VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
MICROPROCESSORS AND INTERFACING

(Common to Computer Science and Engineering & Information Technology)

Date : 3 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1.	a)	What is the function of bus interfacing unit in 8086 architecture? Explain.	8M
	b)	With an example explain the direct addressing mode in 8086.	7M
2.	a)	List the features of 8086 microprocessor.	8M
	b)	What are segment registers? Explain the purpose of segment registers.	7M

Unit - 2

3.	a)	What is the function of assembler directives? Explain.	7M
	b)	Explain the structure of macro with the help of an example.	8M
4.	a)	Write a sample program to convert 4-digit hex into its decimal and then ASCII equivalent and display it.	7M
	b)	Explain the following assembler directives: ALIGN, EXTRN, PROC and PUBLIC	8M

Unit - 3

5.	a)	Write a program to initialize 8255 in the configuration given below: PortA: Simple input; Port B: Simple output; Port CL: output; Port CH: input. Assume address of the control word register of 8255 is 83H.	5M
	b)	Design an 8086 based system with the following specifications. i. 8086 in minimum mode ii. 64 K Byte EPROM iii. 64 K Byte RAM Draw the complete schematic of the design indicating address map.	10M
6.	a)	Explain the interfacing of ADC to 8086.	7M
	b)	With a schematic, explain the interfacing of keyboard to 8086.	8M

Unit - 4

7.	a)	Describe the purpose of the 8086 interrupt pointer table.	7M
	b)	With a block diagram explain the operation of DMA controller in a microcomputer system.	8M
8.	a)	Explain the difference between BIOS and DOS interrupts.	8M
	b)	Explain the interfacing and refreshing of DRAM in the IBM PC.	7M

Unit - 5

9.	a)	Explain the bit format used for sending asynchronous serial data.	7M
	b)	Explain how MC3488A driver and MC3486 receiver used for RS-423 signal transmission.	8M
10.	a)	List the salient features of 80386.	7M
	b)	Write a short notes on RS-232c serial data standard.	8M
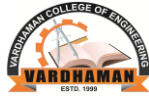
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to Electronics and Communication Engineering &
Electrical and Electronics Engineering)

Date : 3 December, 2013　　　　　Time : 3 Hours　　　　　Max. Marks : 75

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

Unit - 1

1. a) "Object oriented development helps manage complexity of massive software intensive systems". How?　　5M
    b) Write a Java program to accept a number, reverse it and check if the number is palindrome or not. Print suitable message.　　10M
2. a) "Java is a simple, 2- stage system", discuss.　　5M
    b) Explain with examples, any two character extraction functions of String class. Write a program to accept a full name and compute initials from that full name. (e.g: "Peter Pan" – initial is PP).　　10M

Unit - 2

3. a) Write a program to maintain the office database. The Employee class should contain the information as follows- Emp_code, Emp_name, Address, Ph_no, Da-10%, Hra-20%. Create three subclasses namely Manager, Typist, officer each class having their own basic pay. The DA and HRA remain same for all employees.　　8M
    b) Explain the concept of interfaces in java.　　7M
4. a) Design a class Balance which keeps track of customers balance in a bank. Write a test driver program to validate the class designed. Note: The test driver should work when placed in any folder.　　8M
    b) Write a Java program to demonstrate reading contents from a file.　　7M

Unit - 3

5. a) How do you create user defined exceptions in Java? Give example.　　8M
    b) Write a multithreaded Java program to implement a synchronized buffer (queue). Create "Supplier" – a threaded object that makes entries into the queue, and a "Consumer" – a threaded object that consumes queue entries. Demonstrate the creation of buffer, Supplier and Consumer that operates in synchronized manner.　　7M
6. a) What is the need for Inter-thread communication mechanism? How does Java support inter – thread communication?　　8M
    b) Write a simple program in Java to collect data about the student like name, dob, three test marks. The program must handle a customized exception "Entry of negative marks" upon the entry of negative number for test marks.　　7M

Unit - 4

7. a) Write a Java program for handling mouse events.　　12M
    b) List few components in java and what are the events it generates.　　3M
8. a) Write a code snippet to demonstrate TextFiled AWT Control.　　7M
    b) Create a new KeyAdapter instance. Override the keyPressed method to customize the handling of that specific event. Now every time the user presses a key this method should be launched.　　8M

