of the piston is 200 mm and the stroke length is 400mm. Determine 9M
      i. The theoretical discharge of the pump
      ii. Coefficient of discharge
      iii. Slip and Percentage of slip

Unit – 4

7. a) Draw a neat sketch and explain the main parts and working of a centrifugal pump. 10M
   b) The internal and external diameters of the impeller of a centrifugal pump are 200mm and 400mm respectively. The pump is running at 1200 rpm. The vane angle of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. 5M
8. a) Write short notes on cavitation. 5M
   b) The diameter of a centrifugal pump, which is discharging $0.03m^3$/sec of water against a total head of 20m is 0.40m. The pump is running at 1500 rpm. Find the head, discharge and the ratio of powers of a geometrically similar pump of diameter 0.25m when it is running at 3000 rpm. 10M

Unit – 5

9. a) Sketch and explain the working of an air lift pump. 8M
   b) The ram for a hydraulic crane has 20cm diameter and velocity ratio is 10:1. The liquid is supplied to a jigger at 50bar and the system has a mechanical efficiency of 55%. Determine 7M
      i. The load lifted by the crane
      ii. The quantity of liquid used to lift the load through 8 m height
10. a) What is the function of a fluid coupling? Explain the construction and working of a fluid coupling. 7M
    b) Sketch and explain the working of a vane pump and write an equation for theoretical volume displaced by the pump per sec. 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1704

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

AERODYNAMICS - I

(Aeronautical Engineering)

Date : 19 December, 2013 **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) By considering a control volume approach over a 2D body, obtain an expression for drag per unit span in terms of velocity using wake survey method. 7M

   b) Consider an infinitely thin flat plate of chord 'C' at an angle of attack 'α' in supersonic flow. The pressure on the upper and lower surfaces are different but constant over each surface i.e $P_u(S)=C_1$, $P_l(S)=c_2$, where C_1 and C_2 are constants and $C_2>C_1$. Ignoring the shear stress, calculate the location of center of pressure. 8M

2. a) Starting from normal and axial force per unit span over an airfoil, obtain the following relations: 9M

   i. $C_n = \frac{1}{C}\int_0^c (Cpu - Cpl)\,dx + \frac{1}{C}\int_{L.E}^{T.E} (Cfu - Cfl)\,dy$

   ii. $C_a = \frac{1}{C}\int_{L.E}^{T.E} (Cpu - Cpl)\,dy + \frac{1}{C}\int_0^c (Cfu - Cfl)\,dx$

   iii. $C_{m\,L.E}$

   b) Consider an infinitely thin flat plate with a 1m chord at an angle of attack of 10^0 in a supersonic flow. The pressure and shear stress distributions on the upper surface are given by, $P_u = 4\times10^4(x-1)^2 + 5.4\times10^4$, $P_l = 2\times10^4(x-1)^2 + 1.73\times10^5$, $\tau_u = 288x^{-0.2}$, $\tau_l = 731x^{-0.2}$ respectively. Where 'x' is the distance from the leading edge in meters and P and τ in N/m^2. Calculate the normal and axial forces, the lift and drag, moments about leading edge, moment about quarter chord all per unit span. Also calculate the location of center of pressure. 6M

Unit – 2

3. a) Derive the continuity equation for a finite control volume fixed in space. 8M

   b) Consider a velocity field given by $u = \frac{y}{(x^2+y^2)}$ and $v = \frac{-x}{(x^2+y^2)}$. Calculate the equation of streamline passing through the point (0,6). Also find whether the flow is rotational or irrotational. 7M

4. a) What are the different types of elementary flows? Determine the stream function and velocity potential for the following flows: 8M
   i. Vortex flow
   ii. Doublet flow

   b) Derive an expression for pressure coefficient for a non-lifting flow over cylinder. Also state what is D'Alembert's paradox. 8M

Cont…2

Unit – 3

5. The NACA 4412 airflow has a mean camber line given by 15M

$$\frac{z}{c}=\begin{cases}0.25\left[0.8\frac{x}{c}-\left(\frac{x}{c}\right)^2\right] & for\ 0\le\frac{x}{c}\le 0.4\\ 0.11\left[0.2+0.8\left(\frac{x}{c}\right)-\left(\frac{x}{c}\right)^2\right] & for\ 0.4\le\frac{x}{c}\le 1\end{cases}$$

Using thin airfoil theory calculate

i. Cl when $\alpha=0^0$

ii. Cl when $\alpha=3^0$

6. a) Based on thin airfoil theory, calculate the lift and moment coefficient about leading edge for a thin symmetric airfoil at 1.5^0 angle 3M

b) Derive the fundamental relation of thin airfoil theory $\frac{1}{2\pi}\int_0^c\frac{r(\varepsilon)d\varepsilon}{x-\varepsilon}=V(\alpha-\frac{dz}{dx})$ and hence prove that for a symmetric airfoil $\frac{dc_l}{d\alpha}=2\pi$. 12M

Unit – 4

7. a) Derive the fundamental equation of Prandtl lifting line theory. 9M

b) Consider a finite wing with an aspect ratio of 8 and a taper ratio of 0.8. The airfoil section is thin and symmetric. Calculate the lift and inducted drag coefficient for the wing when it is at an angle of attack of 5^0. Assume f=τ as 0.055. 6M

8. Briefly discuss about lifting surface theory and hence justify that this theory predicts better lift distribution on a wing with low aspect ratio and of any type of platforms. Also compare with the Prandtl-lifting line theory. 15M

Unit – 5

9. What is vortex panel method? Obtain an expression for lift per unit span for an airfoil based on vortex panel method. 15M

10. Calculate the pressure coefficient distributions around a circular cylinder using the source panel technique. 15M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1109

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

HYDRAULICS AND HYDRAULIC MACHINES

(Civil Engineering)

Date : 19 December, 2013 **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 methods of dimensional analysis? Describe the Rayleigh's method for dimensional analysis. 7M
   b) Find the form of the equation for discharge Q through a sharp edged triangular notch assuming Q depends on the central angle α of the notch, head H, gravitational acceleration g, density ρ, viscosity μ and surface tension σ of the fluid. 8M
2. a) What are the various similarities that should exist between the model and prototype so that the prototype represents the model? Explain them in detail. 7M
   b) A 7.2m high and 15m long spillway discharges 94m^3/s under a head of 2m. If a 1:9 scale model of this spillway is to be constructed, find the model dimensions, head over the model and model discharge. 8M

Unit – 2

3. a) Water is flowing through a pipe at the end of which a nozzle is fixed. The diameter of the nozzle is 100mm and the head of water at the center of the nozzle is 100m. Find the force exerted by the jet of water on a fixed vertical plate. The coefficient of velocity is given as 0.95. 7M
   b) A jet of water from a nozzle is deflected through 60^0 from its original direction by a curved plate which it enters tangentially without shock with a velocity of 30m/s and leaves with a mean velocity of 25m/sec. If the discharge from the nozzle is 0.8m^3/s, calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary. 8M
4. a) Derive an expression for the work done by the fluid jet on moving curved plate. 7M
   b) A jet of water having a velocity of 45m/s impinges without shock a series of vanes moving at 15m/s, the direction of motion of the vanes being inclined at 20^0 to that of the jet. The relative velocity at outlet is 0.9 of that at inlet, and the absolute velocity of the water at exit is to be normal to motion of the vanes. Find 8M
      i. Vane angle at entrance and exit
      ii. Work done on vanes per unit weight of water supplied by the jet
      iii. The hydraulic efficiency

Cont…2

Unit – 3

5. a) Define the term most economical section of a channel. What are the conditions for the rectangular channel of the best section? 7M

   b) A rectangular channel 4m wide has depth of water 1.5m. The slope of the bed of the channel is 1 in 1000 and the value of Chezy's constant C=55. It is desired to increase the discharge to a maximum by changing the dimensions of the section for constant area of cross section, slope of the bed and roughness of the channel. Find the new dimensions of the channel and increase in discharge. 8M

6. a) Explain in detail, the classification of surface profiles and their characteristics for Gradually Varied Flow (G.V.F). 7M

   b) A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6m/s and depth of flow is 0.4m. The width of the channel is 8m. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. Also determine the power lost in the hydraulic jump. 8M

Unit – 4

7. a) What are the uses of a draft tube? Describe with neat sketches different types of draft tubes. 7M

   b) Determine the efficiency of a Kaplan turbine developing 3000kW under a net head of 5m. It is provided with a draft tube with its inlet (diameter 3m) set 1.6m above the tail race level. A vacuum gauge connected to the draft tube indicates a reading of 58m of water. Assume draft tube efficiency as 78%. 8M

8. a) Explain Unit speed, Unit discharge and Unit power of a hydraulic turbine. Derive expressions for each of them. 7M

   b) A Pelton wheel turbine develops 3000kW under a head of 300m. The overall efficiency of the turbine is 83%. If speed ratio = 0.46, C_V=0.98 and specific speed is 16.5, then find 8M
      i. Diameter of the turbine
      ii. Diameter of the jet

Unit – 5

9. a) Draw a neat sketch and explain the main parts of a centrifugal pump. 9M

   b) Define the following terms in a centrifugal pump 6M
      i. Suction head
      ii. Delivery head
      iii. Static head

10. a) A centrifugal pump is to discharge 0.118m^3/sec at a speed of 1450 rpm against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. 9M

    b) Derive an expression for minimum speed for starting a centrifugal pump. 6M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1510

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

THEORY OF COMPUTATION

(Computer Science and Engineering)

Date : 21 December, 2013 **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 – I

1. a) Design DFA to accept even number of a's and odd number of b's . 8M
   b) Give formal definition of Deterministic Finite Automata. 4M
   c) Write the table filling algorithm. 3M
2. a) Design a DFA to accept the following language. 7M
   $L = \{ w : |w| \bmod 3 = 0\}$ on $\sum = \{ a,b ,c,d\}$
   b) Convert the following NFA to DFA. 8M
   $A = (\{p,q,r\},\{ 0,1\} , \delta , p,r)$
   δ is given as follows :-
   $\delta (p,0) = \{p,q\}$ $\delta (p,1) = \{p\}$
   $\delta (q,0) = \Phi$ $\delta (q,1) = \{r\}$
   $\delta (r,0) = \Phi$ $\delta (r,1) = \Phi$

Unit – II

3. a) Prove that for every regular expression, there exists a finite automation which accepts the same language accepted by regular expression. 8M
   b) Obtain a regular expression for L={vuv:u,vϵ{a, b}* and |v|=2} 7M
4. a) Show that $L=\{a^ib^j \mid i>j\}$ is not regular. 8M
   b) Show that if L1 and L2 are regular languages, then L1-L2 is also regular. 7M

Unit – III

5. a) What are useful and useless symbols in a CFG? Remove useless symbols from the following CFG. 7M
   S→aAa |aB , A→aS |bD , B→aBa |b ,C→ abb |DD , D → aDa.
   b) Show that the following grammar is ambiguous. 8M
   S→ aB | bA
   A→ aS| bAA| a
   B→ bS | aBB | b
6. a) Eliminate all ϵ-productions from the grammar below: 8M
   S→BAAB
   A→PA2|2A0|ϵ
   B→AB|1B|ϵ
   b) Show that $L=\{w|w \epsilon \{a, b, c\}^*$ where $n_a(w)=n_b(w)=n_c(w)\}$ is not context free. 7M

Unit – IV

7. a) Define push down automata. Differentiate PDA by empty stack and final state by giving their definitions. 6M
   b) Obtain PDA to accept the language $L(M)=\{w/w\epsilon(a+b)^*$ and $n_a(w)=n_b(w)$ by a final state i.e. number of a's in string w should be equal to number of b's in w. 9M

Cont…2

8. a) Obtain a CFG that generates the language accepted by PDA M=({a_0, a_1}, {a, b}, {A, Z}, δ, q_0, Z, {q_1}) with the transitions 8M
   δ (a_0, a, Z) = (q_0, AZ)
   δ(q_0, b, A) = (q_0, AA)
   δ(q_0, a, A) = (q_1, ϵ)
   b) Construct the PDA for the grammar 7M
   S→aABC
   A→aB|a
   B→bA|b
   C→a

Unit – V

9. a) Define a Turing Machine. With a neat diagram explain the working of a Turing Machine. 6M
   b) Obtain a Turing Machine to accept the language L = {w | w Є $(0+1)^*$} containing the substring 001. 9M
10. a) Explain the working of a Turing machine with a diagram. 6M
   b) Write short notes on post's correspondence problem. 6M
   c) Give the formal representation of Turing machine. 3M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1602

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

DATA COMMUNICATIONS SYSTEMS

(Information Technology)

Date : 21 December, 2013 **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 – I

1.	a)	What does the Shannon capacity have to do with communications? Explain in detail	5M
	b)	Define a DC component and its effect on digital transmission. The attenuation of a signal is -10 dB. What is the final signal power if it was originally 5W?	10M
2.	a)	We measure the performance of a telephone line (4 KHz of bandwidth). When the signal is 10 V, the noise is 5 mV. What is the maximum data rate supported by this telephone line?	5M
	b)	List three different techniques in serial transmission and explain the differences.	10M

Unit – II

3.	a)	How the signal power is lost in metallic transmission line losses? Explain.	10M
	b)	Describe the characteristics of electromagnetic waves.	5M
4.	a)	List and Explain in detail transmission line classifications.	5M
	b)	Describe the different metallic transmission line types.	10M

