Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1509

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

COMPUTER ARCHITECTURE AND ORGANIZATION

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

Date: 26 May, 2014 **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) Convert the following pairs of decimal numbers to 5 bit, signed, 2's complement, binary numbers and add them. State whether or not overflow occurs in each case. 8M
   i. -14 and 11
   ii. -3 and -8
   iii. -10 and -13
   b) What do you understand by stacks and subroutines? Explain in brief? 7M
2. a) By using the required parity generator/checker circuit, explain how parity checking can be used for the error detection. 7M
   b) Convert the following binary number into decimal & octal number: 8M
   i. $(00010.110)_2$
   ii. $(000.10110)_2$

Unit - II

3. a) Define addressing modes? Explain all the addressing modes with an example? 8M
   b) With an example of each, explain memory reference instructions? 7M
4. a) With a neat block diagram, explain how the basic computer registers are connected to the common bus? 7M
   b) With a neat diagram, explain the instruction pipeline processing in RISC architecture? 8M

Unit – III

5. a) What is Micro programming? Give an example for Micro programming? 7M
   b) Differentiate between hardwired & micro-programmed Computers? 8M
6. a) Perform the following: 7M
   i. $(110.101)_2 = (\ )_{10}$
   ii. $(1.10101)_2 = (\ )_{10}$
   iii. $(11010.1)_2 = (\ )_{10}$
   iv. 110.10 x 10.1
   b) Perform the long hand binary division for the given binary number 8M
   Divisor is 1111 and Dividend = 1100

Cont...2

Unit - IV

7.	a)	Draw the block diagram of a DMA controller and explain its functioning?	6M
	b)	Explain the organization of a 2M X 32 memory module using 512k X 8 static memory chips?	9M
8.	a)	Consider the page reference string 2 3 2 1 5 2 4 5 3 2 5 2. Find the number of page faults using the page replacement algorithms: i. Optimal ii. FIFO iii. LRU Assume that the number of frames available in the memory is 3.	10M
	b)	Consider the impact of the cache on overall performance of the computer. What is the average access time experienced by the processor with the hit rate and miss penalty?	5M

Unit – V

9.	a)	Describe the architecture of a shared memory multiprocessor?	7M
	b)	Draw and explain the 8x8 omega switch network?	8M
10.	a)	What do you mean by cache coherence? Mention the conditions under which cache coherence occurs. Explain, how cache coherence problem can be resolved by a snoopy cache controller?	7M
	b)	Define IPC? Mention the IPC methods. Explain any two methods in detail?	8M

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

Question Paper Code : A1215

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

ELECTRICAL TECHNOLOGY

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

Date: 26 May, 2014 **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) How D.C Generators are classified? Give neat diagram of each type of generator. 8M
   b) A DC Shunt generator with armature and shunt field resistance of 0.5Ω and 100Ω respectively has no load voltage of 300V. What is the power delivered to the load when the load current is 10A? Allow brush drop of 2V on load. 7M
2. a) Sketch speed, armature current and torque, armature current characteristics of 8M
      i. D.C series motor and
      ii. D.C shunt motor. Mention two applications of each motor.
   b) A shunt motor connected to 440V, takes 3A on no load. If shunt and armature field resistance is 600Ω and 0.5Ω respectively, rated speed being 1000 rpm, calculate the speed when taking a load current of 30A from the line. 7M

Unit - II

3. a) A single phase 50Hz transformer has 80 turns on the primary winding and 280 turns in the secondary winding. The voltage applied across the primary winding is 240 V. Calculate (i) the maximum flux density in the core (ii) induced e.m.f in the secondary winding. The net cross sectional area of the core can be taken $200cm^2$ 8M
   b) Draw the phasor diagram of transformer when it is operating on lagging load. 7M
4. a) A 200/100V, 50Hz, transformer has an impedance of (0.3+j0.8) Ω in the 200V winding and impedance of (0.1+j0.25) Ω in the 100V winding. What are the currents on the high and low voltages sides if a short circuit occurs on the 100V side with 200V applied to the HV side? 8M
   b) Derive the equation of e.m.f for a transformer. 7M

Unit - III

5. a) Explain the principle of operation of 3 phase induction motors. Also define synchronous speed and slip. 8M
   b) An alternator of 8 poles runs at 750 rpm, and supplies power to a 6 pole induction motor which has full load slip of 3%. Find the full load speed of induction motor and the frequency of its rotor e.m.f. 7M
6. a) Explain the working principle of star delta starter with a schematic diagram. 8M
   b) A 3 phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate i) synchronous speed ii) rotor speed when slip is 4% and iii) rotor frequency when rotor runs at 600 rpm 7M

Cont...2.

Unit - IV

7. a) Explain how do you find the regulation of an alternator by synchronous impedance method. 8M

   b) A 12 pole, 500 rpm, star connected alternator has 60 slots with 20 conductors per slot. The flux per pole is 0.02 Wb and is distributed sinusoidally. The winding factor is 0.93. Calculate 7M
      i. Frequency.
      ii. Phase e.m.f
      iii. Line e.m.f

8. a) Explain the construction and principle of operation of synchronous motor. 8M

   b) A 3 ph, 400V synchronous motor takes 52.5 A at a pf of 0.8 leading Calculate the power supplied and the induced e.m.f The motor impedance per phase is (0.25+j0.32) Ω 7M

Unit –V

9. a) What is a servomotor? Explain 2 phase and 3 phase AC servomotor. 8M

   b) A stepper motor has a step angle of 2.5^0. Determine 7M
      i. Resolution.
      ii. Number of steps required for the shaft to make 25 revolutions.
      iii. Shaft speed if the stepping frequency is 3600 rps.

10. a) With a neat figure explain the operation of a shaded pole motor. 8M

    b) Discuss the sped- torque characteristics of capacitor start motor and capacitor run motor. 7M

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

Question Paper Code : A1508

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

OPERATING SYSTEMS

(Common Computer Science and Engineering & Information Technology)

Date: 28 May, 2014 **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 is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose? 8M

   b) What is a process? Explain the various states of the process. Explain process control block in detail. 7M

2. a) Explain in detail the data structure of a Unix thread with diagram 7M

   b) Consider the following set of processes, with the length of the CPU burst given in milliseconds: 8M

Process	Burst Time	Priority
P1	8	4
P2	6	1
P3	1	2
P4	9	2
P5	3	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5 all at time 0.

i. Draw the Gantt Charts that illustrate the execution of these processes using the following scheduling algorithms: Non preemptive Priority (a smaller priority number implies a higher priority) and RR (Quantum = 1).

ii. Calculate the Average Waiting time and Average Turnaround Time in both the algorithms.

Unit - II

3. a) The first known correct software solution to the critical-section problem for two processes was developed by Dekker. The two processes, Pa and Pi, share the following variables: 10M

boolean flag[2]; /* initially false */
int turn;
The structure of process P; (i == 0 or 1) is shown in below; the other process is P,- (j == 1 or 0). Prove that the algorithm satisfies all three requirements for the critical-section problem.

Cont...2

```
do
{
    flag[i] = TRUE;
    while (flag[j] )
    {
        if (turn == j)
        {
            flag [i] = false;
            while (turn == j)
                ; // do nothing
            Flag[i] = TRUE;
            // critical section
             turn = j;
        }
        flag[i] = FALSE;
        // remainder section
    }
}while (TRUE);
```

b) Explain the two methods to eliminate deadlocks by aborting a process 5M

4. a) Consider the following snapshot of a system 10M

Process	*Allocation*				*Max*				*Available*			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the banker's algorithm:

i. What is the content of the matrix Need?
ii. Is the system in a safe state?
iii. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

b) Explain how recovery from deadlocks is done using Banker's Algorithm 5M

Unit - III

5. a) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)?Which algorithm makes the most efficient use of memory? 8M

b) The in-memory information is used for both file-system management and performance improvement via caching. The data are loaded at mount time and discarded at dismount. Explain the contents of in-memory structure. 7M

6. a) When considering a particular directory structure, we need to keep in mind different operations that are to be performed on a directory. Explain any four of them. 8M

b) Discuss situations under which the least frequently used page-replacement algorithm generates fewer page faults than the least recently used page replacement algorithm. Also discuss under what circumstance does the opposite holds? 7M

Cont...3

Unit - IV

7. a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 12M
   86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130
   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

   b) Give two examples each for which blocking I/O is suitable and non-blocking I/O is suitable. 3M

8. a) Explain the three most important aspects of tertiary-storage performance. 8M

   b) What are the various kinds of performance overheads associated with servicing an interrupt? 7M

Unit - V

9. a) Discuss the strengths and weaknesses of implementing an access matrix using access lists that are associated with objects. 7M

   b) Make a list of six security concerns for a bank's computer system. For each item on your list, state whether this concern relates to physical, human, operating-system and software security. 8M

10. a) What hardware features are needed for efficient capability manipulation? Can these be used for memory protection? 8M

    b) Discuss by means of manager of a system that connected to the Internet could have designed their systems to limit or eliminate the damage done by a worm. What are the drawbacks of making the change that you suggest? 7M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1410**

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Date: 28 May, 2014 **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) Point charges 1mc and -2mc are located at (3, 2, -1) and (-1,-1,4) respectively. Calculate the electric force on a 10nc charge located at (0, 3, 1) and the electric field intensity at that Point. 8M

   b) If $\vec{J} = \frac{1}{r^3}\left(2\cos\theta a_r + \sin\theta a_\theta\right) A/m^2$ Calculate the current Passing through 7M

   i. A Hemi Sphere shell of radius 20 cm, $0 < \theta < \frac{\pi}{2}; 0 < \phi < 2\pi$

   ii. A spherical shell of radius 10cm

2. a) Determine the electric field intensity due to infinite sheet of charge using Gauss's Law. 6M

   b) Conducting Spherical shells with radii a=10cm and b=30cm are maintained at potential difference of 100V such that V(r=b)=0 and V(r=a)=100v. Determine V and E in the region between the shells if $\varepsilon_r = 2.5$ 9M

Unit - II

3. a) Determine the magnetic field intensity at point P due to straight filamentary conductor of finite length. 6M

   b) Given the magnetic vector Potential $\vec{A} = \frac{\rho^2}{4} a_z$ Wb/m, calculate the total magnetic flux crossing the surface $\phi = \frac{\pi}{2}, 1 \le \rho \le 2m, 0 \le z \le 5m$ 9M

4. a) A circular loop located on $x^2 + y^2 = 9;\ z = 0$ carries a direct current of 10A along a_ϕ. Determine $\vec{H}$ at (0,0,4) and (0,0,-4). 8M

   b) In cylindrical Coordinates a magnetic field is given as $\vec{H} = \left[4\rho - 2\rho^2\right] a_\phi$ (A/m), $0 \le \rho \le 1$. 7M

   i. Find the current density as a function of ρ within the cylinder

   ii. Find the total current that passes through the surface z=0 and $0 \le \rho \le 1$(m) in the a_z direction

Cont...2

Unit - III

5. a) State Maxwell's equation in differential and integral form for time varying field. 6M

   b) The electric and magnetic field in frees space are given by 9M

   $E = \frac{50}{\rho}\cos\left[10^6 t + \beta z\right] a_\phi \; V/m$

   $H = \frac{H_0}{\rho}\cos\left[10^6 t + \beta z\right] a_\rho \; A/m$ Express these in phasor form and determine the constants H_0 and β such that the fields satisfy Maxwell's equation.

6. a) What is the significance of boundary conditions? Also derive an expression for the law of refraction for magnetic flux lines at a boundary with no surface current. 7M

   b) Given that $H_1 = -2a_x + 6a_y + 4a_z \; A/m$ in region $y - x - 2 \le 0$ where $\mu_1 = 5\mu_0$ calculate B_1, H_2 and B_2 in region $y - x - 2 \ge 0$ where $\mu_2 = 2\mu_0$. 8M

Unit - IV

7. a) State and prove Poynting's theorem. 9M

   b) A uniform plane wave propagating in a perfect dielectric medium has $\boldsymbol{E} = 500\cos(10^7 t - \beta z)\, a_x$(v/m) and $\boldsymbol{H} = 1.1\cos(10^7 t - \beta z)\, a_y$(A/m). If the wave is travelling with velocity u = 0.5c. Find ϵ_r, μ_r and intrinsic impedance of medium η 6M

8. a) Derive the expression for reflection coefficient when an electromagnetic wave is incident normally on to the surface of a perfect dielectric in terms of η_1 and η_2 7M

   b) Given a uniform plane wave in air as 8M

   $E_i = 40\cos(\omega t - \beta z)\, a_x + 30\sin(\omega t - \beta z)\, a_y \; V/m$ find H_i

   i. If the wave encounters a perfectly conducting plate normal to the z axis at z=0, find the reflected wave E_r and H_r.

   ii. What are the total E and H fields for $z \le 0$?

   iii. Calculate the time – average Poynting vectors for $z \le 0$ and $z \ge 0$

Unit - V

9. a) Derive the general solution for voltage and current at any point on a transmission line in terms of sending end voltage and sending end currents. 9M

   b) A certain transmission line 2m long operating at $\omega = 10^6$ rad/s has $\alpha = 8$ dB/m, $\beta = 1$ rad/m, and $Z_0 = 60 + j40\Omega$. If the line is connected to a source of $10\angle 0^0 V$, $Z_t = 40\Omega$ and terminated by a load of $20 + j50\Omega$, determine: 6M

   i. The input impedance

   ii. The sending – end current

   iii. The current at the middle of the line

10. a) What is the condition for transmission line to be lossless? Derive the expression for attenuation constant, phase constant and characteristic impedance for a lossless transmission line. 6M

    b) A distortionless line has $z_0 = 60\Omega$, $\alpha = 20mNp/m$ $u = 0.6c$. Where 'c' is the speed of the light in vacuum. Find R, L, C, G and λ at 100MHz. 9M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1211

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

ELECTRO MAGNETIC FIELDS

(Electrical and Electronics Engineering)

Date: 28 May, 2014 **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 an expression for the potential at a point due to an infinite uniformly charged line. 7M

   b) Let a point charge Q_1 of 25 nC be located at $p_1(4,-2,7)$ and a charge $Q_2 = 60$ nC be at $p_2(-3,4,-2)$. If $\varepsilon = \varepsilon_0$, find E at $p_3(1,2,3)$. 8M

2. a) Explain the torque on an electric dipole in an electric field 8M

   b) Point charges of $50nC$ each are located at $A(1,0,0)$, $B(-1,0,0)$, $C(0,1,0)$, and $D(0,-1,0)$ in free space. Find the total force on the charge at *A*. 7M

Unit – II

3. a) State and explain Ampere's circuital law. 7M

   b) The magnetic field intensity is given in a certain region of space as $H = (X+2y)/z^2 a_y + 2/z a_z A/m$. Find the total current passing through the surface $z = 4, 1 < x < 2, 3 < y < 5$, in the a_z direction. 8M