Unit - 5

9. a) What is an applet? List any two advantages and disadvantages of applets.   5M

   b) Write a program to demonstrate JList with a DefaultListModel.   10M

10. Write a java program to create the following table using JTree of Swings   15M
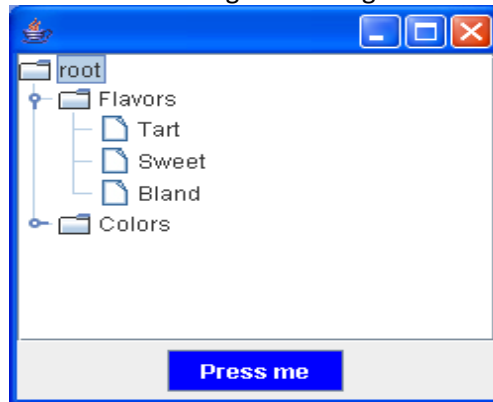
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Mechanical Engineering)

Date : 3 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) What is meant by demand? Explain the important determinants of demand.   8M
   b) State and explain the laws of demand with an example.   7M
2. a) Compute 3-day moving average from the following daily sales data.   5M

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

   b) Explain in detail the barometric technique of forecasting.   10M

Unit - 2

3. a) What are isoquants? What are their features?   5M
   b) Write a note on Cobb-Douglas production function.   5M
   c) Outline the basis of distinctions among cost concepts.   5M
4. a) Explain the different types of internal economies.   9M
   b) Explain the laws of returns that govern production function.   6M

Unit - 3

5. a) Explain the term monopolistic competition and explain the characteristics of monopolistic competition   6M
   b) State the types of competition. Discuss the importance of advertising in the case of monopolistic competitive firm   9M
6. a) Can a monopolist suffer losses? If so, when. When will he decide to shut down in the short run. Explain   8M
   b) Show that under monopoly price is higher and output smaller than under perfect competition.   7M

Unit - 4

7. Write short notes on the following with examples   15M
   a) Joint stock company
   b) Partnership
   c) Sole Proprietorship
8. a) Define the term capital and capital budgeting. Explain the features of capital budgeting proposals.   7M
   b) Write short notes on   8M
      i. Payback method
      ii. Accounting rate of return

Cont…2

Unit - 5

9. a) Differentiate between trial balance and balance sheet.   5M
    b) What are the advantages of trading accounts?   5M
    c) What is the difference between trading account and profit and loss account?   5M

10. The following trial balance was taken from the books of Habib-ur-Rehman on December 31,   15M
    1980:

Cash	13,000	
Sundry debtors	10,000	
Bills receivable	8,500	
Opening stock	45,000	
Buildings	50,000	
Furniture and fittings	10,000	
Investment (Temporary)	5,000	
Plant and machinery	15,500	
Bills payable		9,000
Sundry Creditors		20,000
Habib's capital		78,200
Habib's drawings	1,000	
Sales		1,00,000
Sales discount	400	
Purchases	30,000	
Fright in	1,000	
Purchase discount		500
Sales, salary expenses	5,000	
Advertising expenses	4,000	
Miscellaneous sales expenses	500	
Office salary expenses	8,000	
Miscellaneous general expenses	1,000	
Interest income		1,000
Interest expenses	800	
	2,08,700	2,08,700

Closing stock on December 31, 1980 was Rs.10,000

Prepare income statement / trading and profit and loss account and balance sheet from the above trial balance in report form.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)

AIR TRANSPORTATION SYSTEMS

(Aeronautical Engineering)

Date : 3 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. Define 'oligopoligy'. Why is the airline industry characterized as an oligopoligy? Briefly explain. — 15M

2. Write a note on history of aviation evolution, growth and its development. — 15M

Unit - 2

3. Discuss the economical and technical aspects of regulation. What is the role of ICAO and IATA in the industry? — 15M

4. What is deregulation revolution? Was the airline industry benefited or thrown to loss after deregulation? Comment and support your answer. — 15M

Unit - 3

5. What are the various costs involved in airline industry? What is meant by direct and indirect operating costs? Elaborate. — 15M

6. Explain the following with help of neat diagrams: — 15M
   a) Wake vortices
   b) Cabin dimensions
   c) Flight deck

Unit - 4

7. Explain briefly the process of route selection and development carried out in setting up the airline industry. — 15M

8. Explain in brief
   a) Runway characteristics — 7M
   b) Runway capacity. — 8M

Unit - 5

9. Write a note on the categories of airspace and separation minima. — 15M

10. Explain Future air navigation systems and air navigation service providers as business. — 15M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
DESIGN OF REINFORCED CONCRETE STRUCTURE
(Civil Engineering)