Unit – III

5.	a)	Compare and contrast PCM and DM.	6M
	b)	The input stream to a 4B/5B block encoder is 0100 0000 0000 0000 0000 0001. Answer the following questions: i. What is the output stream? ii. What is the length of the longest consecutive sequence of 0s in the input? iii. What is the length of the longest consecutive sequence of 0s in the output?	9M
6.	a)	List three techniques of Analog-to-digital conversion.	9M
	b)	We want to transmit 1000 characters with each character encoded as 8 bits. i. Find the number of transmitted bits for synchronous transmission. ii. Find the number of transmitted bits for asynchronous transmission. iii. Find the redundancy percent in each case.	6M

Unit – IV

7.	a)	Discuss the concept of redundancy in error detection and correction.	5M
	b)	Briefly describe the services provided by the data link layer.	10M
8.	a)	What is the Hamming distance? What is the minimum Hamming distance?	6M
	b)	Define piggybacking and its usefulness.	9M

Unit – V

9.	a)	Give some hierarchical switching levels of a telephone network.	7M
	b)	What type of topology is used when customers in an area use DSL modems for data transfer purposes? Explain.	8M
10.	a)	Describe the SS7 service and its relation to the telephone network.	7M
	b)	What is DSL technology? What are the services provided by the telephone companies using DSL? Distinguish between a DSL modem and a DSLAM.	8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1212

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

CONTROL SYSTEMS

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

Date : 21 December, 2013 **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 – I

1. a) Define Control System and bring out the clear differentiation between the open loop and closed loop control systems with relevant examples. 8M

   b) Determine the transfer function X2(s)/F(s) for the mechanical system shown in fig.1. 7M

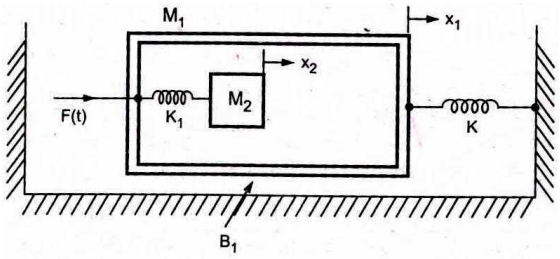


fig.1

2. a) Derive a transfer function for a simple closed loop control system. 3M

   b) For the following DC motor shown in fig.2, find the transfer function $\frac{\theta(s)}{Va(s)}$ if K_b = Back e.m.f. constant, K_T = Torque constant, K_s = Spring constant and J = moment of Inertia. 12M

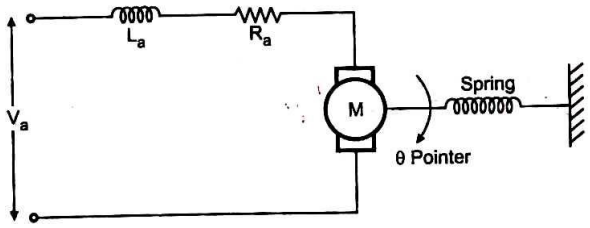


fig.2

Unit – II

3. a) Consider the system shown in fig.3. Simplify this diagram using block diagram reduction technique. 8 M

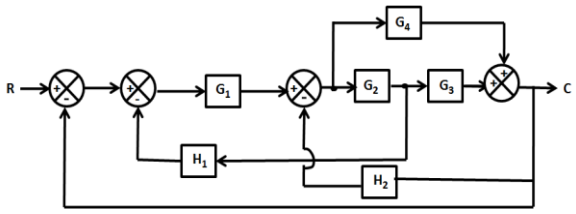


fig.3

Cont…2

b) Find C/R for the graph shown in fig.4 using Mason's gain formula. 7 M

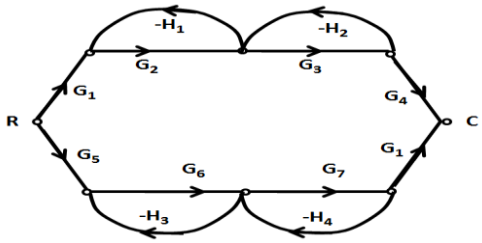


fig.4

4. a) Find the transfer function of the given network shown in fig.5, using Mason's gain formula. 7 M

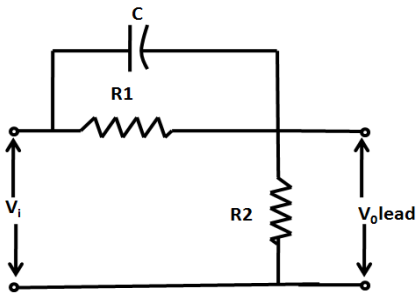


fig.5

b) Use block diagram reduction method to obtain the equivalent transfer function from R to C of the fig.6 shown below. 8M

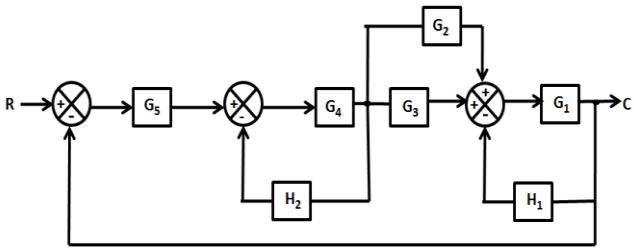


fig.6

Unit – III

5. a) The system given in fig.7 is a unity feedback system with minor feedback loop. In the absence of derivative feedback (a=0), determine the damping ratio and undamped natural frequency. Determine the constant 'a' which will increase damping ratio to 0.7. Find the overshoot in both the cases. 10M

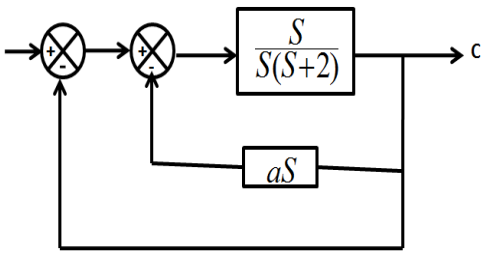


fig.7

b) State & explain Routh's criteria with an example. 5M

6. a) A second order system is given by C(S)/R(S) =(25)/(S^2+6S+25), find it's rise time, peak time, peak overshoot and settling time if subjected to unit step input. Also calculate expression for its output response. 7M

b) Determine departure and arrival angles at complex poles and zeros for 8M

$$G(S)H(S)=\frac{K(S^2+3S+10)}{S(S+2)(S^2+2S+101)}$$

Cont…3

Unit – IV

7. a) Write short notes on Nyquist plot. 5M

   b) For a particular unity feedback system 10M

$$G(S)=\frac{242(S+5)}{S(S+1)(S^2+5S+121)}$$

Sketch the Bode plot. Find w_{gc}, w_{pc}, GM, PM, comment on stability.

8. a) A system has 8M

$$G(S)H(S)=\frac{K(S+2)}{S(S+4)(S+10)}$$

Find K to get PM=+30^0

   b) Sketch the Nyquist plot for system with 7M

$$G(S)H(S)=\frac{1+0.5S}{S^2(1.0.1S)(1+0.02S)}$$

Comment on the stability.

Unit – V

9. a) Write a note on controllability and observability of a system. 4 M

   b) Obtain the time response for the following system shown below 11M

$$\begin{bmatrix}\dot{x}1\\ \dot{x}2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}\begin{bmatrix}x1\\ x2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

where u(t) is the unit step function . given x(0) = [1 0]^T.

10. a) Obtain the state model of the given transfer function 8 M

$$\frac{Y(S)}{U(S)}=\frac{S^2+7S+2}{S^3+9S^2+26S+24}$$

   b) Find the state transition matrix of the following state equation shown below 7 M

$$\dot{x}(t)=\begin{bmatrix}0 & 1\\ -8 & -6\end{bmatrix}x(t)+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

And also find the inverse State Transition Matrix i.e. $\varphi^{-1}(t)$.

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1312

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

THERMAL ENGINEERING - I

(Mechanical Engineering)

Date : 21 December, 2013 **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 – I

1.	a)	Mention the various classifications of internal combustion engines.	7M
	b)	Explain briefly with a neat sketch, the actual valve timing diagram for the high speed 4-stroke Diesel engine. Mention its important features.	8M
2.	a)	Compare the theoretical and actual p-v diagrams for 4-stroke petrol engine.	7M
	b)	Define volumetric efficiency and explain the various factors affecting the volumetric efficiency.	8M

Unit – II

3.	a)	Discuss the stages of combustion in Compression ignition engine.	9M
	b)	Discuss the effects of engine variables on flame propagation in Spark Ignition engine (Any three)	6M
4.	a)	Discuss the factors affecting delay period in compressed ignition engine (Any five)	9M
	b)	List out the factors to be considered in the design of combustion chamber in CI engine.	6M

Unit – III

5.	a)	Explain Morse test for determining the indicated power of a multi-cylinder engine.	5M
	b)	During a trial on a four cylinder, four stroke engine coupled to a hydraulic dynamometer at constant speed, the following readings were obtained: BP with all cylinders working = 14.7 kW, BP with No. 1 cylinder cut-off = 10.14 kW, BP with No. 2 cylinder cut-off = 10.3 kW, BP with No. 3 cylinder cut-off = 10.36 kW, BP with No. 4 cylinder cut-off = 10.21 kW, fuel consumption = 5.5 kg/hour, calorific value of fuel=42,000 kJ/kg, diameter of cylinder = 8 cm, stroke of piston = 10 cm, clearance volume = 0.1 liters. Calculate (i) mechanical efficiency and (ii) relative efficiency on indicated power basis.	10M
6.	a)	Compare positive displacement and roto-dynamic machines.	5M
	b)	During a test on a 4-stroke oil engine the following data were obtained: Mean height of the indicator diagram=21 mm, Indicator calibration=27 kN/m^2 per mm, swept volume of the cylinder=14 liters, speed of engine=6.6 revolutions per second, effective brake load=77 kg, effective brake radius=0.7 m, fuel consumption=0.002 kg/sec., calorific value of fuel=44,000 kJ/kg, cooling water circulation=0.15 kg/sec, cooling water inlet temperature=38^0C, cooling water outlet temperature=71^0C, specific heat of water=4.18 kJ/kgK, heat loss to exhaust gases=33.6 kJ/sec. Determine the indicated and brake power. Draw the heat balance sheet in kJ/sec and percentage basis.	10M

Cont…2

Unit – IV

7. a) Derive an expression for the volumetric efficiency of a reciprocating compressor in terms of pressure ratio, clearance ratio and index of expansion. 6M

   b) An air reciprocating compressor with a bore of 15cm, stroke of 20cm and a clearance of 5% runs at 300 RPM. The suction and delivery pressures are 1 bar and 12 bar respectively. (i) Calculate the ideal volumetric efficiency and power input assuming the index of compression and expansion to be 1.3. (ii) Find also the theoretical maximum percentage saving in work possible had the compression been carried out in two stages instead of a single stage. 9M

8. a) Explain the advantages of multi-stage compression. 5M

   b) A multi-stage compressor compresses air from 1 bar to 40 bar. The maximum temperature of air is not to exceed 400K in any stage. If the compression follows the law $pv^{1.3}$ = constant, find the number of stages for minimum power input. Also find the actual intermediate pressures and temperatures. What will be the minimum power input in kW required to compress and deliver 10 kg per minute of air and the rate of heat rejection in each inter-cooler? Assume ambient temperature of 27^0C, perfect inter-cooling between the stages and specific heat of air = 1.006 kJ/kgK. 10M

Unit – V

9. a) Explain briefly with a neat sketch, the main components and the principle of operation of a centrifugal compressor. 9M

   b) Explain briefly the phenomenon of surging and chocking in centrifugal compressors. 6M

10. a) Explain briefly with a neat sketch, the construction and principle of operation of an axial flow compressor. 9M

    b) Define work done factor and explain the variation of work done factor with the number of stages of an axial flow compressor. 6M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1705

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

AIRCRAFT PRODUCTION TECHNOLOGY

(Aeronautical Engineering)

Date : 21 December, 2013 **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 – I

1.	a)	Discuss briefly the various steps involved in preparing a sand casting.	7M
	b)	With a schematic diagram explain the working principle of hot chamber pressure die casting process.	8M
2.	a)	What are the differences between pattern and castings?	4M
	b)	Discuss briefly on the various desirable properties of moulding sand.	5M
	c)	List the advantages and disadvantages of die casting process.	6M

Unit – II

3.	a)	Briefly explain butt welding and seam welding processes.	8M
	b)	What is soldering? Discuss the steps involved in soldering process.	7M
4.	a)	Explain the principle involved in electric arc welding.	7M
	b)	With a suitable sketch explain the working principle of projection welding process? List its advantages and disadvantages.	8M

Unit – III

5.	a)	Explain in brief how do you specify a lathe and drilling machine.	6M
	b)	Explain with neat sketch the Horizontal milling machine.	9M
6.	a)	With neat sketch explain the following types of sheet metal forming processes i. Blanking ii. Shearing	8M
	b)	Explain with line diagram Stretch Forming and spinning.	7M

Unit – IV

7.	a)	Name the type of processes involved in chemical machining.	4M
	b)	Explain how the EDM process is capable of producing complex shapes.	8M
	c)	Why is electron beam machining hazardous?	3M
8.	a)	Explain the various heat treatment procedure used for aluminum alloy and case hardening steels.	7M
	b)	Explain in brief the various types of surface finishing processes used for Aluminum alloy and steels.	8M