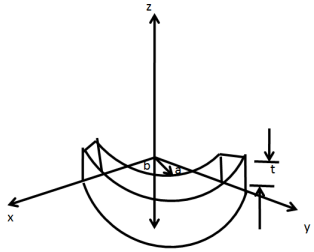
4. a) Obtain an expression for magnetic field intensity at a point due to an infinite sheet of current. 7M

   b) Mention the applications of Ampere's circuital law. A long straight non-magnetic conductor of 0.2 mm radius carries a uniformly-distributed current of 2 A dc.Use Ampere's circuital law to find H and B within the conductor, at radius ρ. 8M

Unit - III

5. a) A spherical condenser has a capacitance of 54pF. It consists of two concentric spheres differing in radii by 4cm and having air as dielectric. Find their radii. 6M

   b) A metal bar of conductivity σ is bent to from a flat 90^0 sector of inner radius a, outer radius b and thickness t as shown in figure. Determine the resistance of the bar between the vertical curved surfaces at $\rho = a$ and $\rho = b$. 9M



6. a) Obtain the boundary condition for electric field for conductor and dielectric boundary. 9M

   b) Determine the self-inductance of a coaxial cable of inner radius a and outer radius b. 6M

Cont...2

Unit - IV

7. a) Explain the concept of scalar and vector magnetic potential. 7M

   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 6 mA, flowing in the $a_z$direction from B to C. A filamentary current of 15 A flows along the entire z axis in the a_z direction. Find F on side BC. 8M

8. a) Briefly explain Lorentz force equation. 8M

   b) A small current loop L1 with magnetic moment $5a_z$ A.m^2 is located at the origin while another small loop current L2 with magnetic moment $3i_z$ A.m^2 is located at (4,-3,10). Determine the torque on L2 7M

Unit - V

9. a) Derive Maxwell's equation from Faraday's law. Also write Maxwell's equations for a general medium for time varying fields in differential and integral forms. 7M

   b) If the electric field intensity in free space is given in the rectangular co-ordinates $\vec{E} = E_m \sin(\alpha x)\sin(\omega t - \beta z)a_y (v/m)$. Find the magnetic field intensity, $\vec{H}$ using Faraday's law. 8M

10. a) State and prove Poynting theorem. Write the expression for average power density by using Poynting theorem. 9M

    b) The conduction current through a wire with a conductivity, 10^7 (S/m) and relative permittivity, ε_r = 1 is given by $I_c = 2\sin(\omega t)mA$ If $f = \frac{10^9}{2\pi}$ Hz, find the displacement current. 6M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1314

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

HYDRALULIC MACHINERY AND SYSTEMS

(Mechanical Engineering)

Date: 28 May, 2014 **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 an expression for force exerted by jet on a flat vertical plate moving in the direction of jet. 8M
   b) A jet of water of diameter 50 mm moving with a velocity of 40 m/s, strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate. 7M
2. a) 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 30 m/s and leaves with a mean velocity of 25 m/s. If the discharge from the nozzle is 0.8 m^3/s, calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary. 8M
   b) The water in a jet propelled boat is drawn through inlet openings facing the direction of motion of the ship. The boat is moving in sea-water with a speed of 30 km/h. The absolute velocity of the jet of the water discharged at the back is 20 m/s and the area of the jet of water is 0.03 m^2. Find the propelling force and efficiency of propulsion. 7M

Unit - II

3. a) Define the following with respect to turbine. 8M
      i. Hydraulic efficiency
      ii. Mechanical efficiency
      iii. Volumetric efficiency
      iv. Overall efficiency
   b) Two jets strike the buckets of a Pelton wheel, which is having shaft power as 15450 kW. The diameter of each jet is given as 200 mm. If the net head on the turbine is 400 m, find the overall efficiency of the turbine. Take Cv = 1.0. 7M
4. a) Draw a neat sketch and explain the construction and working of any radial flow reaction turbine. 11M
   b) Explain the purposes of the 'draft tube'. 4M

Cont...2

Unit - III

5. a) Draw neat sketches and explain the characteristic curves of a Pelton wheel and a reaction turbine. 7M

   b) A pelton wheel is supplied with water under a head of 35m at the rate of 40.5 kilo liter/min. The bucket deflects the jet through an angle of 160^0 and the mean bucket speed is 13m/s. Calculate the power and hydraulic efficiency of the turbine. 8M

6. a) With the help of a neat sketch explain the working of a reciprocating pump 8M

   b) A single acting reciprocating pump running at 50 rpm delivers $0.01m^3$/sec of water. The diameter of the piston is 200mm and stroke length 400mm. Determine: 7M
      i. Theoretical discharge of the pump
      ii. Coefficient of discharge
      iii. Slip and the percentage of slip of the pump.

Unit - IV

7. a) Define the following terms 5M
      i. Suction head
      ii. Delivery head
      iii. Static head
      iv. Manometric head
      v. Manometric efficiency

   b) A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 rpm works against a total head of 40m. The velocity of flow through the impeller is constant and equal to 2.5m/s. The vanes are set back at an angle of 40^0 at outlet. If the outer diameter of the impeller is 500mm and width at outlet is 50mm, determine : 10M
      i. Vane angle at inlet
      ii. Work done by impeller on water per second
      iii. Manometric efficiency

8. a) Define *cavitation*. What are the effects of cavitation? 5M

   b) A single stage centrifugal pump with impeller diameter of 30 cm rotates at 2000 rpm and lifts 3 m^3 of water per second to a height of 30 m with an efficiency of 75%. Find the number of stages and diameter of each impeller of a similar multistage pump to lift 5 m^3 of water per second to a height of 200 m when rotating at 1500 rpm. 10M

Unit - V

9. a) Explain the term, 'Hydraulic devices'. Name any five hydraulic devices. 5M

   b) A hydraulic press has a ram of 150 mm diameter and plunger of 20 mm diameter. The stroke of the plunger is 200 mm and weight lifted is 800 N. If the distance moved by the weight is 0.1 m in 20 minutes, determine: 10M
      i. The force applied on the plunger
      ii. Power required to drive the plunger
      iii. Number of strokes performed by the plunger

10. a) Sketch and explain the working of a vane pump and write an equation for theoretical volume displacement by the pump per second. 8M

    b) With a neat sketch explain the working of an accumulator. 7M

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

Question Paper Code : A1704

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

AERODYNAMICS-I
(Aeronautical Engineering)

Date: 28 May, 2014 **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 center of pressure and aerodynamic center. Derive $M'_{LE} = -C/4\,L' + M'_{c/4} = -X_{cp}L'$ 10M

   b) With a neat sketch, differentiate between the symmetric and cambered airfoil. 5M

2. Derive the expression for C_n and C_a in terms of shear stress, normal pressure and slope at a point on the airfoil. 15M

Unit – II

3. Explain the following with relevant expressions and neat sketches: 15M
   i. Kelvin's circulation theorem
   ii. Vortex sheet
   iii. Kutta-Joukowski theorem and
   D' Alembert's paradox

4. a) Tabulate the velocity, ϕ and ψ expressions for: 10M
      i. Uniform flow in X-direction
      ii. Source
      iii. Vortex
      iv. Doublet

   b) Derive the continuity equation for a finite control volume fixed in space. 5M

Unit – III

5. a) Derive an expression for lift coefficient and moment coefficient of cambered airfoil. 10M
   b) Explain briefly about Kutta Condition. 5M

6. a) Explain thin airfoil theory. 10M
   b) Express the algebraic form of Kutta-Joukowski theorem and explain the parameters in the equation. 5M

Unit – IV

7. a) Derive the equation for prandtl lifting line theory 10M
   b) Write shortnotes on Horshoe vortex 5M

8. What is the downwash velocity induced by the pair of wingtip vortices along the bound vortex? Derive an expression for this using Biot-savarts law. 15M

Cont...2

Unit – V

9. For a lifting flow over arbitrary bodies obtain an expression for lift per unit span by vortex panel method 15M

10. Derive an expression for C_p at the i^{th} control point, $C_{p,i} = \left(1 - \frac{V_i}{V_\infty}\right)^2$ based on the source panel method for non – lifting flow over arbitrary bodies. 15M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1109

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

HYDRAULICS AND HYDRAULIC MACHINES

(Civil Engineering)

Date: 28 May, 2014 **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 stepwise procedure of Raleigh method of analysis. 6M
   b) The pressure drop Δp generated by a pump of a given geometry is known to depend upon the impeller diameter D, the rotational speed N, the fluid discharge Q, the fluid density ρ and viscosity μ. Obtain the dimensionless form of the functional relationship. 9M
2. a) For Froude model law, find the ratios of velocity, discharge, force, work and power in terms of the length scale. 10M
   b) A 1:6 scale model of a passenger car is tested in a wind tunnel. The prototype velocity is 60 km/h. If the model drag is 250 N what is the drag and the power required to overcome the drag in the prototype? The air in the model and prototype can be assumed to have the same properties. 5M

Unit - II

3. a) Show that the efficiency of a free jet striking normally at series of flat plates mounted on the periphery of a wheel never exceeds 50%. 7M
   b) A jet of water having a velocity of 45 m/s impinges without shock a series of vanes moving at 15 m/s, the direction of motion of the vanes being inclined at 20˚ 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
   (i) vane angles at the entrance and exit; (ii) work done on vanes per unit weight of water supplied by the jet; and (iii) the hydraulic efficiency 8M
4. a) Derive an expression for the work done by the jet striking symmetrical moving curved vane at the centre. 7M
   b) A metal plate of 10 mm thickness and 200 mm square is hung so that it can swing freely about the upper horizontal edge. A horizontal jet of water 20 mm diameter impinges with its axis perpendicular and 50 mm below the edge of the hinge, and keeps it steadily inclined at 30˚ to the vertical. Find the velocity of the jet if the specific weight of the metal is 75.54 kN/m^3. 8M

Unit - III

5. a) Prove that for the trapezoidal channel of most economical section: 8 M
   Half of top width = length of one of the slopping sides.
   Hydraulic mean depth = half of depth of flow.
   b) In a rectangular channel 3.5 m wide laid at a slope of 0.0036, uniform flow occurs at a depth of 2 m. Find how high can the hump be raised without causing afflux? If the upstream depth of flow is to be raised to 2.5 m, what should be the height of the hump? Take Manning's 'n' equal to 0.015. 7 M

Cont...2

6. a) Derive an expression for critical depth and critical velocity for flow of water in open channels. 8 M

   b) Find the slope of the free water surface in a rectangular channel of width 20 m, having depth of flow 5 m. The discharge through the channel is 50 m^3/s. The bed of the channel is having a slope of 1 in 4000. Take the value of chezy's constant C = 60. 7 M

Unit - IV

7. a) What do you mean by gross head and net head? Explain the different types of efficiency of a turbine. 7 M

   b) Show that the expression for the non-dimensional numbers specific speed, specific diameter, flow number and head number for Pelton wheel are functions of only the diameter ratio (d/D) where 'd' is the jet diameter and 'D' is Pelton wheel diameter. It is assumed that friction effect is neglected and 180° reversal of flow is achieved by the Pelton wheel buckets. 8 M

   Find out the values of the above dimensionless numbers if diameter ratio d/D is 0.2.
   Assume K_v =1 and K_u = 0.5.

8. a) Describe the following terms: 8 M
      i. Specific speed of a turbine,
      ii. Unit rate of flow of a turbine,
      iii. Cavitation, and
      iv. Governing of a turbine

   b) A Pelton wheel is supplied with water under a head of 35 m at the rate of 40.5 kilo litre/min. the bucket deflects the jet through an angle of 160° and the mean bucket speed is 13 m/s. Calculate the power and hydraulic efficiency of the turbine. 7 M

Unit - V

9. a) Draw a neat sketch and explain the main parts of a centrifugal pump. 8 M

   b) Find the power required to drive a centrifugal pump which delivers 40 liters of water per second to a height of 20 m through a 150 mm diameter and 100 m long pipeline. The overall efficiency of pump is 70% and Darcy's f = 0.06 for the pipeline. Assume inlet losses in suction pipe equal to 0.33 m. 7 M

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

    b) A pump operates at a maximum efficiency of 82% and delivers 2.25m^3/s under a head of 18 m while running at 3600 rpm speed. Compute the specific speed of the pump. Also determine the discharge 9 M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1510**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

THEORY OF COMPUTATION

(Computer Science and Engineering)

Date: 30 May, 2014 **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) Write any four differences between DFA and NFA and give the formal definition of NFA. 8M
   b) Design a DFA to accept the following language. 7M
   $L = \{w : |w| \bmod 3 = 0\} on \Sigma = \{a, b, c, d\}$
2. a) Convert the following NFA to DFA. 8M
   $A = (\{p, q, r\}, \{0,1\}, \delta, p, r)$
   δ is given as follows :-
   $\delta(p, 0) = \{p, q\}$ $\delta(p, 1) = \{p\}$
   $\delta(q, 0) = \phi$ $\delta(q, 1) = \{r\}$
   $\delta(r, 0) = \phi$ $\delta(r, 1) = \phi$
   b) Write the procedure to convert ε NFA to DFA and draw a NFA to recognize the set of strings abc, abd and aacd. 7M

Unit – II

3. a) Design a Regular Expression and construct a NFA which accepts strings of a's and b's starting with ab. 9M
   b) Write a note on applications of regular expressions. 6M
4. a) Give the meaning of the following regular expression: 8M
   aa*bb*cc*
   (a+b)* (a+bb)
   (aa)*(bb)*b
   (0+1)*000
   b) Show that if L is a regular language over alphabet Σ , then , L = Σ * – L is also regular language. 7M

Unit – III

5. a) Show that the following grammar is ambiguous with respect to the string aaabbabbba. 8M
   S→aB | bA
   A→aS| bAA| a
   B→bS | aBB | b
   b) Give formal definition of CFG and obtain a grammer to strings consisting of multiples of three a's. 7M
6. a) Define the following: 8M
   i. Sentence
   ii. Language of grammer
   iii. Ambiguous grammer
   iv. Derivation tree
   b) Obtain a grammer to genarete the language. 7M
   $L = \{0^m 1^m 2^n \mid m >= 1 \; and \; n >= 0\}$

Cont...2

Unit – IV

7. Obtain the PDA for the given regular language: 15M
   L={ww^R | w is in (0 + 1)*}, the language for even length palindrome.
   Also show the moves of the PDA to accept the string 101101 for the above grammar.
8. a) Convert the following PDA to CFG using the given transitions. 9M
   PDA P=({p,q},{0,1},{X,Y},δ,q,Z)), transition δ is given by:

$$\delta(q,1,Z)=\{(q,XZ)\}$$
$$\delta(q,1,X)=\{(q,XX)\}$$
$$\delta(q,\varepsilon,X)=\{(q,\varepsilon)\}$$
$$\delta(q,0,X)=\{(p,X)\}$$
$$\delta(p,1,X)=\{(p,\varepsilon)\}$$
$$\delta(p,0,Z)=\{(q,Z)\}$$

   b) Identify whether the given grammar contains nullable variable? If so eliminate the same and rewrite the grammar. 6M
   S→ABA
   A→aA | ε
   B→bB | ε