Unit – V

9.	a)	What is the difference between jig and fixture?	5M
	b)	Define the terms sample size, random sampling, population and lot size.	4M
	c)	How is the depth of flaw measured in ultrasonic testing? Explain.	6M
10.	a)	What are the main elements of jigs and fixtures? Explain each one of them.	6M
	b)	List out the various standards under ISO 9000 series.	4M
	c)	Discuss the principle involved in detecting subsurface flaws using magnetic particle inspection.	5M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1107

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

STRENGTH OF MATERIALS - II

(Civil Engineering)

Date : 21 December, 2013 **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 – I

1. a) Define with sketches the equations for normal and tangential stresses for the following cases: 7M
   i. Uniaxial direct stresses
   ii. Biaxial direct stresses
   iii. General 2-D stress system

   b) At a certain point in a piece of elastic material, there are normal tensile stresses of magnitude 120MN/m^2 and 60MN/m^2 acting orthogonally to each other as shown in fig.1. In addition, there is a shearing stress of 80MN/m^2 acting normal to the normal stresses. Determine 8M
   i. The magnitude and direction of the principal stresses
   ii. The magnitude and direction of the maximum shearing stress and
   iii. The normal and shearing stress on a plane inclined at 30^0 of the direction of 120MN/m^2 stress

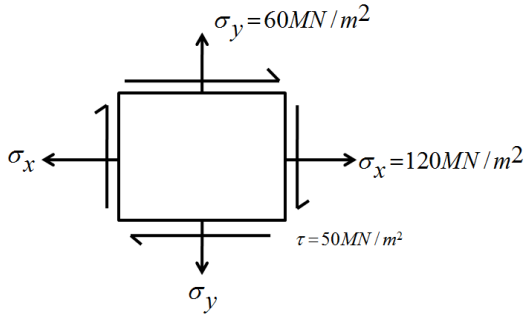


fig.1

2. a) What are the theories of failure? Briefly explain Coulomb's theory of max shearing stress. 7M

   b) A M.S. shaft 10cm dia is subjected a max torque of 15KNm and a maximum bending moment of 10KN-m at a particular section. Find f.o.s according to the maximum shear stress theory if the elastic limit in simple tension is 240MN/m^2. 8M

Unit – II

3. a) Derive the formula for Euler's buckling load of a column with one end fixed and other end hinged. 7M

   b) Calculate Euler's buckling load for a strut having T-section the strut is 3m long and hinged at both ends. The T-section has the following dimensions 8M
   Flange is 10cm x 1cm, web is 7cm x 1cm and take E=2.1 x 10^5 N/mm^2

4. a) What are the assumptions made in Euler's formula for buckling load? 7M

   b) A strut in a framed structure is formed of a mild steel pipe 15cm external diameter and 1cm thick. It is 3m long and has both ends hinged. Take fc=331 N/mm^2 and Rankine constant α = 1/1600, factor of safety is 5. Find the Rankine load to that the strut can carry. 8M

Cont…2

Unit – III

5. a) Derive the torsion equation $\frac{T}{J}=\frac{q}{R}=\frac{N\theta}{l}$. 8M

   b) A hollow shaft is subjected to a torque of 40KNm and a bending moment of 30KNm. The internal diameter of shaft is one-half the external diameter. If the maximum shear stress is not to exceed 80N/mm^2, find the diameter of the shaft. 7M

6. a) A wagon weighing 25KN is moving at 3 kilometer per hour. How many springs each of 24coils will be required in a buffer stop to absorb the energy of motion during a compression of 200mm. The mean diameter of coils is 240mm and the diameter of rod comprising the coil is 20mm. Take N=0.9 x 10^{5}N/mm^2. 7M

   b) The central load on a carriage spring is 10KN and the span of the spring is 1m and the central deflection is not to exceed 22mm if bending stress is limited to 200N/mm^2, determine the thickness, width and number of plate. Assume E=2 x 10^{5}N/mm^2 and width of plate as 15times the thickness. Also compute the radius of each plate. 8M

Unit – IV

7. a) Explain the stresses under the combined action of direct loading and BM, with figure. 7M

   b) A tie rod of uniform circular cross section is required to withstand a maximum tension of 500KN, but the end fixing is such that the line of action is off the axis of the member by 7.5mm. Find the minimum diameter of the tie rod if the maximum allowable stress is 125N/mm^2. 8M

8. Explain the retaining walls and dams with their purpose, advantages and sketches. 15M

Unit – V

9. Analyse the frame shown in fig.2 by method of joints and verify forces in member DE, CE, CB by method of section 15M

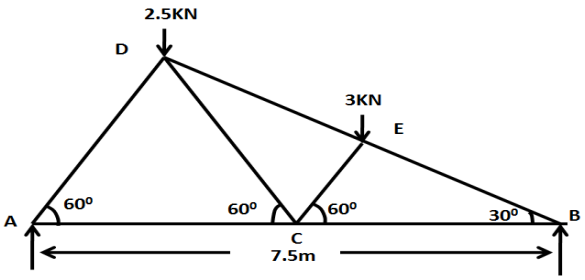


fig.2

10. Analyse the cantilever turss shown in fig.3 below using method of joints or method of sections (any one method): 15M

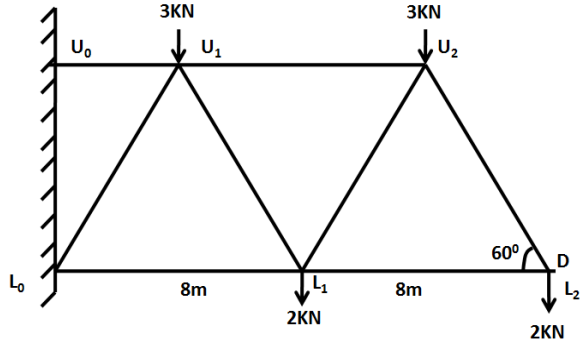


fig.3

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1603

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

WEB TECHNOLOGIES

(Common to Computer Science and Engineering &Information Technology)

Date : 24 December, 2013 **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 - I

1.	a)	Design a web page for a library system, the web page to accept the book details may have the fields like Book Name, Author name , ISBN and No. of Copies available. The web page design can be performed using CSS and attractive colour effects.	9M
	b)	Write javascript for student information system and validate to make the student registration number is non-negative number. Display an appropriate message using popup box.	6M
2.	a)	Illustrate with an example, properties and concept of CSS. Also mention about the border and outline in CSS.	7M
	b)	Write a javascript to analyze a subject code for subject in a semester. The subject code may be visualized like 12 CS 43 where '12' represents year of syllabus, 'CS' – indicates the engineering discipline as Computer Science and Engineering and '4' gives the semester details as 4^{th}sem, and '3' gives the subject information.	8M

Unit - II

3.	a)	Create a XML document to store the Visitor's information with the fields like Name, Organization from, Date of arrival, time of arrival, contact number. Create a DTD to validate the document.	7M
	b)	Discuss the flow of processing the authentication module in Apache and Jigsaw servers.	8M
4.	a)	With suitable example, explain the different types of XML parsers.	7M
	b)	Create a XML document to prepare a table for employee with fields like Employee Name as ENAME, Employee ID as EID and Employee Salary as ESAL.	8M

Unit - III

5.	a)	Discuss the servlet architecture and various interfaces invoked by servlet container and write a servlet program that handles HTTP get request containing data that is supplied by the user as a part of the request	8M
	b)	Explain the following i). Servlet Interface ii). HTTPServlet Class	7M
6.	a)	Explain how Java Servlets perform Session Handling	8M
	b)	Create a Servlet that displays current date and time	7M

Unit - IV

7.	a)	Discuss about usage of JavaBean Component in JSP.	7M
	b)	Develop a JSP to display one of three pages based on user choice.	8M
8.	a)	Develop a JSP to act as a simple search engine with the support of necessary database. Web page will accept the topic name and JSP will be activated by a "submit" button click. JSP will open relevant page with a set of relevant URLs for that topic.	8M
	b)	"A Bean Interface is used by the developer" show how this statement is justified.	7M

Cont…2

Unit - V

9. a) Develop an ASP application to validate the number of question answered by a student. The format of the question paper will have five units and each unit has three question carrying 10 marks. Students have to answer any two questions in each unit. Develop an application to evaluate these answers and display the result. All the questions can be assumed as objective type. 9M

   b) List out the objects of ASP and highlight the features of the properties, methods and events. 6M

10. Write short notes on: 15M
    i. JSF technology
    ii. Ruby
    iii. AJAX

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1408

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

ELECTRONIC CIRCUIT ANALYSIS

(Electronics and Communication Engineering)

Date : 24 December, 2013 **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 – I

1. a) Give the comparison of three transistor configurations. 5M
   b) With a neat circuit diagram of common emitter amplifier and its h-parameter equivalent model, derive the expressions for A_V, A_i, Z_i and Z_O . Show the effect of source resistance on A_V and A_i. 10M
2. a) Obtain the low frequency model of JFET and indicate its importance. 5M
   b) Determine the voltage gain (A_V), input impedance (Z_i) and output impedance (Z_O) for the common drain amplifier. Given: V_{DD}=9V, R_S=2.2 $K\Omega$, R_{GG}=1MΩ. Device specifications are, V_p= - 4V ; I_{DSS} =16mA. 10M

Unit – II

3. a) Explain the concept of negative feedback and derive the expression for gain with feedback. 7M
   b) If an amplifier has a bandwidth of 200KHz and a voltage gain of 100, what will be the new bandwidth and gain, if 5% negative feedback is introduced. What would be the amount of feedback needed if the bandwidth is restricted to 1MHz. Verify the GBW product for the amplifier before and after feedback. 8M
4. a) With a neat circuit diagram, explain the working of Hartley oscillator. Write its conditions for sustained oscillations. 9M
   b) A crystal has the following parameters: L=0.1H, C=0.01pF, R= 10KΩ, and C_h =1pF. 6M
   Find:
   i). Series resonant frequency
   ii). Parallel resonant frequency
   iii). Q-factor

Unit – III

5. a) Calculate dc bias voltages and currents for the Darlington connection in fig.1. Given 8M
   R_B=3.3MΩ; R_E=390 Ω; β_d=8000; V_{CC}=18V; V_{BE}=1.6V

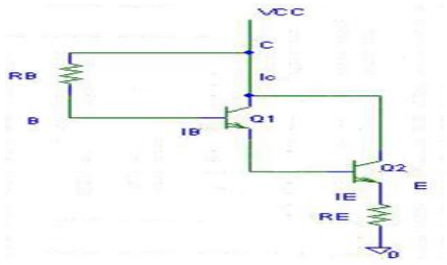


fig.1

Cont…2

b) Determine the lower cutoff frequency for the network shown in fig.2 using the following parameters: C_S = 10µF, C_E = 20µF, C_C = 1µF, R_S = 1kΩ, R_1= 40kΩ, R_2 = 10kΩ, R_E = 2kΩ, R_C = 4kΩ, R_L = 2.2kΩ, β = 100, ro = ∞Ω, Vcc = 20V 7M

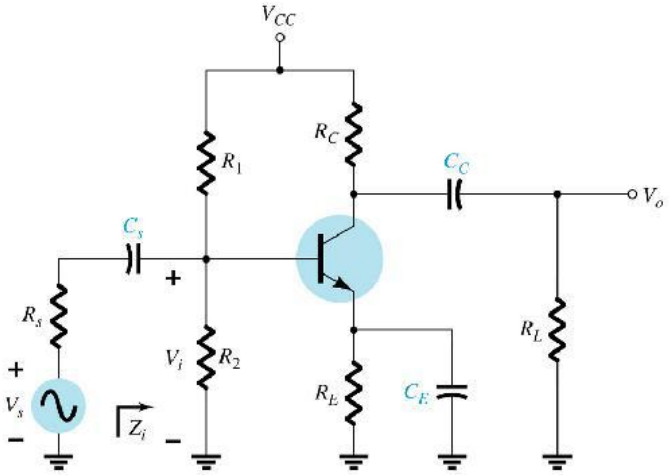
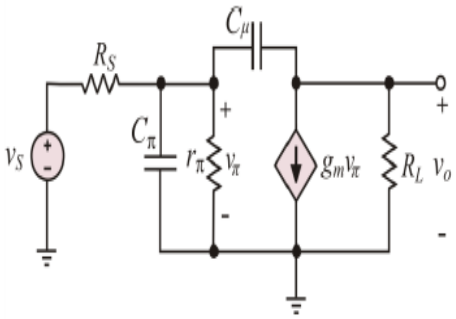


fig.2

6. a) Explain the working principle of a single stage transformer coupled amplifier. 7M

b) Fig.3 is a small-signal model of a BJT amplifier. Determine the so-called Miller capacitance , C_M and draw an equivalent small-signal circuit that incorporates C_M. Next, determine the circuit time constant, 3-dB frequency, and the midband gain. Finally, does this amplifier have a high-pass or low- pass response? 8M



$R_L = 2\,\text{K}$
$g_m = 0.04\ \text{A/V}$
$r_\pi = 5\,\text{K}$
$R_S = 5\,\text{K}$
$C_\pi = 10\,\text{pF}$
$C_\mu = 2\,\text{pF}$