Unit – V

9. a) Define ID of a Turing Machine. 3M
   b) Design a Turing Machine to accept the following language. 12M

$$L=\{a^n b^n \mid n>=1\}$$

10. a) Explain the working of a Turing machine with a diagram. 6M
    b) Write a note on Universal Turing machine and Halting problem. 9M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1602**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

DATA COMMUNICATION SYSTEMS

(Information Technology)

Date: 30 May, 2014 **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) Describe the CISCO three layer hierarchical internetworking model. 9M
   b) Suppose that the spectrum of a channel is between 10 MHz and 12 Mhz, and an intended capacity of 8 Mbps. 7M
      i. What should be the SNR in order to obtain this capacity
      ii. How many signaling levels are required to obtain this capacity
2. a) ''A data communications circuit can be described in terms of circuit configuration'' – Comment. 6M
   b) Explain briefly three fundamental digital modulation schemes. 9M

Unit – II

3. a) Explain cross talk and what is needed to reduce it? 7M
   b) Define Characteristic impedance, velocity factor, and dielectric constant and tell how they affect the performance of a transmission line. 8M
4. a) List and describe the five types of transmission line losses. 8M
   b) What do you mean by a transmission line? Describe balanced and unbalanced transmission lines. 7M

Unit – III

5. a) A signal is quantizied using 10 bit PCM (Pulse Code Modulation). Find the Signal-to-Quantization noise ratio. 4M
   b) Explain the term companding. 4M
   c) What are the goals of Multiplexing? Which of three multiplexing techniques is (are) used to combine analog signals? Which of three multiplexing techniques is (are) used to combine digital signals? 7M
6. a) Four channels , two with a bit rate of 200kbps and two with a bit rate 150 kbps are to be multiplexed using multiple slots TDM with no synchronization bits. Answer the following questions: assume 4 bits from the first 2 sources and 3 bits from the second 2 sources. 8M
      i. What is the size of a frame in bits?
      ii. What is the frame rate?
      iii. What is the duration of a frame?
      iv. What is the date rate?
   b) Describe Delta Modulation PCM and Differential PCM. 7M

Unit – IV

7. a) Sixteen-bit messages are transmitted using a Hamming code. How many check bits are needed to ensure that the receiver can detect and correct single bit errors? Show the bit pattern transmitted for the message 1101001100110101. Assume that even parity is used in the Hamming code. 7M
   b) Explain three types of automatic repeat request (ARQ) protocols. 8M
8. a) Data link protocols almost always put the CRC in a trailer rather than in a header. Why? 8M
   b) Explain XMODEM protocol with its frame format. 7M

Cont...2

Unit – V

9.	a)	Explain the Differences between cable modems and standard voice-band modems.	8M
	b)	Sketch the Functional block diagram of a standard telephone set and list the important components of the system.	7M
10.	a)	Bring out the significance of digital service unit and channel service unit.	7M
	b)	List the steps in basic telephone call procedures.	8M

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

Question Paper Code : A1212

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

CONTROL SYSTEMS

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

Date: 30 May, 2014 **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) Distinguish between open loop and closed loop control system. Give any two examples for each. 7M

   b) From the basic principle derive an expression for the transfer function between $\theta_m(S)$ and control voltage of a two phase induction motor type A.C. servo motor. 8M

2. a) Define Transfer function. List out the properties, advantages and disadvantages of transfer functions. 5M

   b) Write the differential equations for the mechanical system shown in fig1. Draw the electrical network and electrical analogue (FV, FI) giving clearly all the analogous quantities. 10M

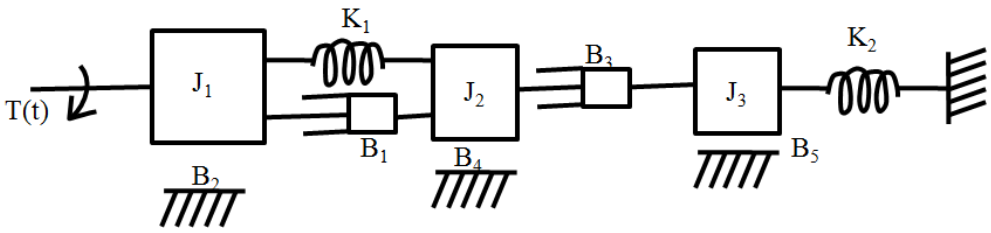


Fig. 1

Unit – II

3. a) Draw a block diagram to describe the electrical circuit given in the fig.2 and determine the transfer function using block diagram reduction. 10M

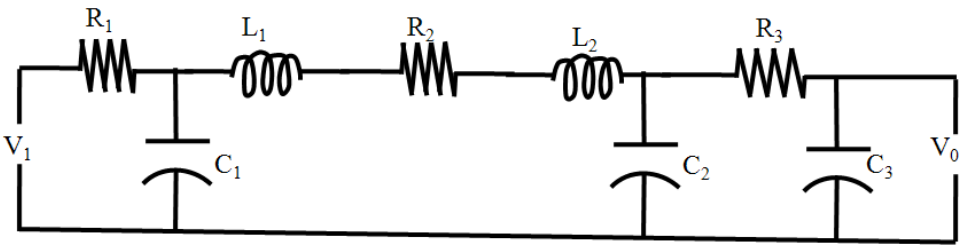


Fig.2

Cont...2

b) Use Mason's gain formula to find out Y_5/Y_1 for the signal flow graph shown in fig. 3 5M

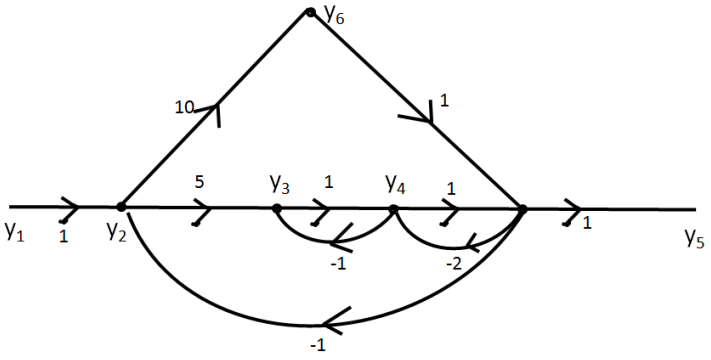


Fig. 3

4. a) Obtain the transfer function of the lag network shown in fig. 4. 7M

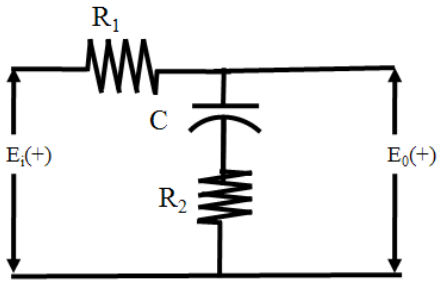


Fig. 4

b) For the system shown in fig. 5, determine $I_0(s)/V_i(s)$ by block diagram reduction technique. 8M

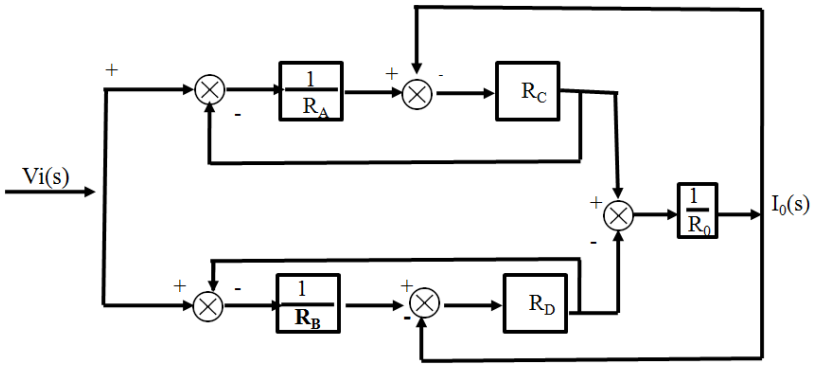


Fig. 5

Unit – III

5. a) A unit feedback system has G(s) = (40 (s+2)) / (s(s+1) (s+4)). Determine 6M
   i. Type of the system
   ii. All error co-efficients
   iii. Error for ramp input with magnitude 4

   b) A feedback control system has open loop transfer function 9M
   G(s)H(S) = (K/(s(S+4)(S^2 + 4S + 20))).
   Plot the root locus for K = 0 to ∞. Indicate all the points on it.

Cont...3

6. a) $S^6 + 4S^5 + 3S^4 - 16S^2 - 64S - 48 = 0$. Find the number of roots of this equation with positive real part, zero real part and negative real part. 6M

   b) Open loop transfer function of unity feedback system is G(s) = (K/(1+Ts)s) where K and T are constants. Determine factor by which gain 'K' should be multiplied so that overshoot of unit step response be reduced from 75% to 25%. 9M

Unit – IV

7. a) State the advantages and limitations of frequency domain approach. 5M

   b) A unity feedback control system has G(S) = 10/S(S+1)(S+2). Draw Nyquist plot and comment on closed loop stability. 10M

8. a) State and explain Nyquist criterion. 5M

   b) What are i)gain margin and ii) phase margin? Determine these two analytically for a system with G(S) H(S) = (1/(S(S+1)(S+(1/2)))) given that the gain crossover frequency is 0.82 rad/sec. Is the system stable? 10M

Unit – V

9. a) Obtain a state model for the system described by 7M
   $T(S) = (Y(s)/U(S)) = (2S^3 + 7S^2 + 12S + 8)/(S^3 + 6S^2 + 11S + 9)$

   b) Write a note on the following: 8M
   i) Observability
   ii) Controllability

10. a) What is the significance of state transition matrix and list out its properties? 7M

    b) A third order system has the coefficient matrix 8M

$$A=\begin{bmatrix}1 & 2 & 1\\ 0 & 1 & 0\\ 1 & -4 & 3\end{bmatrix},\ B=\begin{bmatrix}0\\ 0\\ 1\end{bmatrix},\ C=\begin{bmatrix}1 & 1 & 0\end{bmatrix}$$

Determine the state transition matrix and output controllability

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1312**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

THERMAL ENGINEERING-I

(Mechanical Engineering)

Date: 30 May, 2014 **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 is the difference between air standard cycle and fuel air cycle analysis? Explain the significance of the fuel air cycle. 7M
   b) Compare the actual and theoretical p-v diagrams of a 4-S diesel engine. 8M
2. a) Describe with a suitable sketch the two stroke cycle spark ignition engine. How its indicator diagram differs from that of a four stroke engine 10M
   b) Discuss the differences between theoretical and actual valve timing diagrams of a diesel engine 5M

Unit – II

3. a) Briefly explain the stages of combustion in S.I. engines elaborating the flame front propagation. 10M
   b) What is meant by abnormal combustion? Explain the phenomenon of knock in S.I. engines. 5M
4. a) Bring out clearly the process of combustion in C.I. engines and also explain the various stages of combustion. 8M
   b) Explain the phenomenon of knock in C.I. engines and compare it with S.I. engine knock. 7M

Unit – III

5. a) Define air-fuel ratio and briefly state its effect on power output, fuel consumption and combustion pressure. 7M
   b) The following readings are taken on a single cylinder ,4-stroke gas engine 30cm in diameter and 40cm in stroke. RPM=200, No. of explosions= 80 per minute, Brake diameter= 150cm, Net load on the brake= 1200N, Net mean effective pressure= 6bar, Gas used= 11.5cu.m/hr, Pressure of the gas= 15cm of water above atmospheric pressure, Barometric reading= 755mm of Hg. Ambient temperature =20^0C, C.V of the gas used= 21000KJ/m^3 at N.T.P. Find out(i) the mechanical efficiency and (ii) the brake thermal efficiency. 8M
6. a) What are the methods available for improving the performance of an engine? 6M
   b) A test on single cylinder 4-stroke oil engine having bore 180mm and stroke 360mm gave the following results. Speed-290rpm, brake torque- 392N-m, indicated mean effective pressure 7.2 bar, oil consumption 3.5kg/hr, cooling water flow 270kg/hr, cooling water temperature rise 36^0C air-fuel ratio by weight 25. Exhaust gas temperature 415^0C, barometric pressure 1.013bar, room temperature 21^0C .The fuel has calorific value of 45,200KJ/kg and contains 15% of hydrogen by weight. Calculate (a) the indicated thermal efficiency (b) the volumetric efficiency based on atmospheric conditions. Take R=0.287KJ/kgK, C_p for dry exhaust gases =1.0035KJ/kgK, and C_{ps} for superheated steam= 2.093KJ/kgK. 9M

Cont...2

Unit – IV

7. a) A single stage reciprocating compressor takes $1m^3$ of air per minute at 1.013 bar and 15^0C and delivers it at 7 bar. Assuming that the law of compression is $pV^{1.35}$ = constant, and the clearance is negligible, calculate the indicated power. 8M

   b) Explain the principle of working of a reciprocating compressor 7M

8. An air compressor having stroke length of 88cm and clearance volume of 2% of the swept volume delivers air at a pressure of 8.2 bar. In order to study the effect of clearance on free air delivery and work expended, the compressor was overhauled and a distance piece of 0.55cm was fitted between the cylinder head and the cylinder. The compressor was then commissioned under the changed clearance. Calculate: 15M
   Percentage change in the volume of free air delivered, Percentage change in power expended
   Before and after overhauling the piston had a suction pressure 1.025 bar and the index of compression and expansion was 1.3

Unit – V

9. The following data refers to a centrifugal compressor 15M
   Total pressure ratio = 3.6:1, Diameter of inlet eye of compressor impeller = 35cm, Axial velocity at inlet = 140m/s, Mass flow = 12kg/s, Velocity in delivery duct = 120m/s, The tip speed of the impeller = 460m/s, Speed of the impeller = 16000 rpm. Total head isentropic efficiency = 80%, Pressure coefficient = 0.73, Ambient conditions = 1.013 bar and 15^0C. Calculate
   i. The static pressure and temp at inlet and outlet of the compressor
   ii. The static pressure ratio
   iii. Work of compressor per kg of air
   iv. The theoretical power required.