Fig.3

Unit – IV

7. a) Give the classification of power amplifiers with their Q-point selection and load line. Indicate their maximum conversion efficiency. 8M

b) With necessary load line analysis, show that the maximum efficiency of class-B push pull power amplifier is 78.5%. 7M

8. a) A single transistor amplifier with transformer coupled load produces harmonic amplitudes in the output as: B_0=1.5 mA, B_1=120 mA, B_2=10 mA, B_3=4 mA, B_4=2 mA, B_5=1mA. 8M

i). Determine the % THD.

ii). Assume a second identical transistor is used along with a suitable transformer to provide push-pull operation. Use the above data to determine the new % THD.

b) Explain the importance of the following in power amplifier design. 7M

i). Thermal stability

ii). Heat sink

Cont…3

Unit – V

9.	a)	Explain the basic principles of tuned amplifiers and their applications.	6M
	b)	Derive the following expressions for single tuned amplifier using FET. i). Voltage Gain ii). Dynamic Resistance.	9M
10.	a)	Draw the circuit diagram and frequency response of double tuned amplifier. Explain how it performs better than single tuned amplifier.	10M
	b)	A parallel resonant circuit consists of a capacitor of 100pF and an inductor of 100μH. The inductor has a resistance of 5Ω. Find the value of frequency at which the circuit will resonate and the circuit impedance at resonance.	5M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1411

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Date : 24 December, 2013 **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 – I

1. a) Obtain the CE hybrid parameter in terms of CC hybrid parameters. 7M
   b) Design a transistor CE amplifier with R_i = 1 k and R_O = 50 K. Assume that h_{fe} = 50, h_{ie} = 1 k, h_{re} = 2.5 x 10^{-4} and h_{oe} = 25 μ℧ . 8M
   For the CE amplifier designed find A_I, A_V and A_{VS}.
2. a) Draw the hybrid circuit for the CE and CC configurations subject to the restriction that R_L = 0. Show that the input impedances of the two circuits are identical. 7M
   b) Obtain h_{ob} in terms of CE parameters, make reasonable approximations and obtain an approximate expression for h_{ob}. 8M

Unit – II

3. a) A transformer coupled class A power amplifier is required to deliver a maximum of 5W to a 4Ω load. The quiescent point is adjusted for symmetrical clipping and the collector supply voltage is V_{CC} = 20 V. Assuming ideal characteristics and taking V_{min} = 0 find, 8M
      i). The transformers turns ratio
      ii). Peak collector current
      iii). Quiescent operating point I_{CQ}, V_{CEQ}
   b) Draw a series fed class A power amplifier and give the expression for its dc power input and ac power output. Hence show that $P_{0(ac)max} = \frac{V_{CC}^2}{8R_L}$. 7M
4. a) Prove that the maximum power dissipation is approximately 1/5th of the maximum ac output power, for a class B amplifier. 9M
   b) An ideal class B push-pull power amplifier with input and output transformers, has V_{CC} = 20 V, $N_2 = 2N_1$ and R_L = 20Ω. The transistors have h_{fe} = 20. Let the input be sinusoidal. For the maximum output signal at $V_m = V_{CC}$, determine 6M
      i). The output signal power
      ii). The collector dissipation in each transistor
      iii). Conversion efficiency

Unit – III

5. a) With neat circuit diagram explain the working of transistor R-C phase shift oscillator. Write the expression for frequency of oscillations. 8M
   b) i). If an amplifier has a band width of 200KHz and a voltage gain of 100, what will be the new band width and gain if 5% negative feedback is introduced. 7M
      ii). What is the product of gain and band width before and after adding negative feedback in part i.
6. a) Derive the expression for output resistance of voltage series feedback amplifier. 9M
   b) In the Hartley oscillator, the tank circuit has L_1=2.7μH, L_2=4.7μH, M=0.1μH and C=0.001μH. Determine the frequency of oscillations. 6M

Cont…2

Unit – IV

7. a) Obtain the expression for the output voltage of an RC-high pass filter for ramp input. 8M
   b) A pulse of 10 V amplitude and duration 1 ms is applied to a high-pass *RC* circuit with *R* = 20kΩ and *C* = 0.5μF. Plot the output waveform to scale and calculate the per cent tilt in the output. 7M
8. a) State and prove the clamping circuit theorem. 7M
   b) A ramp shown in Fig.1 is applied to a high-pass *RC* circuit. Draw to scale the output waveform for the cases: (i) *T* = *RC*, (ii) *T* = 0.2*RC*, (iii) *T* = 5*RC.* 8M

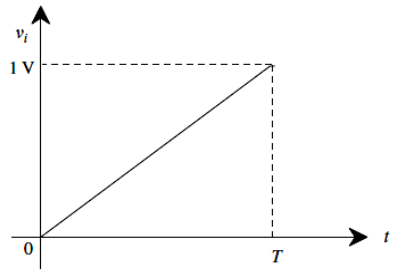
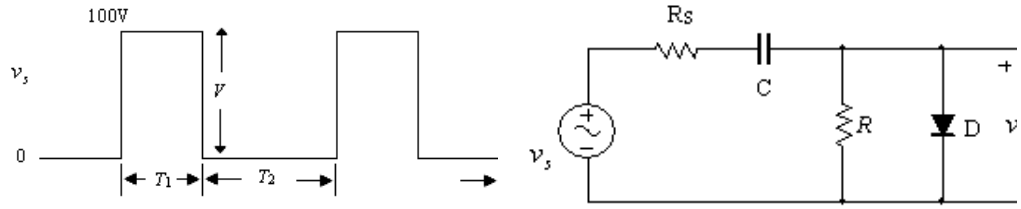


Fig.1

Unit – V

9. a) What is a multi vibrator and how are multi vibrators classified? 3M
   b) What are the advantages and disadvantages of symmetrical and unsymmetrical triggering? 4M
   c) For the excitation as in Fig.2(a) and the clamping circuit [Fig. 2(b)], calculate and plot to scale the steady-state output. $R_f = R_s$ =100Ω, *R*= 100 K, *C* = 0.1μF, T_1 = 100 μs and T_2 =1000 μs. 8M



(a) (b)

Fig.2

10. a) Explain that hysteresis exists in Schmitt trigger circuit. 8M
    b) Sketch the steady-state output voltage for the clamper circuit shown in Fig.3 and locate the output dc level and the zero level. The diode used has *Rf* = 100 Ω, Rr=500kΩ, V_γ = 0. *C* is arbitrarily large and *R* = 20 kΩ. The input is a ± 20 V square wave with 50 per cent duty cycle. 7M

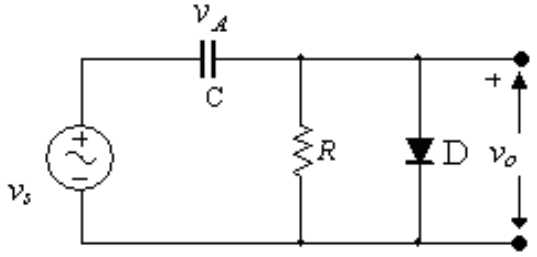


Fig.3

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1313

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

PRODUCTION TECHNOLOGY

(Mechanical Engineering)

Date : 24 December, 2013 **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 – I

1.	a)	With a neat flow diagram indicate the different steps involved in making a casting.	7M
	b)	Define pattern. With neat sketches describe the following types of pattern. i). Match plate pattern ii). Sweep pattern	8M
2.	a)	Define the term "Gating." Sketch a gating system and highlight the functions of each Element.	8M
	b)	With a neat sketch describe Investment Casting Process.	7M

Unit – II

3.	a)	Define Welding. How are welding Process classified? List any two applications of welding.	8M
	b)	Sketch Thermit welding process. Highlight the advantages of the same.	7M
4.	a)	Write brief notes on the following: i). welding characteristics of Aluminum and its alloys ii). Oxy- acetylene gas cutting	8M
	b)	Sketch and explain the principle of resistance welding.	7M

Unit – III

5.	a)	With the help of a neat sketch explain explosive welding process.	7M
	b)	What is recrystallisation? What effect does it have on the properties of metal?	4M
	c)	List out the differences between cold and hot working of metals.	4M
6.	a)	With the help of a suitable sketch explain the working principle of laser beam welding process.	8M
	b)	List the various destructive techniques used in testing welded joints? Briefly explain any two of them.	7M

Unit – IV

7.	a)	Sketch the different types of rolling mills. State the applications of rolling process.	8M
	b)	With a neat sketch explain the production of stainless tubes.	7M
8.	a)	Describe with neat sketch the different sheet metal cutting operations.	8M
	b)	Clearly explain the concept of clearance. Illustrate with necessary diagrams.	7M

Unit – V

9.	a)	Discuss in detail the various types of defects encountered in forged components.	6M
	b)	With a suitable sketch explain impact extrusion process.	6M
	c)	What is the difference between extrusion and drawing processes?	3M
10.	a)	Discuss the various types of defects that occur during extrusion.	6M
	b)	Describe the blow moulding process.	4M
	c)	With the help of a schematic diagram of an indirect extrusion explain its working principle.	5M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1706

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

AEROSPACE VEHICLE STRUCTURES - I

(Aeronautical Engineering)

Date : 24 December, 2013 **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 – I

1. a) Explain statically indeterminate (redundant) structure with an example. 3M
   b) Determine the redundant fixed end moments for the beam shown in figure below 12M

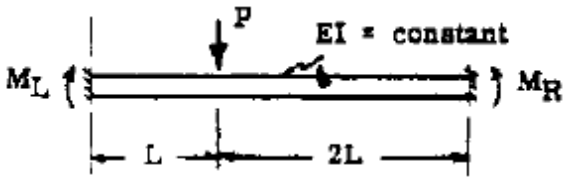


Fig.1

2. The cantilever beam shown in figure below is singly redundant. Find the loadings in the members 15M

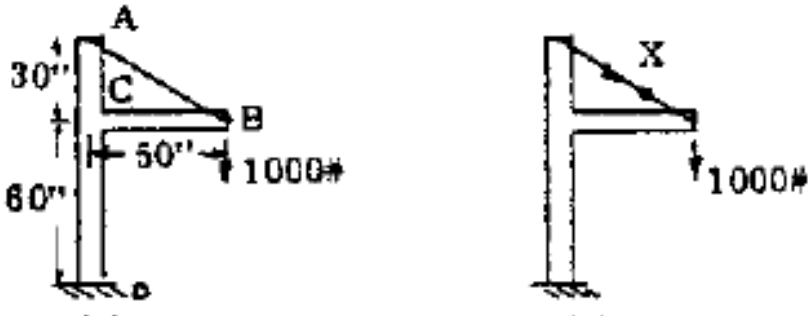


Fig.2

Unit – II

3. Determine stresses of 160N/mm^2 tension and 120N/mm^2 compression, are applied at a particular point in an elastic material on two mutually perpendicular planes. The principle stress in the material is limited to 200N/mm^2, tension. Calculate the allowable stresses at the point on the given planes. Determine also the value of the other principle stress and the maximum value of shear stress at the point. Verify the answer with Mohr's circle. 15M

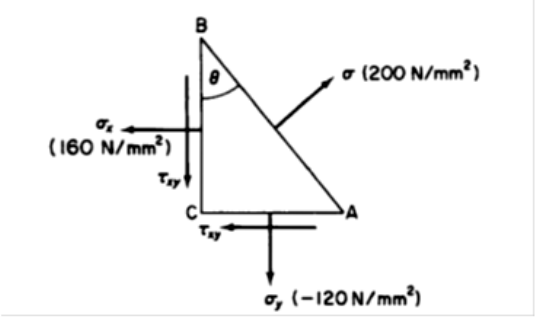


Fig.3

Cont...2

4. Consider at a point in given material, the 3 dimensional states of stresses is given by $\sigma_x=\sigma_y=\sigma_z$=10N/mm^2, τ_{xy}=20N/mm^2 and $\tau_{yz}=\tau_{zx}$=10N/mm^2. Compute the principle planes if the corresponding principle stresses are σ_1=37.3N/mm^2, σ_2=-10N/mm^2, σ_3=2.7N/mm^2. 15M

Unit – III

5. At a particular point in a structural member a two dimensional stress system exists where σ_x=60 N/mm^2 σ_y =-40 N/mm^2 and τ_{xy}=50 N/mm^2. If Young's modulus E=200000 N/mm^2 and Poisson's ratio *v*=0.3.calculate the principal strains at the point and their inclinations to the plane on which σ_x acts; verify these answers using Mohr's circle (graphical method). 15M

6. A bar of solid circular cross-section had a diameter of 50 mm and carries a torqueT, together with an axial tensile load P. A rectangular stain gauge rosette attached to the surface of the bar gave the following strain readings : 15M
ε_a=100x10^{-6}, ε_b= -200x10^{-6} and ε_c=-300x10^6,where the gauges 'a' and 'c' are in line with, and perpendicular to, the axis of the bar respectively. If Young's modulus=70 000N/mm^2 and Poisson's ratio *v*= 0.3, Calculate the values of T and P.