10. a) Draw a neat velocity diagram of a axial flow compressor and derive an equation for degree of reaction 12M

    b) List the applications of axial flow compressors 3M

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

Question Paper Code : A1705

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

AIRCRAFT PRODUCTION TECHNOLOGY

(Aeronautical Engineering)

Date: 30 May, 2014 **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 and compare merits and limitation of manufacturing processes.	8M
	b)	Describe different casting processes.	7M
2.	a)	Explain Green sand moulding with sketch and mention its advantages and disadvantages.	8M
	b)	Explain investment casting. What are its advantages and disadvantages?	7M

Unit – II

3.	a)	With a neat sketch explain the principle of arc welding.	7M
	b)	Describe gas welding and resistance welding through neat diagrams.	8M
4.	a)	Give an outline of welding techniques used in aircraft production technology.	7M
	b)	With neat diagram explain soldering and brazing techniques.	8M

Unit – III

5.	a)	Explain the working procedure of lathe machine and explain about lathe operations with the help of neat sketches?	7M
	b)	How are shaper and milling machine used in manufacturing?	8M
6.	a)	Explain the working principle of radial drilling machine with help of neat diagram and write the advantages and disadvantages?	7M
	b)	Write the importance sheet metal in Aircraft Manufacturing and write some sheet metal operations.	8M

Unit – IV

7.	a)	Explain the working of Abrasive Jet Machining with neat sketch. What are its advantages and disadvantages?	8M
	b)	Explain Honing process for surface finishing operation.	7M
8.	a)	Explain the working Principle of Electron Discharge Machining with a neat sketch.	8M
	b)	Write short notes on annealing and normalizing heat treatment process.	7M

Unit – V

9.	a)	Explain the main steps of Liquid Penetration Inspection with sketch.	8M
	b)	Define the terms Quality and Reliability.	7M
10.	a)	Describe the concept of quality and quality circle.	7M
	b)	Write short notes on: i. X-ray ii. Magnetic particle inspection and ultrasonic testing	8M

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

Question Paper Code : A1107

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May - 2014

(Regulations: VCE-R11)

STRENGTH OF MATERIALS-II

(Civil Engineering)

Date: 30 May, 2014 **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) A rectangular bar of cross sectional area of 11000 mm^2 is subjected to a tensile load P as shown in Fig. 1. The permissible normal and shear stresses on the oblique plane BC are given as 7 N/mm^2 and 3.5 N/mm^2 respectively. Determine the safe value of P. 7M

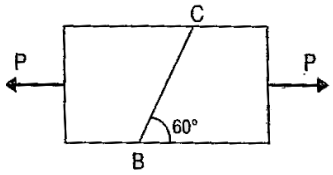


Fig.1

b) A rectangular block of material is subjected to a tensile stress of 110 N/mm^2 on one plane and a tensile stress of 47 N/mm^2 on the plane at right angles to the former. Each of the above stresses is accompanied by a shear stress of 63 N/mm^2 and that associated with the former tensile stress tends to rotate the block anticlockwise. Find: 8M

i. The direction and magnitude of each of the principal stress and
ii. Magnitude of the greatest shear stress

2. a) What do you understand by the term 'theories of failure'? Explain maximum principal strain theory. 7M

b) According to the theory of maximum shear stress, determine the diameter of a bolt which is subjected to an axial pull of 9kN together with a transverse shear force of 4.5kN. Elastic limit in tension is 225 N/mm^2, factor of safety = 3 and poisson's ratio=0.3. 8M

Unit – II

3. a) State Euler's column theory and explain the assumptions made in it. 7M

b) Determine the ratio of buckling strengths of two columns one hollow and the other solid. Both are made of the same material and have the same length, cross sectional area and end conditions. The internal diameter of hollow column is half of its external diameter. 8M

4. A strut of length 'l', moment of inertia of cross-section = 'I' uniform throughout and modulus of material = 'E', is fixed at its lower end, and its upper end is elastically supported laterally by a spring of stiffness 'k'. Show from the first principles that the crippling load P is given by $\frac{\tan \alpha\, l}{\alpha l} = 1 - \frac{p}{kl}$, where $\alpha^2 = \frac{P}{El}$ 15M

Unit – III

5. A solid circular shaft and a hollow circular shaft whose inside diameter is 0.75 of the outside diameter, are of the same material, of equal lengths and are required to transmit a given torque. Compare the weights of these two shafts if the maximum shear stresses developed in the two shafts are equal. 15M

6. Derive an expression for torque transmitted by a hollow circular shaft. 15M

Cont...2

Unit – IV

7. a) A rectangular column of width 200 mm and of thickness 150mm carries a point load of 240kN at an eccentricity of 10 mm as shown in Fig.2. Determine the maximum and minimum stresses on the section. 10M

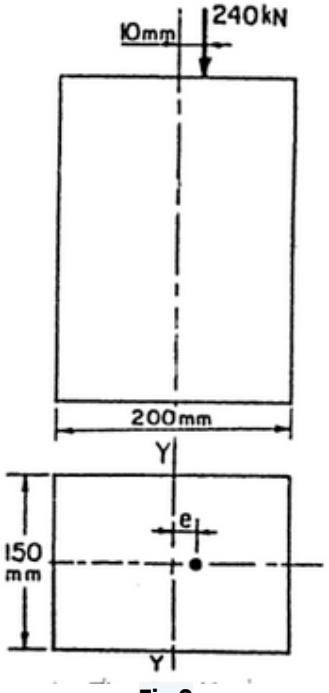


Fig.2

b) State the assumptions of theory of simple bending. 5M

8. A hollow rectangular column of external depth 1 m and external width 0.8 m is 10 cm thick. Calculate the maximum and minimum stress in the section of the column if a vertical load of 200kN is acting with an eccentricity of 15 cm as shown in Fig.3. 15M

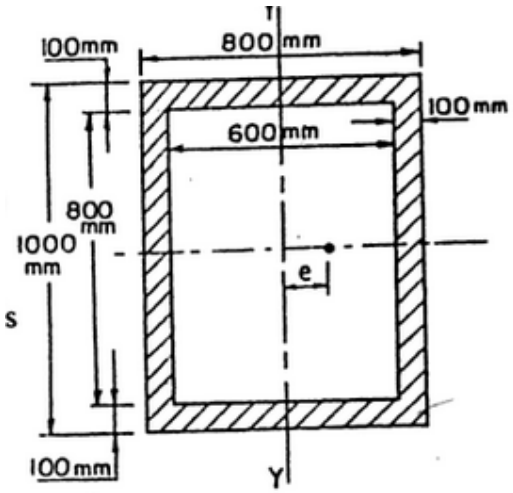


Fig.3

Cont...3

Unit – V

9. a) Define and explain the following terms: 8 M
   i. Perfect Frame
   ii. Imperfect frame
   iii. Deficient frame, and
   iv. Redundant frame

   b) Find the forces in the members AB, AC and BC of the truss shown in Fig. 4. 7 M

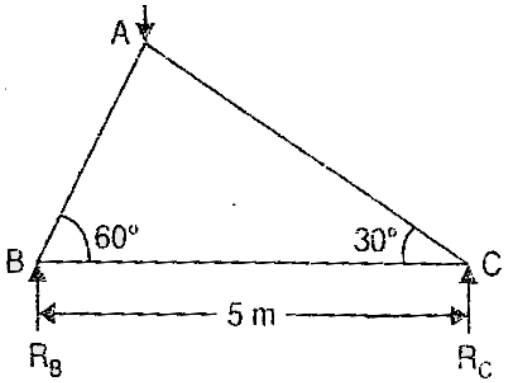


Fig.4

10. A plane truss is loaded and supported as shown in Fig.5. Determine the nature and magnitude of the forces in the members' 1, 2 and 3. 15M

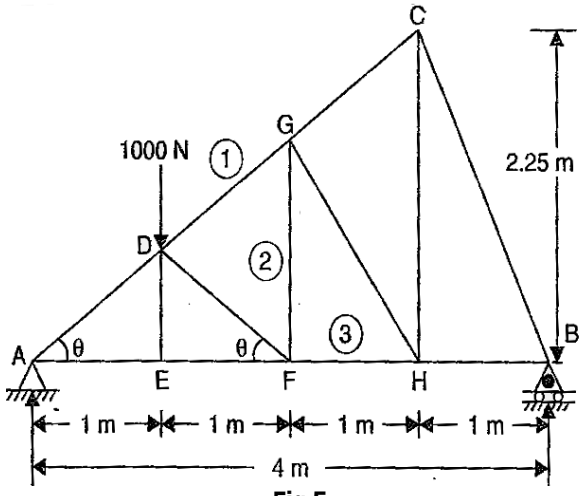


Fig.5

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

Question Paper Code : A1603

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

WEB TECHNOLOGIES

(Common to Computer Science and Engineering & Information Technology)

Date: 9 June, 2014 **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 the web page for the library system, the page must accept the fields like Book Name, Author Name, ISBN, and No. of copies available. Design the page using different CSS properties. 7M
   b) Write a java script program to find the area of the circle and rectangle using functions. Use the prompt box to take input and display the output. 8M
2. a) Write the function in JavaScript that checks if a field has been left empty. If the field is blank, an alert box alerts a message, the function returns false, and the form will not be submitted. 7M
   b) Illustrate with examples Java Script popup boxes. 8M

Unit – II

3. a) With an example, explain the different types of XML parsers? 8M
   b) Create the XML document for the information of the product given below. 7M

Identifier	Name	Price
p1XML	Editor	$499.00
p2DTD	Editor	$199.00
p3XML	Book	$19.99
p4XML	Training	$699.00.

4. a) Create XML document for an address book of the person consisting of name, street, region, postal code, locality, country, telephone number, and emailID. Assume the field values suitably. 7M
   b) Discuss the deployment structure, processing of information and protocol support for Jigsaw and Tomcat servers. 8M

Unit – III

5. a) Write a simple servlet that counts and displays the number of times it has been accessed? 7M
   b) Explain the following: 8M
      i. ServletInterface
      ii. HTTPServletClass
6. a) Explain how servlets perform session tracking techniques? 7M
   b) Explain life cycle of a servlet with the help of its architecture? 8M

Unit – IV

7. a) What is a page directive? Briefly discuss different attributes of page directive. 8M
   b) Write a JSP program to illustrate different JSP elements. 7M
8. a) Write a program using Java Server Pages to print current date and time on to a web page using a JSP expression. 8M
   b) What is <jsp:useBean>action? Briefly discuss <jsp:useBean> attributes action. 7M

Cont...2

Unit – V

9.	a)	Write an ASP program which contains username and password field along with a submit button (enter), when submit button is pressed the form should be redirected to name.asp where name.asp process the form data and returns XHTML to the client.	10M
	b)	Write a brief note on silver light.	5M
10.	a)	List out the objects of ASP and highlight its properties, methods and events.	8M
	b)	Briefly explain the AdRotator ActiveX component properties and methods with an example?	7M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1408**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

ELECTRONIC CIRCUIT ANALYSIS

(Electronics and Communication Engineering)

Date: 9 June, 2014 **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 h-parameters model of CE transistor configuration and obtain the expressions for current gain A_I, voltage gain A_V, input impedance Z_I, output impedance Z_O, voltage gain with source internal resistance A_{VS} and current gain A_{IS} with source internal resistance. 9M

   b) A CE transistor amplifier is driven by a voltage source V_S of internal resistance R_s=1200Ω. The load impedance is a resistor R_L=1200Ω. The h-parameters are h_{ie}=1.1KΩ, $h_{re}=2.5\times10^{-4}$, h_{fe}=51, h_{oe}=25μA/V. Compute the current gain A_I, voltage gain A_V, input impedance Z_I, output impedance Z_O, voltage gain with source internal resistance A_{VS} and current gain A_{IS} with source internal resistance. 6M

2. a) Draw and explain the small signal model of JFET circuit. 5M

   b) Draw the circuit of a self-bias bypassed R_S (source resistance) common source JFET amplifier and draw it's equivalent circuit. Hence obtain the expressions for input impedance Z_i, out impedance Z_o and voltage gain A_v. 10M

Unit – II

3. a) How the gain of an amplifier gain is stabilized with the help of negative feedback. Give the advantages of negative feedback circuit. 7M

   b) The current-series feedback circuit is considered to have an overall transconductance gain of -1mA/V, a voltage gain of -4, and a sensitivity of 50. If R_S = 1KΩ, h_{fe}=150 and $r_{bb'}$ is negligible, find: 8M

   i. R_e
   ii. R_L
   iii. R_{if}
   iv. The Quiescent Collector current I_C at room temperature

4. a) Explain the principle and working of Wein bridge oscillator. Find an expression for the frequency of oscillations. 8M

   b) A Colpitt's oscillator has a coil with inductance of 120μH, C_1= 300pF and C_2=1200pF. Find frequency of oscillations and minimum gain required for amplifier to have sustained oscillations. 7M

Unit – III

5. a) Draw the circuit diagram of Darlington pair using two BJTs. Obtain the expression for current gain and voltage gain of Darlington pair with a load resistance R_L (emitter resistance). 10M

   b) It is desired that the voltage gain of an RC coupled amplifier at 60Hz should not decrease by more than 10% from the mid band value. Find the lower 3dB frequency. 5M

Cont...2

6. a) Draw the hybrid-∏ model of a CE transistor. What is the significance of each of the components used in the model. 6M

   b) The following low frequency parameters are known for a given transistor at I_c=10mA, V_{CE}=10V and at room temperature, h_{ie}=500Ω, h_{fe}=100, h_{oe}=10^{-4}A/V, h_{re}=10^{-4}. At the same operating point f_T=50MHz and C_e=3pF. Compute the values of all the hybrid-∏ parameters. 9M

Unit – IV

7. a) With neat load line analysis, obtain the value of maximum conversion efficiency in class A power amplifier. Mention the merits and demerits of class A power amplifier. 9M

   b) A transformer coupled class A power amplifier delivers 4 watts to 8Ω loud speaker through a transformer of turns ratio 20:1. If the supply voltage V_{cc}=24V and the operating collector current is 400mA, find 6M
      i. RMS value of secondary voltage
      ii. RMS value of secondary current
      iii. RMS value of primary voltage
      iv. RMS value of primary current
      v. Conversion efficiency

8. a) With neat circuit diagram, explain the working of class B Push-Pull power amplifier? 7M

   b) The output transformer used in class B Push-Pull amplifier has an efficiency of 95% while delivering a maximum of 10 watts of power to a load of 20Ω. The Push-Pull amplifier uses a single supply of V_{cc}=40V. Find: 8M
      i. Maximum voltage rating per transistor
      ii. Maximum collector current
      iii. Maximum power dissipation per transistor
      iv. Transformer turns ratio is $2N_1$:N_2

Unit – V

9. a) A parallel resonant circuit has a capacitor of 100pF in one branch and inductance of 100μH plus a resistance of 10Ω in the parallel branch. Find: 8M
      i. Resonant frequency
      ii. Impedance of the circuit at resonance
      iii. Q factor of the circuit
      iv. Bandwidth

   b) Explain the working of a double tuned amplifier with neat circuit diagram and input - output waveforms. 7M

10. a) A circuit with resonance frequency of 455KHz and has a 10KHz bandwidth. The inductive reactance is 1255Ω. What is the parallel impedance of the circuit at resonance? 8M

    b) Design a single tuned amplifier for a single resonant frequency and explain the working. 7M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1411

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Date: 9 June, 2014 **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 explain small signal JFET model of a common source amplifier. 6M
   b) Draw the common base hybrid model. Given h_{ie}=0.83kΩ, h_{fe}=50. Find out the current gain (h_{fb}) and input impedance (h_{ib}) for a transistor in CB configuration. 9M
2. a) Define h parameters. Draw the complete hybrid equivalent circuit of a transistor. 8M
   b) Determine the various gains of the circuit shown in Fig.1 if an emitter resistance of 0.5k is included in the circuit. 7M

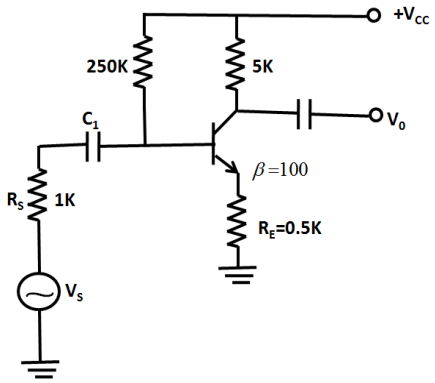


Fig.1

Unit – II

3. a) With a neat diagram, explain the principle of operation of class B push-pull amplifier. Obtain the maximum value of overall efficiency in case of push pull amplifier. 10M
   b) Explain the harmonic distortion present in a power amplifier. 5M
4. a) Explain the operating principle of class AB push-pull amplifier 7M
   b) An amplifier has an input signal of 16V peak-to-peak and an input impedance of 320kΩ. It gives an output voltage of 8V peak-to-peak across a load resistor of 4W. Calculate the dB Power gain of the amplifier. 8M

Unit – III

5. a) With a neat block diagram, explain the operation of any two feedback amplifiers. 8M
   b) Discuss the general characteristics of four basic feedback configurations. In a negative feedback amplifier A=100, β=0.04 and V_i=50 mV. Find gain with feedback, output voltage, feedback factor and feedback voltage. 7M
6. a) Explain the concept of positive and negative feedback. Describe advantages and disadvantages of negative feedback. 6M
   b) Sketch the circuit of a Wien bridge oscillator and derive the expression for the frequency of oscillations? 9M

Cont...2

Unit – IV

7. a) Briefly explain the basic low pass RC circuit as integrator circuit. 6M
   b) How will the circuit of Fig.2 respond to a 10v step input of Fig.3? In what time will the output rise from 1v to 9v? 9M

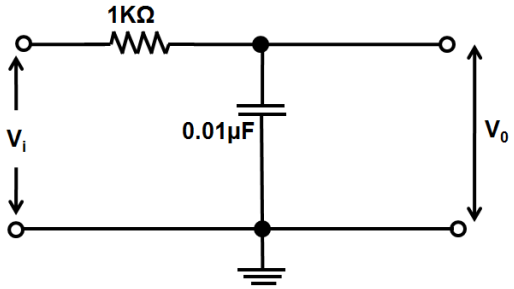


Fig.2

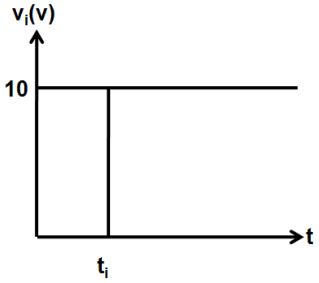


Fig.3

8. a) With a basic and practical clamping circuits, explain the diode clamping? 7M
   b) Draw the transfer characteristics (Vo/Vi) for the two diode clipper circuit of Fig.4 shown below. Assume the diodes to be ideal. 8M

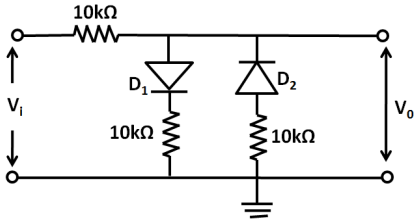


Fig.4

Unit – V

9. a) Explain the working of a bistable multivibrator with the help of a neat circuit diagram and waveforms. 8M
   b) Explain the working of a Schmitt trigger with the help of a neat circuit diagram and waveforms. 7M
10. a) Distinguish between monostable multivibrator and bistable multivibrators. 7M
   b) In an astable multivibrator circuit shown in Fig.5, $R_1=R_2=5k\Omega$, $R_3=R_4=0.4k\Omega$ and $C_1=C_2=0.02\mu F$. Determine the time period and frequency of oscillations. Find the minimum value of transistor β. 8M

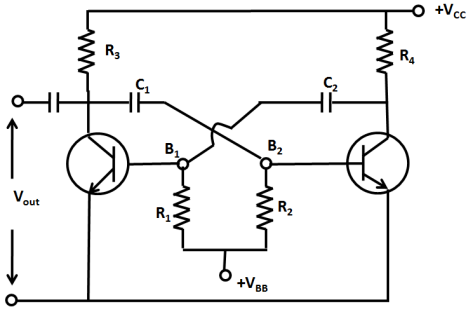


Fig.5

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

Question Paper Code : A1313

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

PRODUCTION TECHNOLOGY

(Mechanical Engineering)

Date: 9 June, 2014 **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 different types of pattern allowances with neat sketches.	7M
	b)	Enumerate the different steps in manufacture of castings and list its advantages.	8M
2.	a)	With the help of a neat sketch, explain the construction and working of a cupola furnace.	8M
	b)	Explain the investment casting process with the help of neat sketches.	7M

Unit – II

3.	a)	Write a note on non-ferrous metals with their applications.	8M
	b)	Describe forge welding operation with neat sketches.	7M
4.	a)	Explain thermit welding process? Where it is employed.	8M
	b)	Classify welding processes and enumerate one practical application with each of the classification.	7M

Unit – III

5.	a)	List the welding defects and explain the causes and remedies of any three different types of welding defects.	6M
	b)	With the help of neat sketches explain the construction and working of i. Friction welding ii. Laser beam welding process	9M
6.	a)	Explain the principle of hot and cold working. Enumerate the differences in terms of properties of hot and cold worked products.	8M
	b)	What is strain hardening? Why it is done?	7M

Unit – IV

7.	a)	Explain the types of rolling mills with neat sketches . Also state the applications of rolling process.	10M
	b)	Explain the principle of operation of coining process.	5M
8.	a)	Draw neat sketches and explain the principle of operation of Bending and forming process.	8M
	b)	Explain the forces in rolling process and the method to counter act the forces.	7M

Unit – V

9.	a)	What are the characteristics of extrusion process?	8M
	b)	Explain hot extrusion and where it is used and why?	7M
10.	a)	Explain the various types of plastics with suitable applications?	8M
	b)	Highlight the processing of thermoplastics considering the molding machines and materials used.	7M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1706

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

AEROSPACE VEHICLE STRUCTURES-I

(Aeronautical Engineering)

Date: 9 June, 2014 **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 statically determinate and indeterminate structure with example. 6M
   b) A beam ABC of length 2L rests on three supports equally spaced and is loaded with UDL w/unit length throughout the length of the beam as shown in Fig.1. Draw the SF and BM diagram. 9M

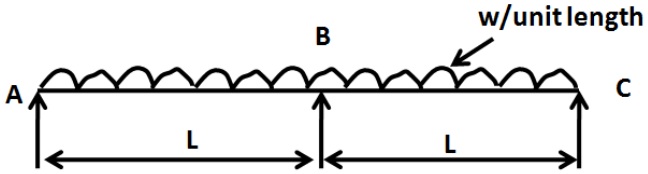


Fig.1

2. For Fig.2, determine the unknown nodal displacements and forces in the beam. The beam is of uniform section throughout. 15M

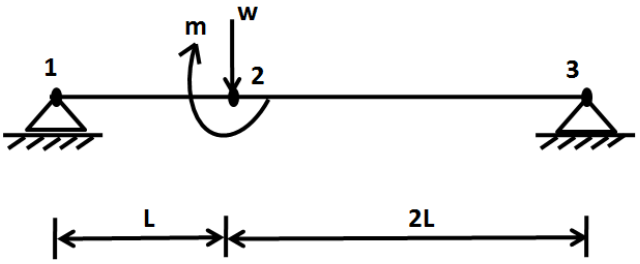


Fig.2

Unit – II

3. a) What are the assumptions made in Beams with elastic supports. 5M
   b) Derive differential equation for a beam resting on elastic foundation. 10M
4. a) What are the assumptions of Euler's theory. 5M
   b) A hollow alloy tube of 6 m long with external diameter of 50mm and internal diameter of 30mm was found to be extend 2.98mm under a tensile load of 50KN . Find the buckling load for the tube, when used as strut with both ends pinned. Also, find the safe load on the tube taking a factor of safety 4. 10M

Cont...2

Unit – III

5. a) Define 6M
   i. Plane stress
   ii. Plane strain
   b) A piece of material is subjected to tensile stresses of 70 N/mm^2 and 30 N/mm^2 at right angles to each other. Find fully the stress on a plane the normal of which makes an angle of 35° with the 70 N/mm^2 stress. 9M

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

Unit – IV

7. Find the support reactions in the beam ABC shown in Fig.3 using the principle of virtual work. 15M

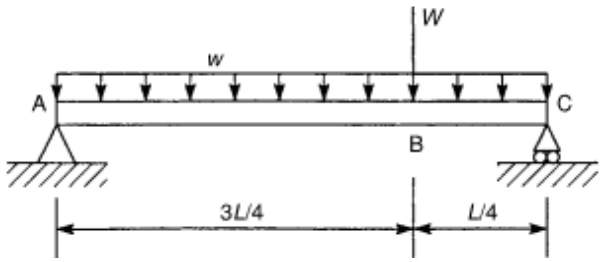


Fig.3

8. A steel rod of uniform circular cross section is bent as shown in Fig.4, AB and BC being horizontal and CD being vertical. The arms AB, BC, and CD are of equal length. The rod is encastré at A, and the other end D is free. A uniformly distributed load covers the length BC. Find the components of the displacement of the free end D in terms of EI and GJ. 15M

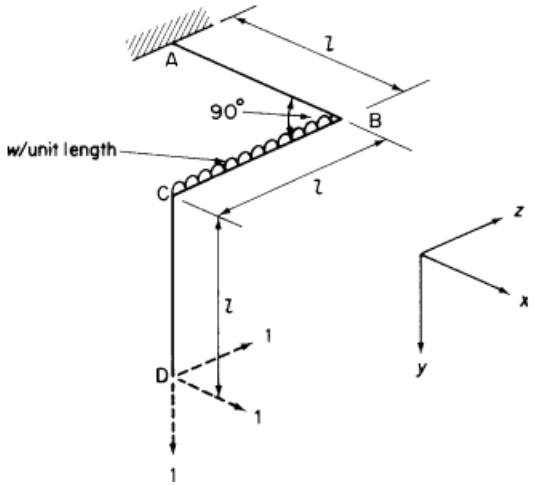


Fig.4

Cont...3

Unit – V

9. a) Explain Bredt–Batho theory with neat sketch. 5M

b) The cold-formed section shown in Fig. 5 is subjected to a torque of 50 N m. Calculate the maximum shear stress in the section and its rate of twist. G=25 000 N/mm^2. 10M

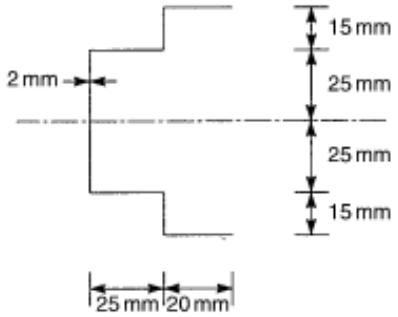


Fig.5

10. a) Briefly explain torsion of closed section with Bredt-Batho theory. 6M

b) Derive expression of shear of closed section beam. 9M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1108

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations May/June - 2014

(Regulations: VCE-R11)

STRUCTURAL ANALYSIS-1

(Civil Engineering)

Date: 9 June, 2014 **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) Differentiate between cantilever and propped cantilever beams. 3 M
   b) Determine the reaction component in the propped cantilever shown in Fig.1. EI is constant throughout. 12M

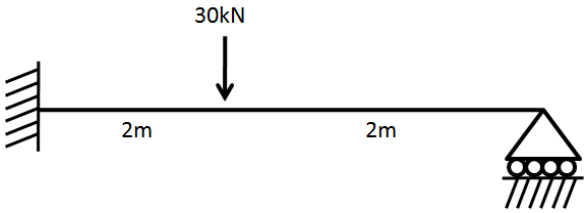


Fig.1

2. a) Explain the procedure involved in the analysis of cantilever beams. 5M
   b) Draw SFD and BMD for the propped cantilever beam shown in fig. 2. 10M

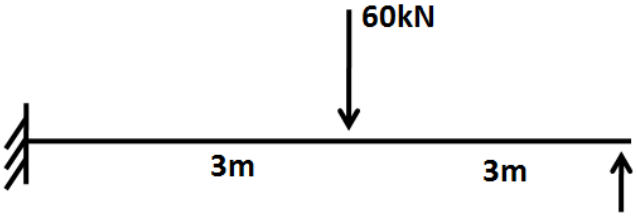


Fig.2

Unit – II

3. A steel beam AB, 6m long is fixed horizontally at the ends A and B which are at the same level. The beam carries a load of 50 kN downwards at C, 1m from A and a load of 50 kN upwards at D, 2m from A. Find the fixing moments and the deflection at D. Take $I=8\times10^7$ mm^4. 15M

4. A continuous beam ABC with AB =10m, BC = 8m is fixed at A and simply supported at C. It is continuous over the supports at B. The beam supports 20 kN/m over the span AB and concentrated load of 50kN at 2m from C. Moment of inertia is same throughout. Using Clapeyron's theorem, determine the moment at A and B. Draw SFD and BMD. 15M

Unit – III

5. A simply supported beam of span 20m is subjected to a set of loads of magnitude 20kN,30kN, 15kN, and 10kN spaced at 1.5m, 2m and 1m respectively moving from left to right with 10 kN load leading. Determine the max bending moment at a section 5m from left and also absolute bending moment developed in the beam. 15M

Cont...2

6. a) Determine the deflection at free end of a cantilever of length 'L' subjected to a concentrated load 'P' at the free end. Use strain energy method. 5M

   b) Determine the vertical deflection of point 'C' in the frame shown in fig 6(b).Given $E=200kN/mm^2$ and $I=30x10^6mm^4$. 10M

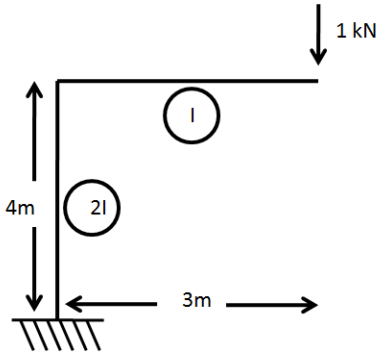


Fig.3

Unit – IV

7. Two wheel loads of 160 kN and 400 kN spaced 2 m apart move on a simply supported beam girder of span 16m. Find the maximum positive and negative shear force at a section (i) 4 m from the left end and (ii) 6 m from the left end. 15M

8. A continuous beam is shown in Fig.4. Using slope deflection method compute the end moments and plot the BMD. Also sketch the deflected shape of the beam. 15M

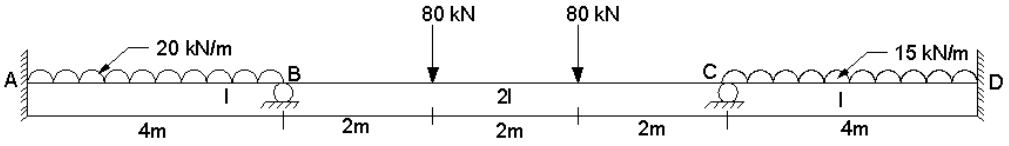


Fig.4

Unit – V

9. a) Define the degree of freedom. What is the degree of freedom for a fixed support, hinged support, roller support and free end. 6M

   b) Find the degree of indeterminacy for the structures shown in Fig.5, Fig.6, Fig.7. 9M