Unit – IV

7. a) State Castiglino's theorem. 3M
   b) Determine the deflection at point C due to load P using Castiglino's theorem for the structure shown below 12M

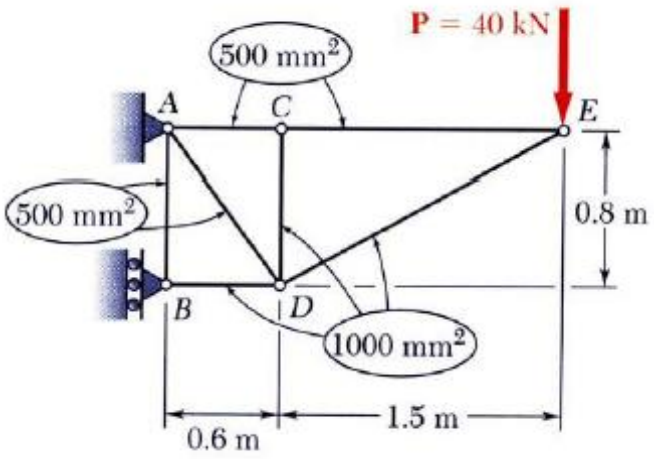


Fig.4

8. Use Maxwell's reciprocal theorem to obtain the displacements at the point of loading and reaction for the beam shown below 15M

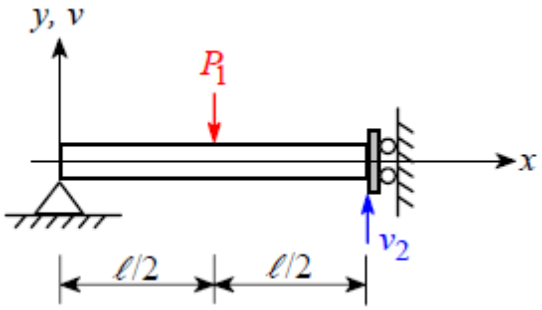


Fig.5

Cont…3

Unit – V

9. Find the shear flows in the two cell box shown below. The horizontal webs have guages of t=0.040 in. Assume G is constant for all webs. The cross section is symmetrical about a horizontal centerline . 15M

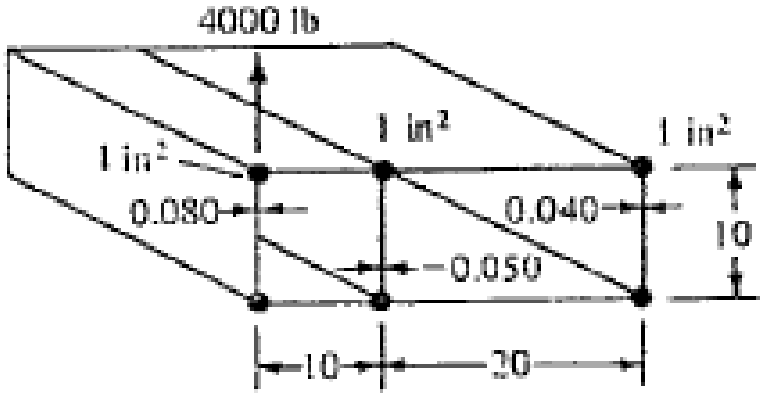


Fig.6

10. a) Explain briefly Bredt-Batho theory with neat sketch. 8M
    b) Define: 7M
    i) Shear flow
    ii) Shear center

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1108

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Date : 24 December, 2013 **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 – I

1. a) Define Propped Cantilever and explain how it is different from Cantilever beam 5M
   b) Find the support moment for the propped Cantilever shown in Fig.1 and Draw the Bending moment diagram. 10M

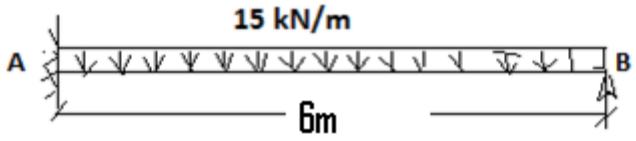


Fig.1

2. a) Explain briefly the steps involved in the analysis of Propped Cantilever. 5M
   b) Find the support moment for a propped cantilever of span 'L' subjected to moment 'M' at the prop .Sketch the Bending moment diagram. 10M

Unit – II

3. a) Explain degree of Indeterminacy and determine the Indeterminancy of Fixed beams. 5M
   b) A fixed beam AB of span 'L' carries a uniformly distributed load of W per Unit length throughout the span. Determine the support moments and draw the BMD. Take E_I=Constant. 10M

4. a) Write down the three moment equation for a two span continuous beam with constant E_I and varying E_I. 5M
   b) Analyse the continuous beam shown in the fig-2 by Clapeyron's theorem and draw the BMD and SFD 10M

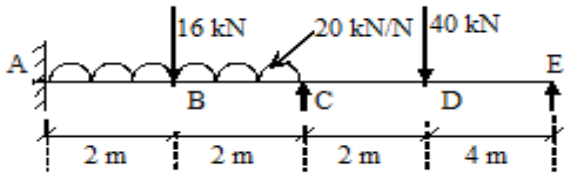


Fig.2

Unit – III

5. a) Define and explain equivalent UDL 5M
   b) Determine the maximum positive and negative shear force and bending moment at a section 1.5m in a simple beam of spear 4m when a concentrated load of 15KN rolls across the beam. Also calculate the absolute bending moments. 10M

Cont…2

6. a) Define strain energy. Derive an expression for strain energy due to axial loading. 5M
   b) A vertical load w is applied to the rigid cantilever frame shown in figure below. Determine the horizontal and vertical displacements of point 'C'. Neglect axial deformations. 10M

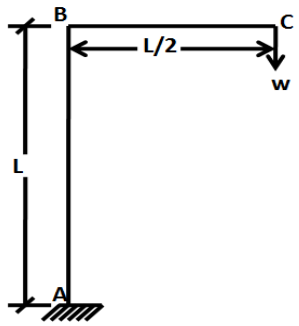


Fig.3

Unit – IV

7. a) Define influence line diagram and mention its practical advantages. 5M
   b) A uniformly distributed load of length 5m and intensity 2kN per metre rolls across a girder of simply supported span 12m. Draw influence line diagram for shear force and bending moment at a section 3m from left hand support. Also calculate maximum positive and negative shear force and maximum bending moment at above section. 10M
8. a) Write assumptions made in slope deflection method write generalized form of slope deflection equation. 7M
   b) Analyse the continuous beam shown in figure below using slope deflection method 8M

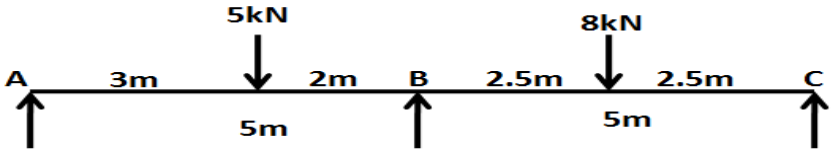


Fig.4

Unit – V

9. a) Define statically determinate and indeterminate structure explain with examples. 5M
   b) Find the degree of static and kinematic indeterminacies of the figure shown below: 10M

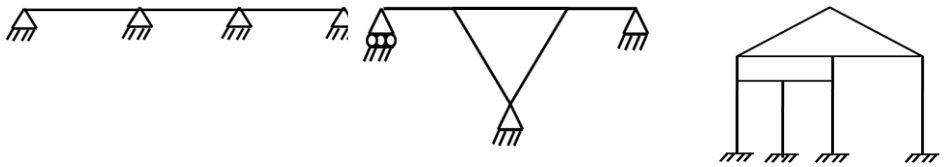


Fig.5

10. a) Define castigliano's first and second theorem. 5M
    b) Determine the forces in all members of the pin jointed plane frame using Castigliano's theorem. Members AB, BC, CA are of area 'za' and others are of area 'a'. 10M

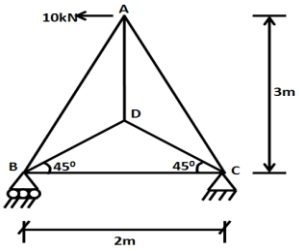


Fig.6

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1604

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

COMPUTER GRAPHICS

(Common to Computer Science and Engineering, Information Technology)

Date : 27 December, 2013 **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 – I

1.	a)	With a neat block diagram explain the conceptual framework for interactive graphics.	8M
	b)	With a neat sketch, explain the working principle of Cathode ray Tube (CRT).	7M
2.	a)	Differentiate between raster scan display and vector scan display.	9M
	b)	What are Virtual reality systems? Explain with an example.	6M

Unit – II

3.	a)	Explain Bresenham's line algorithm with neat diagram and necessary equations.	8M
	b)	Illustrate with example mid-point ellipse drawing algorithm.	7M
4.	a)	Derive the mathematical formulation required to scan convert a circle and explain the circle generating concept with the help of a 8- way symmetry algorithm.	8M
	b)	Write pseudo code for boundary fill algorithm.	7M

Unit – III

5.	a)	Illustrate with example two dimensional composite transformation.	9M
	b)	Illustrate the transformation sequence for rotating an object about a specified pivot point in 2D.	6M
6.	a)	Consider a square with the end points A(0,1),B(1,1),C(1,0),D(0,0) and demonstrate the following with the help of neat sketches. i). Use X-direction shear with shx=2 ii). Use Yref=-1 and shx=0.5. iii). Use shy=0.5 and Xref=-1 in the Y direction shearing	9M
	b)	Discuss Cohen- Sutherland line clipping algorithm.	6M

Unit – IV

7.	a)	Get the transformation matrix for perspective projections.	8M
	b)	Explain Hermite curve technique and illustrate it with an example.	7M
8.	a)	Write a note on polygon meshes, highlighting the three polygons mesh representations.	7M
	b)	Apply the shearing transformation of the square with A (0, 0), B (1, 0), C (1, 1) and D (0, 1) as given below: i). Shear parameter value of 0.5 relative to the line Y_{ref}= -1 ii). Shear Parameter value of 0.5 relative to the line X_{ref} = -1.	8M

Unit – V

9.	a)	Give the Z-Buffer algorithm for hidden surface removal.	7M
	b)	Explain the concept of morphing with relevant necessary equations.	8M
10.	a)	Write short notes on: i. Double Buffering ii. Periodic motion.	8M
	b)	Explain the techniques used to specify the animation paths between key frames.	7M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1409

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

PULSE AND DIGITAL CIRCUITS

(Electronics and Communication Engineering)

Date : 27 December, 2013 **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 – I

1. a) Draw and briefly explain the response of low pass RC circuit to a square wave input shown below, in fig.1 for small time constant, medium time constant and large time constant. Also derive an expression for output voltage levels under steady-state condition. 10M

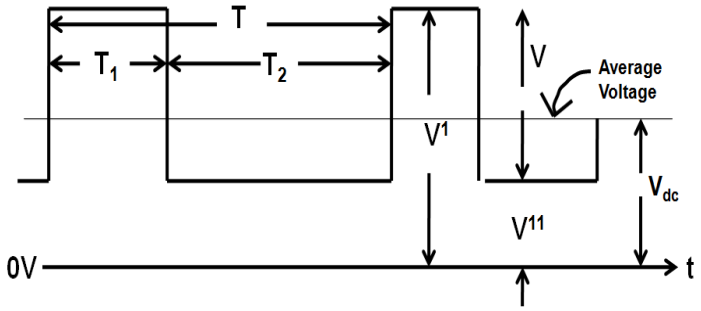
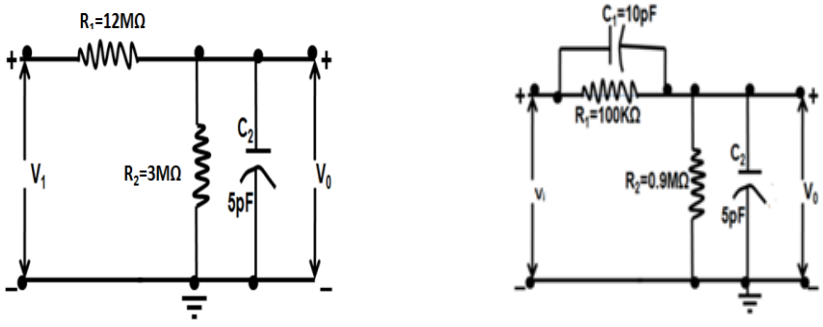


Fig.1

b) Why RC circuits commonly used compared to RL circuits? What do you mean by peaking coil? Explain briefly. 5M

2. a) A square wave whose peak-peak value is 1V extends ±5V, with respect to ground. The duration of the positive section is 0.1sec and of the negative section 0.2sec. IF this waveform is impressed upon a RC differentiation circuit whose time constant is 0.2sec, what are the steady state maximum and minimum values of the output waveform? Prove that the area under the positive section equals that under the negative section of the output waveform. What is the physical significance of this result? 8M

b) A 50Ω pulse generator produces 500µs pulses with negligible rise time and 5V positive amplitude into an open circuit. If the bottom of the pulse is zero and duty cycle is 25%, determine the pulse shape, i.e. the amplitude, the rise time and the fall time after it has passed through the circuits shown in fig.2(a) and fig.2(b) 7M



(a) (b)

Fig.2

Cont…2

Unit – II

3. a) What are clipping circuits? Draw and explain the piecewise linear transmission characteristics of clipping circuits – which removes that part of the waveform that is more positive than V_R, which transmits that part of the waveform that is more positive than V_R. Assume diode is ideal and input is a sinusoidal waveform. 8M

   b) What for clamping circuits are used? What do you mean by positive and negative clamping? State and prove clamping circuit theorem. 7M