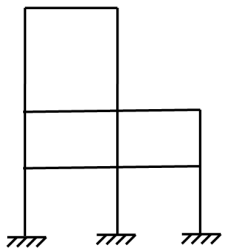


Fig.5

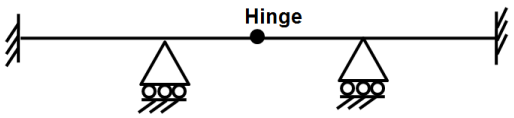


Fig.6

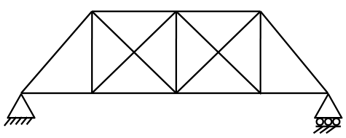


Fig.7

Cont...3

10. Determine the forces in all the members of a pin jointed frame shown in Fig.8. 15M

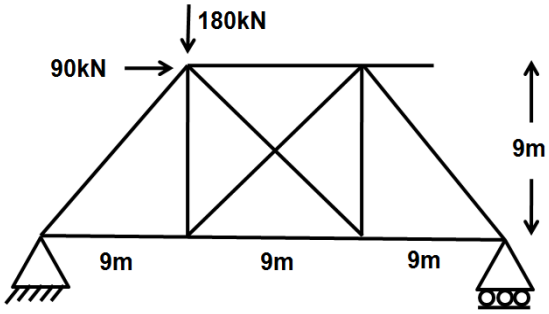


Fig.8

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1604

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

COMPUTER GRAPHICS

(Common to Computer Science and Engineering & Information Technology)

Date: 4 June, 2014 **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) Compare and contrast random scan and raster scan displays. 8M
   b) Explain the architecture of raster graphics system with a display processor. 7M
2. a) Consider a typical color display system which has 680x960 horizontal to vertical electrodes. Calculate the resolution of the display system. Compute the size of the frame buffer if it takes 6 bits per pixel. Also, compute the time taken to transfer the frame if the transfer rate is 28Kbps. 8M
   b) Explain with a neat diagram, the structure and functionality of a cathode ray tube (CRT). 7M

Unit – II

3. a) Describe Scan-Line Polygon Fill Algorithm. 7M
   b) Write the slope, inverse slope, number of intersection points of a scan line at y=8 for the following Fig.1 8M

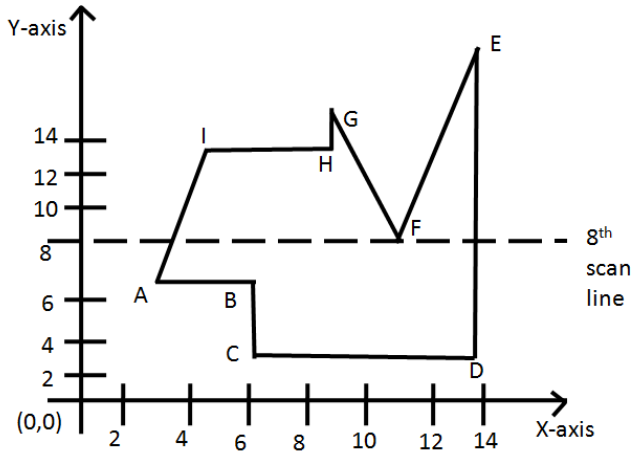


Fig.1

Also determine whether shortening of edges is required or not?

4. a) Explain digital differential analyzer (DDA) algorithm 10M
   b) Write a recursive function in C to demonstrate boundary fill algorithm. 5M

Cont...2

Unit – III

5.	a)	Justify that product of two successive translations are additive.	9M
	b)	Determine a Composite Transformation Matrix for an object being subjected to the following sequence. i. Rotate the object w.r.t. clockwise direction by an angle 60 degrees ii. Scale the object by factors of 3 & 4 w.r.t. X & Y axes iii. Finally translate by a distance of 8 & 16 w.r.t. X & Y directions	6M
6.	a)	Explain general Pivot-Point Rotation. Give the corresponding composite transformation matrix.	8M
	b)	Explain Cohen-Sutherland line clipping algorithm	7M

Unit – IV

7.	a)	Give the sequence of steps required to perform 3D rotation about an arbitrary axis.	8M
	b)	Write the structure of general three dimensional transformation viewing pipeline.	7M
8.	a)	Derive the expression of Bezier curve blending function by also stating its properties.	8M
	b)	Explain three dimensional scaling.	7M

Unit – V

9.	a)	Write pseudo code for Scan-Line Method	7M
	b)	Describe the four steps in generation of animation sequence	8M
10.	a)	Explain back face detection method.	8M
	b)	Justify with suitable reasons “how the special animation purpose languages are better than general purpose programming languages like C, Lisp, Pascal, or FORTRAN”.	7M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1409

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

Date: 4 June, 2014 **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 relevant waveforms, explain the response of an RC Low pass circuit with a square wave input under different time constants. 7M

   b) For the attenuator circuit shown in the Fig.1, calculate and plot output for the cases: 8M
   i. C_1 = 50pF
   ii. C_1 = 150pF

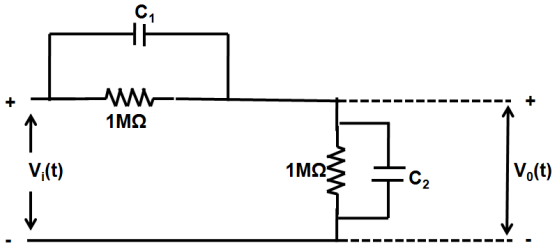


Fig.1

The input $V_i(t)$ is a step of 10V and C_2=100pF.

2. a) With relevant wave forms, explain the response of an RL High pass circuit for a pulse input voltage. 7M

   b) In a low pass RC circuit, R=2KΩ, C=1μF. If a 2ms pulse with 5V amplitude is applied as input to this circuit, sketch the output wave form. 8M

Unit – II

3. a) With the help of a neat circuit diagram and transfer characteristics explain the working of a two level clipper. 7M

   b) In the negative clamper circuit R_S=R_f =100 Ω, R=10KΩ and C=1.0μF. At t=0 a symmetrical square wave signal of amplitude 10 V and frequency 5 KHz is applied. The input signal extends from 0 to 10 V. Draw the output waveform. 8M

4. a) Explain working of a transistor as a switch, indicating base current requirement and junction voltages of silicon npn transistor at room temperature. 7M

   b) The input voltage V_i applied to a two level clipper shown in Fig.2 varies linearly from 0 to 150V. Sketch the output voltage V_0 to the same time scale as the input voltage. Assume ideal diodes. 8M

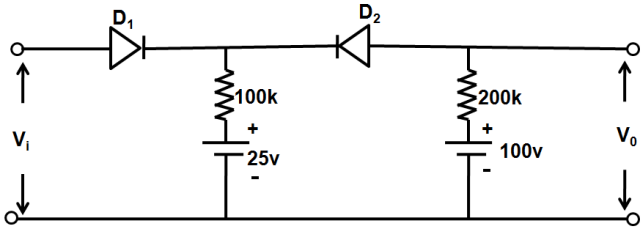


Fig.2

Cont...2

Unit – III

5. Design a self biased bistable multivibrator for the following specifications: Vcc=18V, (h_{fe})min=20, $I_{c(sat)}$=20mA, $R_1=R_2$, I_B(on)=2 (I_B)min and V_{BE} (cut-off)= -1V. Neglect junction voltages and I_{CBO}. Assume npn silicon transistors. 15M

6. a) Design an astable multivibrator to produce an unsymmetrical square wave of T_A=0.5m sec and T_B=0.4m sec. The square wave amplitude is 15V. Assume (h_{FE})min=20; (Ic) sat=5ma and (V_{CE})sat =0. 8M

   b) With neat circuit diagram and relevant wave forms explain fixed bias transistor bistable multivibrator. 7M

Unit – IV

7. a) Explain the working of a transistor Bootstrap time base generator With a neat circuit diagram and necessary waveforms. 7M

   b) With the help of a circuit diagram and waveforms explain the frequency division by an astable multivibrator. 8M

8. a) With a neat circuit diagram and necessary waveforms explain the working of a transistor current time base generator. 7M

   b) Explain the working of monostable relaxation circuits as dividers. 8M

Unit – V

9. a) Compare the unidirectional and bidirectional sampling gates. 7M

   b) Draw a TTL NAND gate and explain its operation. 8M

10. a) Verify the truth table of RTL NOR gate with circuit diagram of two inputs. 8M

    b) For the four diode gate $R_L = R_C = 100K\Omega$ and that $R_2=2K\Omega$, $R_f = 50\Omega$. For $V_S = 25V$, compute gain A, V_{min} and $Vc_{(min)}$. Compute $V_{n(min)}$ for $V = V_{min}$. 7M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1210**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

AC MACHINES-I

(Electrical and Electronics Engineering)

Date: 4 June, 2014 **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) Why transformer should not operate with dc supply? Mention characteristics of ideal transformer. Also obtain the expression for EMF equation of a single phase transformer. 9M

   b) A 50KVA, 4400/220V transformer has R_1=3.45Ω, R_2=0.009Ω, the values of reactance's are X_1=5.2Ω & X_2=0.015Ω. calculate for the transformer: 6M
   i. Equivalent resistance as referred to primary
   ii. Equivalent resistance as referred to secondary

2. a) A transformer takes 0.8A when its primary is connected to 200V, 50Hz. The secondary is open circuited. The power absorbed from the supply is 60 watts. Determine the working current & magnetizing current. 8M

   b) With neat diagram explain and compare the constructional details of a core and shell type single phase transformers. 7M

Unit – II

3. a) Derive an expression for load division between two similar transformers connected in parallel with unequal voltage ratios. 8M

   b) A short circuit test when performed on the HV side of a 10kVA, 2000/400V single phase transformer gave the following test data: 7M
   60V, 4A, 100W.
   If the LV side is delivering a full-load current at 0.8PF (lag) and at 400V, find the voltage applied to the HV side.

4. a) Define voltage regulation of a transformer. Derive the equation for regulation in terms of transformer parameters and load PF. 7M

   b) A single phase, 110/200V transformer gave the following test results: 8M
   110V, 0.5A, 55W on HV side, LV side open
   10V, 80A, 400Q on LV side, HV shorted
   Draw the equivalent circuit of the transformer and find the regulation and efficiency when supplying 100A at 220V, 0.8PF (lag).

Unit – III

5. a) Mention the advantages & disadvantages of a delta/delta connection of a three phase transformer. 5M

   b) A 3Φ transformer 33/6.6KV Δ/Y, 2MVA has primary resistance of 8Ω per phase & a secondary resistance of 0.08Ω per phase, percentage impedance is 7%. Calculate the secondary voltage with rated primary voltage & hence the regulation for full load at 0.75 PF lagging conditions. 10M

Cont...2

6. a) Derive an expression for the copper savings in an auto transformer as compared with a two winding transformer. 8M

   b) A 3-phase step down transformer is connected to 6600V mains and its takes 10A. Calculate the secondary line voltage, line current and output for the following connections having turns ratio per phase is 12. 7M
      i. Delta-delta
      ii. Star-delta

Unit – IV

7. a) Explain about the production of rotating magnetic field in an three phase induction motor air-gap with neat vector diagram. 7M

   b) A 3-phase, 400V, 50Hz, 4-pole induction motor has star connected stator winding. Rotor resistance and reactance are 0.1ohm and 1 ohm respectively. The full load speed is 1440 rpm. Calculate the torque developed on full load by the motor. Assume the stator to rotor ratio as 2:1. 8M

8. a) Draw complete torque-slip characteristics of a three phase induction motor. Show starting torque, breakdown torque and rated torque. Mark the stable and unstable regions. 6M

   b) A 3-phase, 200V induction motor has stator impedance of (0.07+j0.4) ohm/phase while equivalent rotor impedance referred to stator is (0.08+j0.2) ohm/phase. Neglecting no-load current, calculate the maximum mechanical power output and the slip corresponding to maximum output condition. Assume star connected stator. 9M

Unit – V

9. Draw the circle diagram of a 3 Φ, 6-pole, 50Hz, 400V, Y -connected induction motor. 15M

No-Loa	400V	9A	1250W
Short Circuit	200V	50A	6930W

   The stator loss at stand still is 55% of total copper losses & full load current is 32A.
   From circle diagram, determine:
   i. PF, slip output, efficiency, speed & torque at full load
   ii. Starting torque
   iii. Maximum power output
   iv. Maximum torque in synchronous watts & slip for maximum torque

10. a) State the different methods of speed control of a three phase induction motor and discuss in detail any two methods. 10M

    b) A 400V, 3Φ, Y -connected induction motor has impedance of (0.06+j0.2) Ω & an equivalent rotor impedance of (0.06+j0.22)Ω. Determine the max. gross power output & slip at which it occurs, exciting current may be neglected. 5M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1315

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Date: 4 June, 2014 **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 Whitworth quick return motion mechanism with neat diagram. 8M
   b) With the help of neat sketch, discuss the Oldham's coupling. 7M
2. a) What is the working principle of Scotch yoke mechanism? Explain with neat sketch. 10M
   b) How are sliding and turning kinematic pairs different from each other? Explain. 5M

Unit – II

3. a) In a four bar chain ABCD link AD is fixed and in 15 cm long. The crank AB is 4 cm long rotates at 180 rpm (CW) while link CD rotates about D is 8 cm long BC=AD and angle BAD = 60^0 as shown in Fig.1 Find angular velocity of link CD. 8M

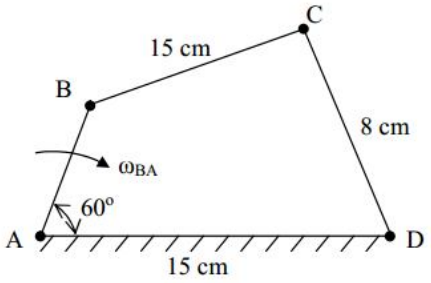


Fig.1

   b) In a crank and slotted lever mechanism crank rotates of 300 rpm in counter clockwise direction as shown in Fig.2. Find: 7M
      i. Angular velocity of connecting rod and
      ii. Velocity of slider

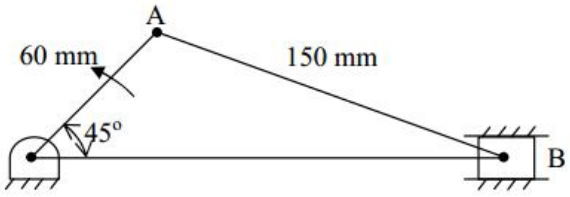


Fig.2.