4. a) A symmetrical 10kHz square wave whose peak-to-peak excursions are ±10V with respect to ground is impressed on the clamping circuit of figure below. Here R=10kΩ, C=1μF, the diode has $R_r=\infty$, $R_f=0$, $V_\gamma=0$ and the source impedance $R_S=0$. 8M

   i). Sketch the output waveform

   ii). If the diode forward resistance is 1kΩ, sketch the output waveform. Calculate the maximum and minimum values with respect to ground

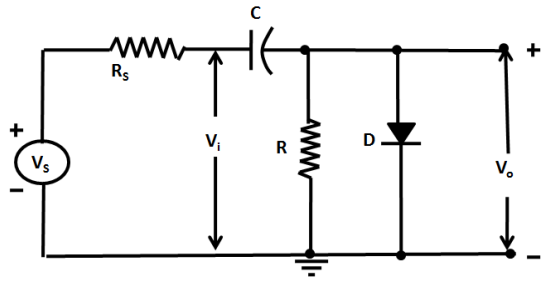


Fig.3

   b) Write notes on 7M

   i). Diode switching times

   ii). Transistor switching times

Unit – III

5. a) Design collector coupled Astable multivibrator to generate un - symmetrical square wave for the following specifications; Vcc=9V, ic=2mA, f=10KHz, hfemin=20, Duty cycle=33% , VCE(sat)=0.3V, VBE(sat)=0.7V. 8M

   b) Draw the circuit and waveforms of Monostable multivibrator. Derive an expression for pulse width. 7M

6. a) Explain the transfer characteristics of Schmitt Trigger. Explain how hysteresis can be eliminated. 7M

   b) Design a fixed bias Bistable multivibrator using npn silicon transistor for the following specification: $V_{CC}=V_{BB}=12V$, hfe(min)=20, ic(sat)=5mA, VCEsat=0.3V, VBE sat= 0.7V. 8M

Unit – IV

7. a) With neat circuit diagram and waveform explain the prinicple of operation of Bootstrap sweep circuit. 7M

   b) Define slope speed error and Displacement error. Derive the relation between them. 8M

8. a) Design Miller sweep circuit for the following specifications : Vcc=10V,ic=2mA, hfe(min)=20, VCEsat=0.3V,VBEsat=0.7. Assume sweep time be Ts=5 mSecs. 8M

   b) In the sweep circuit shown in the figure below show that $A=1+R_2/R_1$. 7M

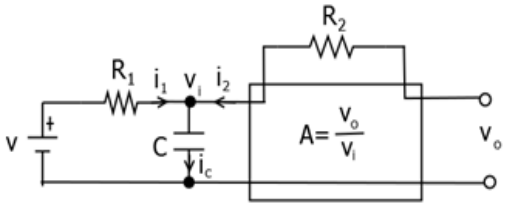


Fig.4

Cont…3

Unit – V

9.	a)	With neat circuit diagram and waveforms explain unidirectional diode Gate and also illustrate the effect of control voltage (-V2) on gate output.	8M
	b)	With neat circuit diagram explain the operation of TTL Nand gate.	7M
10.	a)	Draw and explain the circuit of transistor Bidirectional gates.	8M
	b)	Compare TTL logic and CMOS logic families.	7M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1210

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

AC MACHINES - I

(Electrical and Electronics Engineering)

Date : 27 December, 2013 **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 – I

1. a) Draw the complete phasor diagram for a transformer when the load power factor is 9M
   i). Unity
   ii). Leading
   iii). Lagging
   b) 230/460V transformer has a primary resistance of 0.2Ω and a reactance of 0.5Ω and the corresponding values for the secondary are 0.75Ω and 1.8Ω respectively. Find the secondary terminal voltage when supplying 6M
   i). 10A at 0.8.pf lagging
   ii). 10A at 0.8 pf leading
2. a) Derive the EMF equation of the transformer. 5M
   b) A 50 KVA, 4400/220V transformer has R_1 = 3.45Ω, R_2 = 0.009Ω. The values of reactances are X_1 = 5.2Ω and X_2 = 0.015 Ω. Calculate for the transformer 10M
   i). Equivalent resistance as referred to primary and secondary
   ii). Equivalent reactance referred to both primary and secondary
   iii). Equivalent impedance as referred to both primary and secondary
   iv). Total copper loss

Unit – II

3. a) With a neat sketch explain the procedure for conducting OC test and SC test on a single phase transformer. Also explain with the help of suitable equations, how equivalent circuit of a transformer can be obtained from these tests. 12M
   b) A single phase 1100 V /220V transformer under test gave the following test results: 3M
   OC test 1100V, 0.5A, 55W
   SC test 10V, 80A, 400W on L.V. side, H.V. short-circuited.
   Calculate the efficiency of the transformer when secondary supplies 100A at 0.8 p.f lag.
4. a) Two single phase transformers with equal turns have impedances of (0.5 + j3) Ω and (0.6 + j10) Ω with respect to the secondary. If they operate in parallel, determine how they will share total load of 100 KW at 0.8 p.f lag. 7M
   b) What is an auto transformer? Derive an expression for the saving of copper in an auto transformer as compared to an equivalent two winding transformer? What are advantages and limitations of an autotransformer. 8M

Unit – III

5. a) What are the distinguishing features of Y-Y, Y-Δ, Δ-Y and Δ-Δ three phase connections? Compare their advantages and disadvantages. 7M
   b) A three-phase transformer bank consisting of three single phase transformer is used to stepdown the voltage of a three-phase,6600V transmission line. If the primary line current is 10A ,Calculate the secondary line voltage, line current and output KVA for 8M
   the following connections
   i). Y- Δ
   ii). Δ-Y
   The turns ratio is 12. Neglect losses.

6. a) What are the applications of three-winding transformer? How can this transformer be represented by an equivalent circuit? 7M
   b) A balanced three-phase,200KW load at 400V and 0.8 power factor lagging is to be supplied from a two-phase 1100V supply. Determine voltage and current rating of each winding of Scott connected transformer and KVA ratings of each unit. 8M

Unit – IV

7. a) A 746 kw, 3 phase, 50 Hz, 16 pole Induction motor has a rotor impedance of $(0.02 + j\ 0.15)\Omega$ at standstill. Full load torque is obtained at 360 rpm. Calculate 7M
      i). The ratio of maximum to full load torque
      ii). The speed for maximum torque and
      iii). The rotor resistance to be added to get maximum starting torque.
   b) Explain the phenomenon of cogging and crawling in a 3 phase induction motor 8M
8. a) Show that a rotating magnetic field with a constant speed is produced, when a 3 phase supply is given to the stator of a 3 phase induction motor. 5M
   b) An induction motor has an efficiency of 0.9 when delivering an output of 37KW. At this load, the stator copper loss and rotor copper loss each equals the iron loss. The mechanical losses are one third of the no load loss. Calculate the slip 10M

Unit – V

9. Draw the circle diagram for a 5 hp, 200V, 50 Hz, 4 pole, 3 ϕ, star connected induction motor from the following data: 15M
      i). 200V, 5A, 350Watts
      ii). 100V, 26A, 1700 Watts
      iii). Rotor copper loss at standstill = half of the total copper loss.
   Estimate there from the full load current, power factor, speed and torque.
10. a) Explain the need for starters in starting a 3 phase induction motor. With the help of a neat diagram, explain the working of a star - delta starter. Mention the advantages and disadvantages of star – delta starter. 10M
   b) Explain speed control of 3ϕ induction motor by frequency control method. 5M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1315

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Date : 27 December, 2013 **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 – I

1. a) Classify Kinematic pairs based on 9M
   i). Surface contact
   ii). Relative motion
   iii). Type of closure.
   b) Define Degree of Freedom. Explain Grubler's Equation to find DOF for a planar motion. 6M
2. a) What is completely, successfully and incompletely constrained motion? Explain with neat sketch. 6M
   b) Explain any two of the quick return mechanisms. 9M

Unit – II

3. a) Prove that Peaucellier mechanism traces out an exact straight line motion. 8M
   b) What are the limitations of Scott-Russell mechanism? 7M
4. In an I.C engine mechanism shown in fig.1, crank OA=100mm and connecting rod AB=100mm with centre of gravity G, 100mm from A. In the position shown the crank have an angular velocity of 75 rad/s and an angular acceleration of 1200rad/s². 15M
   Find
   i). Velocity and acceleration of G,
   ii). Angular velocity and angular acceleration of the connecting rod AB. (use relative velocity method).

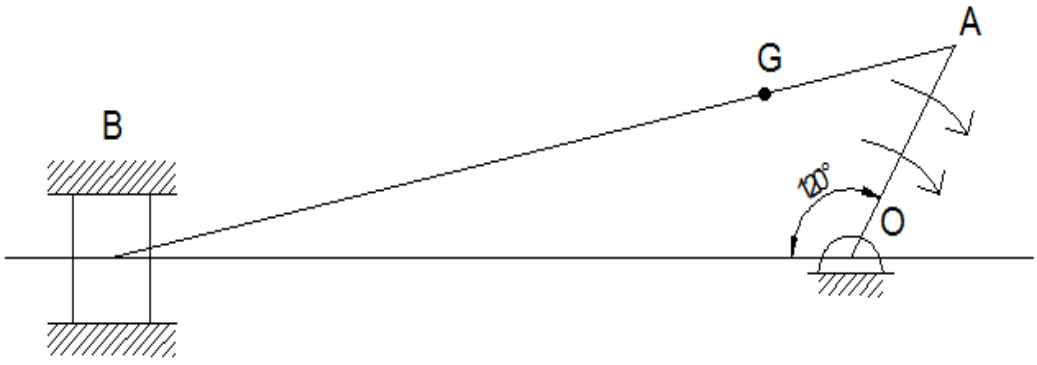


Fig.1

Unit – III

5. a) The lengths of the crank and the connectivity rod of a reciprocating engine are 100mm and 500mm respectively. The crank is rotating at 400rpm. Using Klein's construction, find 1. Velocity of piston 2. Angular velocity of connecting rod 3. Acceleration of the connecting rod when the crank has turned 30° from inner dead centre. 9M
   b) Derive the expression for coriolis component of acceleration. 6M

Cont…2

6. a) State and prove Kennedy's (three centre in line) theorem. 5M
   b) Two shafts with an included angle of 160^o are connected by a Hooke's joint. The driving shaft runs at a uniform speed of 1500rpm. The driven shaft carries a flywheel of mass 12kg and 100mm radius of gyration. Find the maximum angular acceleration of the driven shaft and the maximum torque required. 10M

Unit – IV

7. a) What are the standard follower motions? Explain any two. 8M
   b) State and Derive Law of Gearing. 7M
8. Draw the cam profile for following conditions: Follower type = roller follower, in-line; lift = 25mm; base circle radius = 20mm; roller radius = 5mm; out stroke with UARM, for 120^0 cam rotation; dwell for 60^0 cam rotation; return stroke with UARM, for 90^0 cam rotation; dwell for the remaining period. Determine maximum velocity and acceleration during out stroke and return stroke if the cam rotates at 1200 rpm in clockwise direction. 15M

Unit – V

9. a) Which are the different types of chains used for power transmission? 5M
   b) In an epi -cyclic gear train shown in fig.2, the arm A is fixed to the shaft S. The wheel B having 100 teeth rotates freely on the shaft S. The wheel F having 150 teeth driven separately. If the arm rotates at 200 rpm and wheel F at 100 rpm in the same direction; find 10M
      i). Number of teeth on the gear C and
      ii). Speed of wheel B.

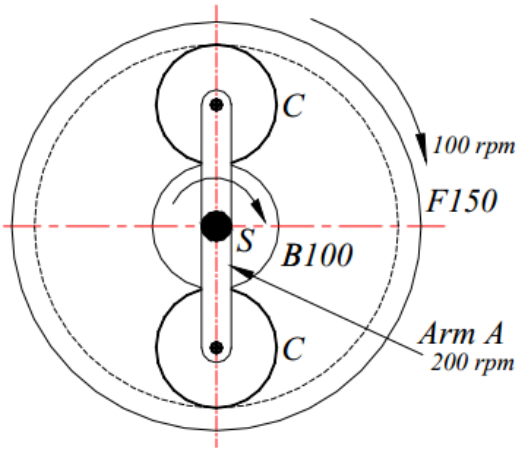


Fig.2

10. a) What is slip in Belts? How does it effect on velocity ratio? 7M
    b) A shaft runs at 80 rpm and drives another shaft at 150 rpm through belt drive. The diameter of the driving pulley is 600 mm. Determine the diameter of the driven pulley for the following cases, 8M
       i). Neglecting belt thickness
       ii). Taking belt thickness as 5mm,
       iii). For case ii, a total slip of 4%,
       iv). For case ii, a slip of 2% on each pulley

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1707

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

FLIGHT MECHANICS - I

(Aeronautical Engineering)

Date : 27 December, 2013 **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 – I

1.	a)	Discuss on the mission profiles of civil transport aircraft and military aircraft with relevant sketches.	10M
	b)	Describe the performance measurement.	5M
2.	a)	Explain the vertical development of atmosphere and discuss its impact on the thermal balance of the earth.	8M
	b)	Describe the standard atmosphere mode.	7M

Unit - II

3.	a)	Draw a force diagram of an aircraft and write down the equations of motion.	9M
	b)	Explain the minimum power speed with relevant graph.	6M
4.		Explain the constant angle of attack, constant mach number cruise method.	15M

Unit – III

5.	a)	Explain the generalized climb performance and obtain the relations for climb gradient and climb rate for a jet engine.	10M
	b)	Discuss the effect of wind on climb and descent performance.	5M
6.		Derive the expressions for rate of turn and turn radius for level turn and also explain the maneuver boundaries graph.	15M

Unit – IV

7.	a)	Describe the power-equivalent weight and speed-equivalent weight method for a piston engine propeller driven aircraft.	10M
	b)	Explain the performance data reduction for a piston engine propeller driven aircraft.	5M
8.	a)	Describe the four phases of flight planning.	8M
	b)	Explain on the various aspects of take-off performance safety factors.	7M

Unit – V

9.	a)	Illustrate the performance summary for fleet selection with the help of neat sketches.	7M
	b)	Draw the Route analysis and aircraft datum performance (WAT) chart with relevant examples.	8M
10.		Explain the operational analysis for en-route climb, cruise and descent performance.	15M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1110

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

BUILDING PLANNING AND DRAWING

(Civil Engineering)

Date : 27 December, 2013 **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 – I

1. a) What are the general principles of building by-laws? 7M
   b) Explain floor area ratio with suitable example. 8M
2. a) Write a brief note on classification of buildings. 10M
   b) What do you mean by built-up area limitations? Explain briefly. 5M

Unit – II

3. a) What are the common rooms in a residential building? What rooms would you consider as optional? 7M
   b) Discuss the characteristics of various types of residential buildings. 8M
4. Draw a typical office building plan with standard specifications to your convenient scale. 15M

Unit – III

5. a) What are the factors to be considered in the design of a bank building? Explain 7M
   b) Differentiate between the following: 8M
      i). Hotel and Motel
      ii). Reading room and stock room
      iii). Auditorium and foyer
      iv). Dispensary and clinic
6. a) Write short notes on modern methods in construction management. 7M
   b) Differentiate clearly between PERT and CPM network methods. 8M

Unit – IV

7. Draw the plan and Elevation of a corner of a Two brick wall thick in Flemish bond at the corner. 15M
8. Draw plan, elevation and section (Showing maximum details) of a glazed window for three shutters. Adopt suitable scale and sizes of the various components of the same. 15M

Unit – V

9. For the line diagram given below fig.1 draw the plan, elevation and section along X-X. Assume suitable dimentions for foundations, doors and windows etc. 15M

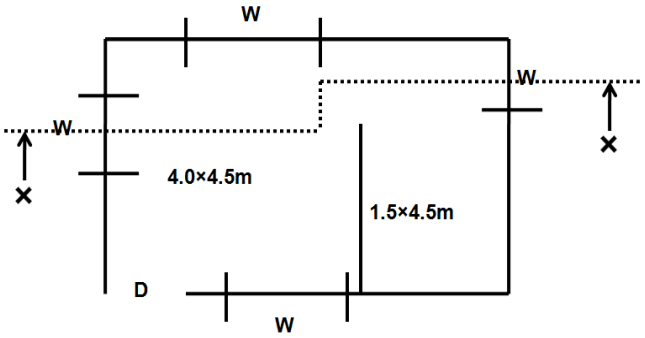


Fig.1

Cont…2

10. Draw plan, section and elevation for the given line diagram fig.2 15M

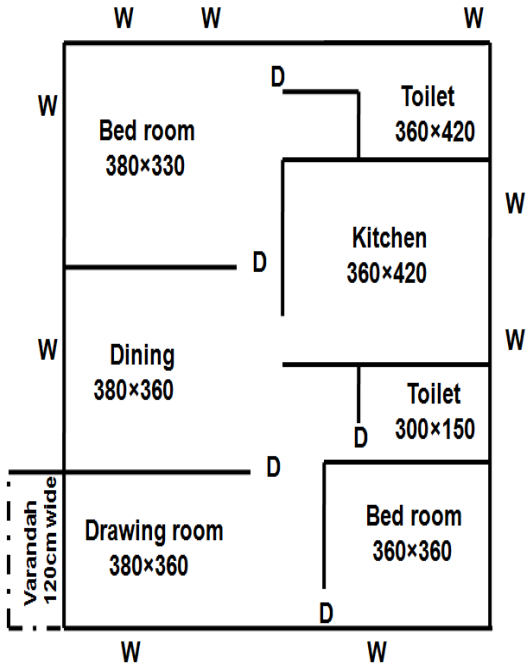


Fig.2

Follow standard dimensions for doors and windows.

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1511

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

DATABASE MANAGEMENT SYSTEMS

(Common to Computer Science and Engineering & Information Technology)

Date : 30 December, 2013 **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 - I

1. a) Explain the advantages of DBMS over a file system? 5M
   b) Consider a Company database which keeps track of Company's Employees Departments and Projects. Projects are controlled by Departments. An employee is assigned to one Department but may work on several Projects. Each department is managed by an Employee. An Employee may have dependents. An employee is supervised by another employee. The number of hours an employee works on a project is also tracked. Draw an ER model for the given company database. Specify the key attributes of each entity type and the structural constraints on each relationship type? 10M
2. a) Explain the Database system structure with a neat diagram? 10M
   b) Explain the role of a Database administrator (DBA)? 5M

Unit - II

3. a) Discuss super key, minimal super-key , candidate key and primary key in relational model with example? 7M
   b) Consider the following database and answer the given queries using relational algebra: 8M
      item (itemid, itemname, price,)
      store (warehouseid, itemid, qty)
      warehouse (warehouseid, wname, waddress, city, supervisorid)
      supervisor (supervirsorid, sname, address, phno)
      i. Find the address of supervisor whose name is shyam and phone number is 9999999999?
      ii. Display the details of warehouse supervised by Harish?
      iii. Display the details of items which are stored in warehouses located at Bangalore?
      iv. Find the details of item which are stored at more than 3 warehouses?
4. a) Discuss possible violation for various integrity constraints during all update operations? 7M
   b) Refer the database given in Q-3(a) and answer the given queries using SQL: 8M
      i. Display warehouse name and names of the items stored in that warehouse?
      ii. Display the name of cheapest item?
      iii. Display the details of warehouse whose supervisor belongs to Delhi?
      iv. Find the address of warehouse which has more than 100 pieces of more than 2 items?

Unit - III

5. a) Define Normalization, 1NF, 2NF, 3NF and explain with suitable examples? 6M
   b) List Armstrong's Axioms and Prove that these axioms are sound and complete for FD inference? 9M
6. a) What is Join Dependencies .How is the concept of Join Dependencies related to 5NF? 9M
   b) Consider the relation schema *R(A,B,C)*, which has the FD $B \rightarrow C$. If *A* is a candidate key for *R*, is it possible for *R* to be in BCNF? If so, under what conditions? 6M

Cont…2

Unit - IV

7.	a)	Explain the two-phase locking protocol. What are some variations of two-phase locking protocol used to overcome deadlock and starvation?	10M
	b)	Explain briefly Log-based recovery?	5M
8.	a)	What are desirable properties of a transaction?	5M
	b)	What are Timestamps? Write the Timestamp ordering Algorithm for Concurrency algorithm?	10M

Unit - V

9.	a)	List the different levels of RAID technology and explain its features?	5M
	b)	Mention the purpose of indexing. How this can be done by B+ tree? Explain?	10M
10.	a)	What is the role of the buffer manager and disk space manager in a DBMS?	5M
	b)	What is the difference between a clustered index and an un clustered index? If an index contains data records as 'data entries,' can it be un clustered?	5M
	c)	What alternatives are available for the data entries in an index?	5M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1013

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B.ech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Electronics and Communication Engineering)

Date : 30 December, 2013 **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 – I

1. "Managerial economics bridges the gap between economic theories and business practice". Discuss. 15M
2. Following a price change for Diet Coke, explain how retailers use sales information to learn if Lays snack chips represent a complement or substitute for Diet Coke. 15M

Unit – II

3. The Cost curves faced by a firm are of U shape in nature. What are the basic reasons behind it? 15M
4. Define Iso-quants. Explain the features of Iso-quants with suitable diagrams. 15M

Unit – III

5. Write a short note on: 15M
   i. Perfect competition
   ii. Monopolistic competition
   iii. Monopoly competition
6. What are the different methods of pricing strategies a company will follow to sell its product in the market? 15M

Unit – IV

7. To start a business what are the different methods and sources of rising finance 15M
8. XYZ LTD wants to install a new machine in the place of an existing old one which has become absolute. The company short listed two offers. The two models differ in cost, output and anticipated net revenue. The estimated life of both the machines is 5 years. There will be only negligible salvage value at the end of 5 years. Further details are given below: 15M

	A	B
Cost of the machine	25,00,000	40,00,000

Anticipated cash inflow after tax:

Year	Machine A	Machine B
1	Nil	9,00,000
2	6,00,000	16,00,000
3	18,00,000	15,00,000
4	12,00,000	17,00,000
5	8,00,000	9,00,000

The companies cost of capital is 16% you are required to make an appraisal of the two offers and advise the firm by using the following payback period (PBP) and NPV methods.
Present value of Re. 1 @16%

Year	1	2	3	4	5
PV @16%	0.862	0.743	0.641	0.522	0.476

Cont…2

Unit – V

9. From the following trial balance of Mr. Vinay, prepare Trading and Profit and Loss Account for the year ended 31st March 2012and Balance Sheet as on that date after taking into account the adjustments given below. 15M

Trial Balance as on 31st March 2012		
	Debit	**Credit**
Vinay's Capital		29,000
vinay's Drawings	760	
Purchases and Sales	8,900	15,000
Sales Returns and Purchases Returns	280	450
Stock 01-04-2011	1,200	
wages	800	
Buildings	22,000	
Freight and Carriage	2,000	
Trade expenses	200	
Advertisement	240	
Interest		350
Tax and Insurance	130	
Debtors and Creditors	6,500	1,200
Bills Receivable and Bills Payable	1,500	700
Cash at Bank	1,200	
Cash in hand	190	
Salaries	800	
Total	**46,700**	**46,700**

Adjustments:

i. Stock on 31st March 2012 was valued at Rs.1,500.
ii. Insurance was prepaid to the extent of Rs 40.
iii. Outstanding Liabilities were Salaries Rs.200 and taxes Rs.130.
iv. Depreciate buildings at 2%

10. The following Balance Sheet of a Company as on 31st March 2011 15M

Liabilities	Rs.	Assets	Rs.
Equity Shares	40,00,000	Land and building	40,00,000
Reserves and surplus	20,00,000	Plant and Machinery	40,00,000
Debentures	30,00,000	Investmetns	30,00,000
Long term loans	50,00,000	Stock	25,00,000
Creditors	8,00,000	Debtors	15,00,000
Other Current Liabilites	12,00,000	Other Current assets	10,00,000
	1,50,00,000		1,50,00,000

Calculate:

i. Current ratio
ii. Stock to working ratio
iii. Debt equity ratio
iv. Net worth ratio/ proprietor ratio
v. Fixed asset to net worth ratio
vi. Current assets to net worth ratio
vii. Solvency ratio

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1209

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

POWER SYSTEM GENERATION

(Electrical and Electronics Engineering)

Date : 30 December, 2013 **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 - I

1. a) Explain the factors to be considered while selecting the site for a hydel power station. 10M
   b) Give the differences between Kaplan and Francis turbines. 5M
2. a) Explain the working principle of a hydro-electric turbine. 8M
   b) A river based hydel plant has its capacity as "firm capacity" when it operates at the peak part of the load curve, the load factor here being 20%. If the rated installed capacity of the generator, head and plant efficiency are 10 MW, 60 m and 0.75 respectively, calculate the minimum flow of river water in order to operate the plant at the base of the load curve. 7M

Unit - II

3. a) Draw the line diagram of Thermal power station with neat sketch and the functions of different components, 8M
   b) Discuss the coal handling methods in modern thermal power stations. 7M
4. a) Explain the following: 8M
      i. Boiler
      ii. Super heater
      iii. Economizer
      iv. Air preheater
   b) What are the advantages and disadvantages of thermal power plant? 7M

Unit - III

5. a) Explain with a simple block diagram the working of a nuclear power station. 7M
   b) List the advantages and disadvantages of 8M
      i. Boiling water reactor, and
      ii. Pressurized water reactor
6. a) With the help of a schematic diagram explain the principle of power generation using gas turbines. 8M
   b) Explain briefly the working of a fast breeder reactor. What are its advantages and disadvantages? 7M

Unit - IV

7. a) Based on the design and configuration, describe the various types of substations. Give the advantages and disadvantages of outdoor substations as compared to indoor substations. 7M
   b) Explain briefly about SF_6 gas insulated substation. Also mention its merits and demerits. 8M
8. a) Describe the following terms related to substations: 8M
      i. Bus bars
      ii. Circuit breakers,
      iii. Current transformers, and
      iv. Surge arrestors
   b) Mention the different types of bus bar arrangements. Draw the single line diagram of a "single bus with sectionalized scheme" and list its advantages and disadvantages. 7 M

Unit - V

9. a) What are the aspects to be considered while deciding the tariff structure? 5M

   b) A consumer has the following load per annum: 10 MVA for 1800 hours, 6 MVA for 600 hours and 0.25 MVA for 400 hours. To meet this load he has the following choice of 10 MVA, 0.8 p.f. lagging transformer 10M

Particulars	A	B
Full load efficiency (%)	98.3	98.3
Core loss at rated voltage (kW)	70	40
Price (Rs. x 1000)	250	280

   If interest and depreciation charges work out to 10% of capital cost and energy costs 3 paisa per unit. The find which alternative is cheaper for him to adopt and by how much.