4. a) How can you show that a Watt mechanism traces an approximate straight line? 10M
   b) What are the limitations of a Scott- Russel mechanism? How is it modified? 5M

Cont...2

Unit – III

5. a) Draw a neat sketch of a Davis Steering gear and explain its working? 12M
   b) The ratio between the width of the front axle and that of the wheel base of a steering mechanism is 0.44. At the instant when the front inner wheel is turned by 18^0, what should be the angle turned by the outer front wheel for perfect steering. 3M
6. a) Explain the procedure to make the Kleins construction for a slider crank mechanism? 10M
   b) Enumerate the conditions for correct steering. 5M

Unit – IV

7. Draw the cam profile for following conditions: 15M
   Follower type=Knife edged, in-line; lift=50mm; base circle radius=50mm; out stroke with SHM, for 60^0 cam rotation; dwell for 45^0 cam rotation; return stroke with SHM, 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 1000 rpm in clockwise direction.
8. a) With neat sketches, explain the following: 10M
      i. Knife edge follower
      ii. Roller follower
      iii. Flat faced follower
      iv. Spherical follower
   b) Define the following: 5M
      i. Tracer Point
      ii. Pitch Curve
      iii. Base Circle
      iv. Prime Circle
      v. Pressure Angle

Unit – V

9. a) A 100mm wide and 10 mm thick belt transmits 5kW of power between two parallel shafts. The distance between the shaft centers is 1.5m and the diameter of the smaller pulley is 440mm. The driving and the driven shafts rotate at 60 rpm and 150 rpm respectively. The coefficient of friction is 0.22. Find the stress in the belt if the two pulleys are connected by 10M
      i. Open belt drive
      ii. Cross belt (Take $\mu = 0.22$)
   b) Write short notes on the phenomenon of creep and slip in a belt. 5M
10. a) An epi-cyclic gear train consists of an arm and two gears A and B having 30 and 40 teeth respectively. The arm rotates about the center of the gear A at a speed of 80 rpm counter clockwise. Determine the speed of the gear B if: 10M
      i. The gear A is fixed
      ii. The gear A revolves at 240 rpm clockwise instead of being fixed
   b) Classify chains and list the application of chain drives in the automobile sector. 5M

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

Question Paper Code : A1707

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

FLIGHT MECHANICS-I

(Aeronautical Engineering)

Date: 4 June, 2014 **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)	Describe with the help of a diagram the mission profile of a civil transport aircraft. What is involved in performance estimation process?	9M
	b)	What is Air data measurement? Explain briefly.	6M
2.	a)	Write down role and design specifications of the performance requirements.	6M
	b)	With suitable examples explain Static Air Temperature (SAT) and Total Air Temperature (TAT).	9M

Unit – II

3.	a)	Derive the equation for motion of aircraft with suitable diagrams.	7M
	b)	Define drag force? Explain any one method used for reducing drag force.	8M
4.	a)	With graph explain the variation of Specific fuel consumption with altitude of an aircraft.	7M
	b)	With neat diagrams explain the concept of minimum drag and minimum power and also derive the expression for velocity at minimum drag and minimum power.	8M

Unit – III

5.	a)	Define the importance of climb gradient and climb rate with respect to flight performance and also derive the expressions of the same.	9M
	b)	Describe the pull-down maneuvers with neat sketches and also explain the importance of V-n diagram.	6M
6.		Derive the expression for rate of turn and turn radius for level turn and explain maneuver boundaries graph.	15M

Unit – IV

7.	a)	How do parametric forms of aerodynamic and thrust forces useful?	7M
	b)	Discuss briefly the space available and space required for take-off of an aircraft.	8M
8.	a)	Explain the principle of flight testing with respect to the performance variables Weight, Altitude and temperature.	7M
	b)	Describe the various aspects of mission profile and fuel planning with relevant sketches.	8M

Unit – V

9.	a)	Describe payload range diagrams with suitable examples.	8M
	b)	Draw the landing performance WAT chart and explain?	7M
10.	a)	Describe the Takeoff field performance runway correction chart with suitable examples.	9M
	b)	Briefly discuss the operational performance data for flight planning.	6M

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

Question Paper Code : A1110

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

BUILDING PLANNING AND DRAWING

(Civil Engineering)

Date: 4 June, 2014 **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 is FAR and FSI. Explain with examples. 8M
   b) Explain the limitations of built up area. 7M
2. a) Explain the open space requirement and height of buildings 8M
   b) Describe briefly the main objectives of building bye laws. 7M

Unit – II

3. a) Explain the characteristics of various types of residential buildings. 8M
   b) Briefly describe the principles of a building. 7M
4. Prepare a line diagram as per convenient scale for a school building for a rural area with the following requirements: 15M
   i. Class rooms = 6
   ii. Headmaster's room with attached toilet
   iii. Staff room = 2
   iv. Office room
   v. Library
   vi. Toilets

   Provisions to be made for corridors. Dimensions may be assumed suitably as per standards.

Unit – III

5. a) Explain briefly critical path method. Give the advantages of the same. 7M
   b) Write a note on objects of planning and stages of construction management. 8M
6. a) Give the importance of project planning and management. 8M
   b) Write briefly the method of planning and scheduling. 7M

Unit – IV

7. Draw and explain with the help of neat sketch the English and Flemish bond at the corner. 15M
8. Draw any two of the following: 15M
   i. King Post Truss
   ii. Queen Post Truss
   iii. Coupled roof or collar roof

Cont...2

Unit – V

9. For the line diagram given in Fig.1, draw the Plan, Elevation and Section at x-x. Assume suitable dimensions for windows and doors. 15M

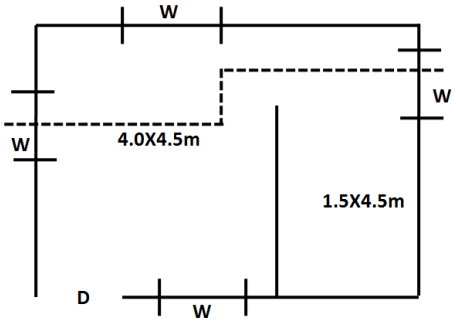


Fig.1

10. Draw Plan, Elevation and Section for the given line diagram in Fig.2. Assume standard dimensions for doors and windows. 15M

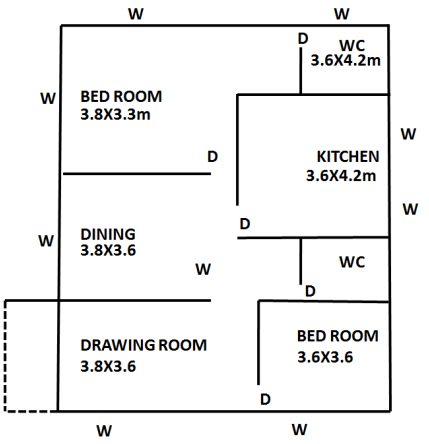


Fig.2

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1511**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech VI Semester Regular Examinations May - 2014

(Regulations: VCE-R11)

DATABASE MANAGEMENT SYSTEMS

(Common to Computer Science and Engineering, Information Technology)

Date: 6 June, 2014 **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 with a neat diagram, the Database Management System Architecture 10M
   b) Explain the three levels of Data Abstraction 5M
2. a) List five responsibilities of a database management system. For each responsibility, explain the problem that would arise if the responsibility were not discharged properly. 5M
   b) Construct an E-R diagram for an airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on individual flights and the schedule and routing of future flights. Specify the key attributes of each entity type and the cardinality ratio 10M

Unit – II

3. Explain in detail the evolution of Logical Database Design from E R Diagram. 15M
4. What is a trigger, and what are its three parts? Why can triggers be hard to understand? Explain the differences between triggers and integrity constraints, and describe when you would use triggers over integrity constraints and vice versa. What are triggers used for? 15M

Unit – III

5. a) Consider a relation R with five attributes ABCDE. You are given the following dependencies: A → B, BC → E and ED → A. 7M
      i. List all keys for R.
      ii. Is R in 3NF
      iii. Is R in BCNF
   b) Consider a relation R that has three attributes ABC. It is decomposed into relations R1 with attributes AB and R2 with attributes BC. 8M
      i. State lossless-join decomposition with respect to this example. Answer this question concisely by writing a relational algebra equation involving R, R1 and R2.
      ii. If you are given the following instances of R1 and R2, what can you say about the instance of R from which these were obtained? Answer this question by listing tuples That are definitely in R and tuples that are possibly in R.
      Instance of R1 = {(5,1), (6,1)}
      Instance of R2= {(1,8), (1,9)}
      Can you say that attribute B definitely is or is not a key for R?
6. Explain 1NF, 2NF, 3NF and BCNF with an example for each. 15M

Cont...2

Unit – IV

7. a) Consider the following actions taken by transaction T1 on database objects X and Y : R(X), W(X), R(Y), W(Y) 8M
   i. Give an example of another transaction T 2 that, if run concurrently to transaction T1 without some form of concurrency control, could interfere with T1.
   ii. Explain how the use of Strict 2PL would prevent interference between the two transactions.
   iii. Strict 2PL is used in many database systems. Give two reasons for its popularity.
   b) Describe how a typical lock manager is implemented. Why must lock and unlock be atomic operations? What is the difference between a lock and a latch? 7M
8. a) SQL supports four isolation-levels serializable: Read Uncommitted, Read Committed and Repeatable Read. For each of the four isolation levels, give examples of transactions that could be run safely at that level. 8M
   b) Compare lock downgrades with upgrades. Explain why downgrades violate 2PL but are nonetheless acceptable. Discuss the use of update locks in conjunction with lock downgrades. 8M

Unit – V

9. Explain the difference between Hash indexes and B+-tree indexes. In particular, discuss how equality and range searches work, using an example. 15M
10. a) Explain the RAID System and how it improves performance and reliability. Discuss choice of RAID levels 7M
    b) Consider the following relations: 8M
    Emp(eid: integer, ename: varchar, sal: integer, age: integer, did: integer)
    Dept(did: integer, budget: integer, floor: integer, mgreid: integer)
    Salaries range from $10,000 to $100,000, ages vary from 20 to 80, each department has about five employees on average, there are 10 floors, and budgets vary from $10,000 to $1 million. You can assume uniform distributions of values.
    For each of the following queries, which of the listed index choices would you choose to speed up the query? If your database system does not consider index-only plans (i.e., data records are always retrieved even if enough information is available in the index entry), how would your answer change? Explain briefly.
    1. Query: Print ename, age, and sal for all employees.
    (a) Clustered hash index on ename,age,salfields of Emp.
    (b) Unclustered hash index on ename,age,sal fields of Emp.
    (c) Clustered B+ tree index on ename,age,salfields of Emp.
    (d) Unclustered hash index on eid,did fields of Emp.
    (e) No index.
    2. Query: Find the dids of departments that are on the 10th floor and have a budget of less than $15,000.
    (a) Clustered hash index on the floor field of Dept.
    (b) Unclustered hash index on the floor field of Dept.
    (c) Clustered B+ tree index on floor,budget fields of Dept.
    (d) Clustered B+ tree index on the budget field of Dept.
    (e) No index.

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1013

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Electronics and Communication Engineering)

Date: 6 June, 2014 **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 is cross elasticity of demand? Explain. 15M
   b) Explain in detail, the functional nature of market demand.
2. a) Compute 3-day moving average from the following daily sales data. 8M

Date and month	Daily sales (Lakhs of tonnes)
Jan 1	40
2	44
3	48
4	45
5	53

   b) Explain in detail the barometric technique of forecasting. 7M

Unit – II

3. a) Write a note on Cobb – Douglas production function. 5M
   b) Explain with a neat sketch, the behavior of costs in short run. 10M
4. A firm has a fixed cost of Rs. 10,000; selling price per unit is Rs. 5 and variable cost per unit is Rs. 3. 15M
   i. Determine break-even point in terms of volume and also sales value
   ii. Calculate the margin of safety considering that the actual production is 8000 units

Unit – III

5. a) What are the features of perfect competition? 9M
   b) Write a note on Price Determination Under Monopolistic Competition. Explain Short and long run equilibrium with profit and loss. Illustrate the same with graphs. 6M
6. a) With a neat sketch, explain the short-run equilibrium price that results in economical losses. 8M
   b) Explain the two equivalent measures of producer surplus with graphs. 7M

Unit – IV

7. a) Write the characteristic features of business. 6M
   b) Explain public enterprises and its types citing examples. 9M
8. a) Explain the three rates of return that appear frequently in Engineering Economy studies. 8M
   b) What is capital budgeting? Explain the features of capital budgeting proposals. 7M

Cont...2

Unit – V

9. In the year 2005, the bad debts amounted to Rs. 2000. It was desired to open a provision for doubtful debts account by calculating 5% on sundry debtors which amounted to Rs. 40,000. In 2006, the actual bad debts amounted to Rs. 1600 and the provision for doubtful debts was required to be maintained at 5% on sundry debtors which stood at Rs. 50,000 on 31st December 2006. In 2007 the actual bad debts amounted to Rs. 400 and the doubtful debt provision was required to be maintained at 5% on sundry debtors which stood at Rs. 30,000 on 31st December 2007. Pass the journal entries and show the bad debts account and the provision for doubtful debts account for the three years. Show also the effect of the transactions on the Profit and loss account and the balance sheet of each year. 15M

10. a) Explain the objectives of double entry system 7M
    b) Explain the advantages and the disadvantages of double entry system of accounting 8M

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1209

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

POWER SYSTEM GENERATION

(Electrical and Electronics Engineering)

Date: 6 June, 2014 **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 the function of: 8M
   i. Penstock
   ii. Surge tank
   iii. Spill way
   iv. Trash rack applicable to hydel power plant
   b) A hydro-electric power station is supplied from a reservoir of capacity $3x10^7$ m^3 at a head of 150 m. Determine the total energy available in kWh, if the overall efficiency of the plant is 70%. 7M
2. a) Briefly discuss various non-conventional methods of generating electrical energy. 8M
   b) Discuss in brief about pumped storage power plant. 7M

Unit – II

3. With a neat schematic layout, explain the various components of typical coal-fired power station. 15M
4. a) Why air pre-heater is required in water tube boiler system? Explain how it saves fuel in the plant. 8M
   b) Discuss in brief about cooling towers and condensers of thermal power station. 7M

Unit – III

5. a) Explain the functions of the following: 9M
   i. Control rods
   ii. Moderator
   iii. Coolant used in a nuclear reactor
   b) Briefly explain the various components of a Gas power station. 6M
6. a) With neat sketch, explain the nuclear chain reaction process. 7M
   b) Compare BWR and PWR. 8M

Unit – IV

7. a) With a neat layout explain all the components of a substation. 8M
   b) Explain the single bus bar scheme with bus sectionalizer. 7M
8. a) Differentiate Gas insulated and air insulated substation. 8M
   b) Draw and briefly explain the single line diagram of gas insulated substation. 7M

Cont...2

Unit – V

9.	a)	A power station is to supply four regions of loads whose peak loads are 15,000 kW, 10,000 kW, 9,000 kW and 11,000 kW respectively. The diversity factor of the loads at the station is 1.5 and the average annual load factor is 50%. Calculate the maximum demand on the station and the annual energy from the station. Suggest the installed capacity and the number of units taking all aspects into account.	8M
	b)	Discuss in brief about methods of power factor improvement in power system.	7M
10.	a)	Discuss about the significance of load factor and diversity factor with respect to cost of electrical supply.	8M
	b)	Mention the disadvantages of low power factor and advantages of improved power factor.	7M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1014**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