10. a) Define power factor? What are the causes of low power factor, and what are the advantages of improving the power factor? 7M

    b) A factory has induction motor and has a maximum demand of 800 kW at 0.707 p.f. lag. The consumer is charged at the rate of Rs. 80 per kVA of the maximum demand. The increase in load has been met with by installing a synchronous motor of 200 h.p. and efficiency of 99%. If the synchronous motor works at full load and a power 0.9 leading. Then calculate the difference in annual fixed charges of the consumer. 8M

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1014

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

PROBABILITY AND STATISTICS

(Mechanical Engineering)

Date : 30 December, 2013 **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 - I

1. a) Three urns contains 6 red, 4 black; 4 red, 6 black; 5red, 5 black balls respectively. One of the urn is selected at random and a ball is drawn from it. If the ball drawn is red find the probability that it is drawn from the first urn. 8M

   b) If A tells the truth 4 out of 5 times and B tells the truth 3 out of 4 times. What is the probability that both expressing the same fact contradict to each other? 7M

2. a) The diameter of an electric cable x is a continuous random variable with Probability Density Function. 7M

$$f(x)=\begin{cases} kx(1-x) & if\ 0\le x\le 1 \\ 0 & else\ where \end{cases}$$

   Find
   i. The value of k
   ii. The cumulative distribution function of x

   b) In a school 25% of the students failed in first language, 15% of the students failed in second language and 10% of the students failed in both. If a student is selected at random find the probability that 8M
   i. He failed in first language if he had failed in second language
   ii. He failed in second language if he had failed in the first language
   iii. He failed in either of the two languages

Unit - II

3. a) A manufacture of envelopes, knows that the weight of the envelopes is normally distributed with mean 1.9gm and variance 0.01gm. Find how man envelopes weighing 8M
   i. 2gm or more
   ii. 2.1gm or more
   Can be expected in a given packet of 1000 envelopes?

   b) Fit a Poisson distribution for the following distribution 7M

x	0	1	2	3	4	5	Total
f	142	156	69	27	5	1	400

4. a) The weights of 1500 ball bearings are normally distributed with a mean of 635 gms and S.D. of 1.36gms. If 300 random samples of size 36 are drawn from this population, determine the expected mean and S.D of the same sampling distribution of means if sampling is done 7M
   i. With replacement
   ii. Without replacement

   b) The number of personal computers sold daily at computer world is uniformly distributed with a minimum of 2000 pcs and a maximum of 5000 pcs. 8M
   i. Find the probability that the daily sales will fall between 2500 and 3000 pcs.
   ii. What is the probability that computer world will sell at least 4000 pcs?
   iii. What is the probability that computer world will exactly sell 2500pcs?

Cont…2

Unit - III

5. a) A cubical die is thrown 9000 times and a throw of 3064 is observed 3240 times. Show that the die cannot be regarded as an unbiased one. 7M
   b) In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the sample have been drawn from the sample population with S.D 4? 8M
6. a) A salesman in a departmental store claims that at most 60 percent of the shoppers entering the store leave without making a purchase. A random sample of 50 shoppers showed that 35 of them left without making a purchase. Are these sample results consistent with the claim of the salesman use 0.05 level of significance? 7M
   b) A manufacturer claimed that at least 98% of the steel pipes which he supplied to a factory conformed to specifications. An examination of a sample of 500 pipes of pipes revealed that 30 were defective. Test his claim at a significance level of 0.05. 8M

Unit - IV

7. a) The following data represent the biological values of protein from cow's milk and buffalo's milk at a certain level 8M

Cow's milk	1.82	2.02	1.88	1.61	1.81	1.54
Buffalo's milk	2.00	1.83	1.86	2.03	2.19	1.88

   Examine the average values of protein in the two samples significantly differ.
   b) Two samples of sizes 9 and 8 gave the sums of squares of deviations from their respective means equal to 160 and 91 respectively. Can they be regarded as drawn from the same normal population? 7M
8. Measurements on the length of a copper wire were taken in 2 experiments A and B as under 15M

   A's measurements (mm): 12.29, 12.25, 11.86, 12.13, 12.44, 12.78, 12.77, 11.90, 12.47
   B's measurements (mm) : 12.39, 12.46, 12.34, 12.22, 11.98, 12.46, 12.23, 12.06.
   Test whether B's measurements are more accurate than A's. (The readings in both the cases are unbiased)

Unit - V

9. a) Define the following terms 6M
      i. Queue
      ii. Waiting time
      iii. Service Discipline
   b) A self service store employs one cashier at its counter. Nine customers arrive on an average every 5 min while the cashier can serve 10 customers in 5 min. assuming Poisson distribution for arrival rate and exponential distribution for service rate, find 9M
      i. Average number of customers in the system
      ii. Average number of customers in queue
      iii. Waiting time in the system
      iv. Waiting time in the queue
10. Arrival rate of telephone calls at a telephone booth are according to Poisson distribution, with an average time of 9 min between two consecutive arrivals. The length of telephone call is assumed to be exponentially distributed with a mean of 3 min. Determine 15M
    i. The probability that a person arriving in the booth will have to wait.
    ii. Find the average queue length
    iii. The telephone company will install a second booth when convinced that an arrival will have to wait at least for four min for the phone. Find the increase in the flow of arrivals which will justify a second booth.
    iv. What is the probability that he will have to wait for more than 10 min before the phone is available and the call is also complete.

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1708

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

MECHANISMS AND MECHANICAL DESIGN

(Aeronautical Engineering)

Date : 30 December, 2013 **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 - I

1. a) With sketches classify Kinematic pairs. 10M
   b) Define the following 5M
      i. Binary link
      ii. Degrees of freedom
      iii. Structure
      iv. Inversion of mechanism
      v. Mechanical advantage
2. With sketches, write a note on inversions of a single and double slider crank chain. 15M

Unit - II

3. A 4 bar mechanism ABCD is made up of 4 links pin jointed at the ends . AD is a fixed link which is 180 mm long. The link AB, BC and CD are 90 mm, 120 mm and 120 mm. At certain instant link AB makes an angle of 60 ^{o} with the link AD. If the link AB rotates at uniform speed of 100 rpm clockwise, determine the following 15M
   i. Angular velocity of links BC and CD
   ii. Angular acceleration of links BC and CD
4. In a 4 bar mechanism, the link AB rotates at 36rad/s. The length of the links are AB=200mm, BC=400mm, CD=450mm and AD=600mm. AD is the frame. At the instant the crank is at right angles to AD find 15M
   i. Velocity of the midpoint of BC and a point on CD, 100mm from the pin connecting the links CD and AD
   ii. Angular acceleration of BC and CD

Unit - III

5. a) What is three centers in line theorem? Explain. 5M
   b) For 4 bar mechanism shown in fig.1, determine angular velocity of link AB and absolute velocity of point B by instantaneous center method. Also locate all the centers. 10M

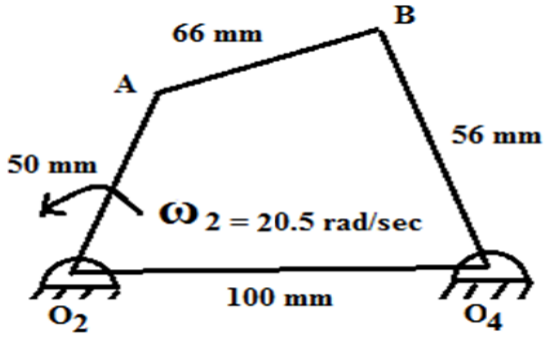


Fig.1

Cont…2

6. a) Derive an expression for effect of gyroscopic couple and centrifugal couple of stability of two wheel vehicle taking a turn. 8M

   b) The rotor of a ship has a mass of 2500kg and the radius of gyration of 0.4m rotates at a speed of 3200rpm counter clockwise when viewed from the stern. Find the gyro couple and its effect when 7M
      i. Ship steers left at a radius of 80m and speed of 7.75m/s
      ii. Ship pitches with bow rising at an angular velocity of 0.8rad/s.

Unit - IV

7. Draw the profile of a cam operating a knife edge follower and with the following data: 15M
   Minimum radius of the cam = 20mm Lift = 30mm
   The cam lifts the follower for 120^o with uniform acceleration and deceleration followed by a dwell period of 30^o. Then the follower lowers down during 120^o of the cam rotation with SHM followed by a dwell period.

8. In a symmetrical tangent cam operating a roller follower, the least radius of cam is 30 mm and roller radius is 17.5 mm. The angle of ascent is 75^o and the total lift is 17.5 mm. The speed of the cam shaft is 600 rpm. Calculate 15M
   i. The principal dimensions of cam
   ii. Acceleration of follower at the beginning of the lift, where straight flank merges into the circular nose and the apex of the circular nose and at the apex of the circular nose.
   Assume that no dwell between ascent and descent.

Unit - V

9. a) With a neat sketch locate the following on a spur gear 10M
      i. Addendum Circle
      ii. Dedendum Circle
      iii. Pirch circle
      iv. Clearance
      v. Working Depth

   b) A belt drive transmits 8kW of power from a shaft rotating at 240 rpm to another at 160rpm. The belt is 8mm thick. The diameter of the smaller pulley is 600mm and the two shafts are 5m apart. The coefficient of friction is 0.25. If the maximum stress in the belt is limited to 3Mpa, find the width of the belt for an open belt drive. 5M

10. a) Briefly explain train value of reverted and epicyclic gear trains. 5M

    b) An epicyclic gear train consists of a sun wheel (S), a stationary internal gear (E) and three identical planet wheels (P) carried on a star shaped planet carrier (C). The size of different toothed wheels are such that planet carrier C rotates at 1/5 times of the speed of sun wheel. The minimum number of teeth on any wheel is 16. The driving torque on sunwheel is 100 Nm. Determine 10M
       i. Number of teeth on different wheels of train
       ii. Torque necessary to keep internal gear stationary

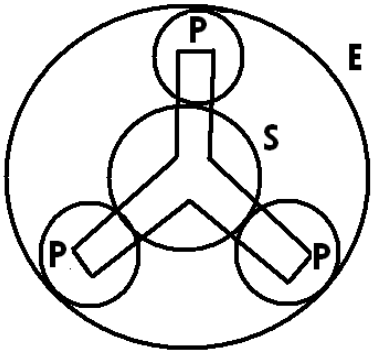


fig.2

Hall Ticket No | | | | | | | | | | |

Question Paper Code : A1111

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

SURVEYING - II

(Civil Engineering)

Date : 30 December, 2013 **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 – I

1. a) Explain the differences between a prismatic compass and a surveyor compass. 7M
   b) Following are the bearings taken in a closed compass traverse. 8M

Line	F.B.	B.B.
AB	S37^{0}30'E	N37^{0}30'W
BC	S43^{0}15'W	N44^{0}15'E
CD	N73^{0}00'W	S72^{0}15'E
DE	N12^{0}45'E	S13^{0}15'W
EA	N60^{0}00'E	S59^{0}00'W

2. a) Differentiate between 7M
      i. Closed and open traverses
      ii. Whole circle bearing and quadrant bearing.
   b) What are the sources of errors in compass survey and what precautions will you take to eliminate them? 8M

Unit – II

3. a) What are the advantages and disadvantages of Plane table surveying? 8M
   b) What are the accessories of plane table surveying? 7M
4. a) What are the methods (systems) of plane tabling? 8M
   b) Explain the three point problem. 7M

Unit – III

5. a) Explain different systems of Tacheometric measurement. 8M
   b) What is anallactic lens? What are its advantages? 7M
6. A stadia Tacheometer is sighted upon a staff vertically upon a point A. The telescope is transmitted and a point marked in the line of sight and readings are taken on the staff held vertically at that point. Compute the horizontal distance from A to B and the difference of level between these points for the following observations. The constants of Tacheometer are 100 and 0. 15M

Staff point	Vertical Angle	Staff Reading in mts
A	-7^0 42'	1.290, 2.000, 2.700
B	+12^0 36'	1.000, 1.750. 2.500

Cont…2

Unit – IV

7. a) What are the various electronic data recording devices available? Compare their merits and demerits. 7M
   b) Discuss in detail the various GPS surveying techniques. 8M
8. a) What are the component subsystems of GIS? Describe them briefly. 7M
   b) Briefly describe the applications of GIS. Discuss how close GIS is related to remote sensing. 8M

Unit – V

9. With a neat sketch explain the following: 15M
   Back tangent, forward tangent, point of intersection, Point of curve, Point of tangency, intersection angle, deflection angle, tangent distance.
10. a) Define and give the expressions for the following elements of a "simple circular curve" 7M
      i. Length of the curve
      ii. Tangent length
      iii. Mid ordinate
    b) A compound curve, consisting of two simple circular curves of radii 350m and 500m, is to be laid out between two straights. The angle of intersection between the tangents and the two straights are 25^0 and 55^0. Calculate the various elements of compound curve. 8M