PROBABILITY AND STATISTICS

(Mechanical Engineering)

Date: 6 June, 2014 **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) A lot consists of 10 good articles, 4 with minor defects and 2 with major defects. Two articles are chosen from the lot at random (without replacement). Find probability that: 8M
   i. Both are good
   ii. Both have major defects
   iii. At least 1 is good
   iv. At most 1 is good
   v. Exactly 1 is good
   vi. Neither has major defects
   vii. Neither is good

   b) Two defective tubes get mixed up with 2 good ones. The tubes are tested, one by one, until both defectives are found. What is probability that the last defective tube is obtained on: 7M
   i. The second test,
   ii. The third test and
   iii. The fourth test

2. a) A can hit a target four times in 5 shots, B three times in 4 shots and C twice in 3 shots. Calculate the probability: 9M
   i. A, B, C all may hit
   ii. B, C may hit and A may loose
   iii. C, A may hit and may loose

   b) State and prove Baye's theorem. 6M

Unit – II

3. a) Explain the important properties of Normal Distribution and its applications 7M

   b) Consider a project that yields an average cash flow of Rs. 500 lakhs with a standard deviation of Rs. 60 lakhs. Calculate the following probabilities: 8M
   i. Cash flow will be more than 560 lakhs
   ii. Cash flow will be less than Rs. 420 lakhs
   iii. Cash flow will lie between Rs. 460 lakhs and Rs. 540 lakhs
   iv. Cash flow will be more than Rs. 680 lakhs

4. a) The mean weight of 500 male students at a certain college is 151 lb and the standard deviation is 15 lb. assuming that the weights are normally distributed, find how many students weigh 7M
   i. Between 120 and 155 lb
   ii. More than 185 lb

   b) A machine produces following units per hour. The data is randomly collected for 10 hours. The production is 63, 64, 69, 71, 70, 69, 63, 70, 65, and 66. If the mean production is 65 units, calculate the value of t. 8M

Cont...2

Unit – III

5. a) Enumerate the steps involved in testing of hypothesis. 7M

   b) A machine turns out 16 defective items in a batch of 500. After overhauling, it turns out 3 defective items in a batch of 100. Has the machine improved after overhauling? 8M

6. a) In a certain continuous production process it was found that the mean measurement of some characteristics of the product occasionally shifts due to slight changes in the machine setting, while the variability is seldom affected. The periodic checkup are made to ensure that the mean is not off the mark and σ is stable. Suppose that in this production process the target value of μ is $\mu_0 = 50$ and σ is known to be 2.5. The sample measurements on a day are 43, 51, 50, 41, 53, 52, 47, 54, 51, 45, 48 and 47. The production manager will welcome any change of μ towards higher values, however he will like to safeguard against decreasing values of μ. Formulate the null hypothesis and test the same. 10M

   b) A certain control process produces 15 percent defectives. A supplier of a new basic raw material claims that the use of his material would reduce the fraction of defective. On making a production trial run with this new material, it was found that from an output of 400 units, 52 were defective. Would you accept the suppliers claim? 5M

Unit – IV

7. a) From a random sample of 10 pigs fed on diet A, the increases in weight in a certain period were 10,6,16,17,13,12,8,14,15,9 lbs. for another random sample of 12 pigs fed on diet B, the increases in the same period were 7,13,22,15,12,14,18,8,21,23,10,17 lbs. Test whether diets A and B differ significantly as regards their effect on increases in weight ? 8M

Diet A			Diet B		
x_i	$x_i - \bar{x}$	$\left(x_i - \bar{x}\right)^2$	y_i	$y_i - \bar{y}$	$\left(y_i - \bar{y}\right)^2$
10	-2	4	7	-8	64
6	-6	36	13	-2	4
16	4	16	22	4	49
17	5	25	15	0	0
13	1	1	12	-3	9
12	0	0	14	-1	1
8	-4	16	18	3	9
14	2	4	8	-7	49
15	3	9	21	6	36
9	-3	9	23	8	64
			10	-5	25
			17	2	4
120	0	120	180	0	314

   b) Following table gives the number of units produced by two workers: 7M
   Worker A: 33, 27, 32, 35, 42, 34, 38,28, 43, 41, 37, 30
   Worker B: 16, 20, 27, 26, 22, 23, 24, 18, 19, 25.
   Calculate the value of F.

Cont...3

8. A milk producers union wishes to determine whether the preference pattern of consumers for the newly introduced Yogo Srikand over the Standard Topiwala Srikand is dependent upon the income levels. A random sample of 500 individuals were taken and the responses were classified into 3x3 contingency table as given On the basis of the above information will you conclude that preference pattern is independent of the income level. 15M

Preference Income	Prefer Yogo	Indifferent	Prefer Topiwala	Total
Low	170	30	80	280
Medium	50	25	60	135
High	20	10	55	85
Total	240	65	195	500

Unit – V

9. a) Customers arrive at one-man barber shop according to a poisson process with the mean inter arrival time of 12 min. customers spend an average of 10 min in the barber's chair. 8M
   What is the expected number of customers in the barber shop and in the queue?
   Calculate the percentage of time an arrival can walk straight into the barber's chair without having to wait.
   How much time can a customer expect to spend in the barber's shop?
   Management will provide another chair and hire another barber, when a customers waiting time in the shop exceeds 1.25h. How much must the average rate of arrivals increase to warrant a second barber?
   What is average time customers spend in queue?
   What is probability that the waiting time in the system is greater than 30 min?
   Calculate the percentage of customers who have to wait prior to getting into the barber's chair.
   What is the probability that more than 3 customers are in the system?

   b) A duplicating machine maintained for office use is operated by an office assistant who earns Rs 5 per hour. The time to complete each job varies according to an exponential distribution with mean 6min. assume a poisson input with an average arrival rate of 5 jobs per hour. If an 8-h day is used as a base determine: 7M
      i. The percentage idle time of the machine
      ii. The average time a job is in the system and
      iii. The average earning per day of the assistant

10. a) Explain the following terms: 6M
      i. Service discipline
      ii. Waiting time
      iii. Server

    b) Arrival at a telephone booth are considered to be Poisson, with an average time of 10 minutes between one arrival and the next. The length of the phone call is assumed to be distributed exponentially with a mean of 3 minutes: 9M
      i. What is the probability that a person arriving at the booth will have to wait
      ii. What is the average length of the queue that is formed from time to time
      iii. The telephone department will install a second booth when convinced that an arrival would expect to have to wait at least three minutes for the phone. By how much the flow of arrivals be increased in order to justify a second booth.

Hall Ticket No: | | | | | | | | | | | Question Paper Code : A1708

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

MECHANISMS AND MECHANICAL DESIGN

(Aeronautical Engineering)

Date: 6 June, 2014 **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) Differentiate between Machines and Mechanisms. 5M
   b) What is Link? Briefly explain the classification of Kinematic pairs. 10M
2. a) Sketch and explain Peaucellier Mechanism. 5M
   b) List and Explain any three inversions of Four bar chain mechanism. 10M

Unit – II

3. In a slider crank mechanism shown in Fig 1, the crank is 200 mm long and rotates at 40 rad/sec in a CCW direction. The length of the connecting rod is 800 mm. When the crank turns through 60° from Inner-dead centre. Determine 15M
   i. The velocity of the slider
   ii. Velocity of point E located at a distance of 200 mm on the connecting rod extended.
   iii. The position and velocity of point F on the connecting rod having the least absolute velocity
   iv. The angular velocity of connecting rod.
   v. The velocity of rubbing of pins of crank shaft, crank and cross head having pins diameters 80,60 and 100 mm respectively.

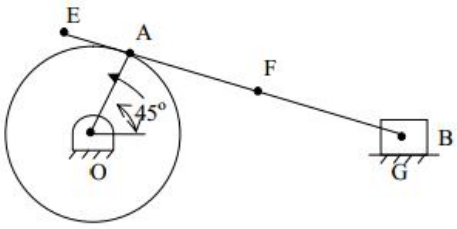


Fig.1

4. Explain the procedure to draw velocity and acceleration vector diagram for a slider crank mechanism shown in Fig.2 using Klein's construction 15M

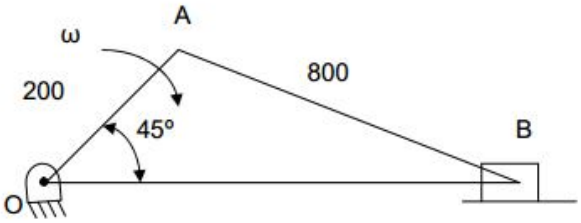


Fig.2

Cont...2

Unit – III

5. In the toggle mechanism shown in Fig.3 the slider D is constrained to move in a horizontal path the crank OA is rotating in CCW direction at a speed of 180 rpm the dimensions of various links are as follows: 15M
   OA = 180 mm, CB = 240 mm, AB = 360 mm and BD = 540 mm
   Find using I centre method,
   i) Velocity of slider
   ii) Angular velocity of links AB, CB and BD

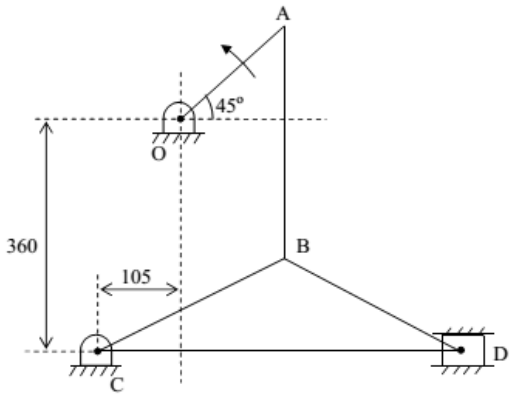


Fig.3

6. a) A four bar mechanism has links AB = 300 mm, BC = CD = 360 mm and AD= 600 mm. Angle BAD=60°. Crank AB rotates in CW direction at a speed of 100rpm. Locate all the instantaneous centers and determine the angular velocity of link BC. 8M

   b) The rotor of the turbine of a ship has a mass of 2500kg and rotates at a speed of 3200rpm C.C.W when viewed from stern. The rotor has radius of gyration of 0.4m. Determine the gyroscopic couple and its effect when 7M
      i. The ship steers to left in a curve of 80m radius at speed of 15 knots (1 knot=1.86hm/h)
      ii. The ship pitches 5° above and 5° below the normal position and the bow is descending with its maximum velocity. The pitching motion follows SHM with time period 40s
      iii. The ship rolls and at this instant its angular velocity is 0.4 rad/s C.W from stern. Also find maximum angular acceleration during pitching

Unit – IV

7. Draw the cam profile for following conditions: 15M
   Follower type = roller follower, in-line; lift = 25mm; base circle radius = 20mm; roller radius = 5mm; out stroke with Uniform Acceleration and Retardation Motion (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 max. velocity and acceleration during out stroke and return stroke if the cam rotates at 1200 rpm in clockwise direction.
8. Draw the cam profile for following conditions: Follower type = Knife edged, in-line; lift = 50mm; base circle radius = 50mm; out stroke with Simple Harmonic Motion (SHM), for 60^0 cam rotation; dwell for 45^0 cam rotation; return stroke with SHM, 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 1000 rpm in clockwise direction. 15M

Cont...3

Unit – V

9. a) State and explain the Law of Gearing. 6M

   b) In an epicyclic gear train, the internal gears A & B, and compound gears C & D rotate independently about the axis O. The gears E & F rotate on pins fixed to the arm G, and gear E meshes with A & C, and Gear F meshes with B & D. All the wheels have same module and number of teeth are T_C=28, T_D=26, T_E=T_F=18. Sketch the arrangement, find the number of teeth on A & B, if the arm makes 100rpm clockwise and A is fixed. Find the speed of gear B. 9M

10. a) A solid shaft is transmitting 1MW at 240 rpm. Determine the diameter of the shaft, if the maximum torque transmitted exceeds the mean torque by 20 %. Take maximum allowable shear stress as 60MPa. 6M

    b) A helical spring is made from a wire of 6mm diameter and has outside diameter of 75mm. If the permissible shear stress is 350MPa and modulus of rigidity 84KN/mm^2, find the axial load which the spring can carry and the deflection per active turn (Neglect effect of curvature). 9M

Hall Ticket No: | | | | | | | | | | | **Question Paper Code : A1111**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

Four Year B. Tech IV Semester Regular/Supplementary Examinations June - 2014

(Regulations: VCE-R11)

SURVEYING-II

(Civil Engineering)

Date: 6 June, 2014 **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 diagram explain prismatic compass. 7M
   b) Compute the interior angle AOB from the following bearings. 8M
      i. OA = 44^0 20' OB = 178^0 40'
      ii. OA = 100^0 10' OB = 212^0 45'
      iii. OA = N 42^0 31' E OB = N 76^0 47' E
      iv. OA = S 74^0 07' E OB = N 42^0 04' W
2. a) What does traverse surveying mean? Distinguish between closed And open traverse? 5M
   b) In a closed traverse ABCDE, the observed FB of the lines was as follows. Calculate the interior angles and apply check. 10M

Line	Fore bearings
AB	60^0 30'
BC	122^0 00'
CD	46^0 00'
DE	205^0 30'
EA	300^0 00'

Unit – II

3. a) What is meant by orientation of plane tabling? Name different methods and explain in brief "Orientation by back sighting ". 8M
   b) Explain the working operation of plane table. 7M
4. a) What are the accessories used in plane table survey. Explain each of them briefly with neat sketches. 10M
   b) What are the advantages and disadvantages of plane table surveying? 5M

Unit – III

5. a) List the different systems of Tacheometric measurement. Describe Subtense method. 7M
   b) Briefly explain the method for finding out the additive and multiplicative constants of Tachometric Survey. 8M
6. A line PQ was observed by Tachometric survey and the following details were observed: 15M

Staff Point	Vertical Angle	Staff intercept	Axial hair Readings
P	+ 8°36′	2.350	2.105
Q	+ 6°6′	2.055	1.895

Find the length of PQ and the RL of Q if that of P is 321.500. Take K=100.

Cont...2

Unit – IV

7.	a)	What are the main functions of GIS?	4M
	b)	List the various sub systems of GIS and briefly explain each of them.	11M
8.	a)	Write a brief note on applications of GPS.	7M
	b)	Briefly explain Kinematic Technique Survey using GPS technique.	8M

Unit – V

9.	a)	With a neat sketch explain various elements of a simple curve.	10M
	b)	How curves are designated? Derive the equation for "degree of curvature" for a chord of length 30m.	5M
10.		Calculate the data to set out a compound curve, for the following details:	15M

i. Total deflection angle=80^0
ii. Deflection angle for smaller curve =35^0
iii. Radius of smaller curve=300m
iv. Radius of larger curve = 400m
v. Chainage of intersection = 2600.000m
vi. Take peg interval of 30m