Date : 3 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Write the principles of limit state of design. List the different limit states and explain.   7M
   b) Define effective cover, effective span, total tension and total compression.   8M
2. a) Explain the necessity of partial safety factor in the limit state of design and mention the codal provision for materials and loads.   7M
   b) Define moment of resistance, neutral axis, lever arm and clear cover for a beam section.   8M

Unit - 2

3. a) Draw a standard T section with usual notations labelling its parts and codal requirements.   5M
   b) A reinforced concrete beam has width equal to 300 mm and total depth equal to 700 mm, with a cover of 40 mm to the centre of the reinforcement. Design the beam if it is subjected to a total bending moment of 150 kN-m. Use M 20 concrete and HYSD bars of grade 415.   10M
4. a) List the circumstances under which doubly reinforced section is provided.   3M
   b) A reinforced concrete beam 250 mm wide and 400 mm effective depth is subjected to ultimate design shear force of 150 kN at the critical section near supports. The tensile reinforcement at the section near supports is 0.5 percent. Design the shear stirrups near the supports. Also, design the minimum shear reinforcement at the mid span. Assume concrete of grade M 20 and mild steel bars of Fe 250 grade.Span of beam is 4.5m.   12M

Unit - 3

5. A reinforced concrete beam of rectangular section 300mm wide is reinforced with four bars of 25mm diameter at an effective depth of 600mm. The beam has to resist a factored shear force of 400KN at support section. Adopt M_{25} concrete and Fe 415 steel and design vertical stirrups for the section. Sketch the details of reinforcement.   15M
6. Design a simply reinforced concrete beam to suit the following data: clear span = 3m; width of support = 200mm; live load = 6KN/m; M_{20} grade concrete; Fe 415 HYSD bars. Sketch the details of reinforcement.   15M

Unit - 4

7. a) Define the terms effective length, pedestal, column and wall and classify the columns based on types of reinforcement.   5M
   b) Design the reinforcement in a column of size 400mmX600mm subjected to a axial load of 2000KN under service load and live load. The column has an unsupported length of 3m and effectively held in position and restrained against rotation at both ends. Use M_{25} concrete and Fe 415 steel. Sketch the details of reinforcement.   10M

8. Design an isolated footing for a square column 400mmX400mm with 12-20mm diameter longitudinal bars carrying service loads of 1500KN with M_{20} and Fe 415. The safe bearing capacity of soil is 250KN/m^2 at a depth of 1m below the ground level. Use M_{20} and Fe 415. Sketch the details of reinforcement.   15M

Unit - 5

9. a) Differentiate one way slab and two way slab.   5M
   b) Design a two way slab for a room of size 4m X 5m with discontinuous and simply supported edges on all the sides with corners prevented from lifting to support a live load of 4 kN/m^2. Adopt M-20 grade of concrete and Fe-415 HYSD bars.   10M
10. a) How do you prevent crack in RC structural member?   5M
    b) A rectangular section beam 200 mm wide by 450 mm overall depth is reinforced with 3 bars of 16 mm diameter at an effective depth of 420 mm. Two hanger bars of 12 mm diameter are provided at the compression face. The effective span of the beam is 5m. The beam supports a service live load of 10 kN/m. If f_{ck} = 20 N/mm^2 and f_y = 415 N/mm^2, compute the short-term deflection.   10M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
SOFTWARE ENGINEERING
(Common to Computer Science and Engineering & Information Technology)

Date : 15 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) Although the industry is moving towards component based construction most software continues to be custom built. Comment.   7M
    b) How does Boehmn describe the spiral model? List two main distinguishing features of it. Describe briefly how spiral model is a realistic approach to the development of large-scale systems and software.   8M
2. a) For the given Myths, comment on the reality   7M
        • Software requirements continually change, but change can be easily accommodated because software is flexible.
        • The only deliverable work product for a successful project is the working program.
    b) Explain briefly Level 0 to Level 3 capacity levels of Capability Maturity Model Integration.   8M

Unit – 2

3. a) Online cloths shop is a service provided by a cloth store, which enables customers to buy cloth and shoes online via the internet. Assume that you are asked to develop an online cloth shop. List any five functional and nonfunctional requirements for the same.   10M
    b) What is a design pattern? List any thee intents of design patterns.   5M
4. a) What is the purpose of domain analysis? How is it related to the concept of requirements patterns?   7M
    b) Briefly discuss the different techniques used in requirements elicitation.   8M

Unit – 3

5. a) Explain briefly when alpha, beta and customer acceptance testing are performed.   5M
    b) Draw the Use case diagrams, class diagrams, sequence diagrams and collaboration diagrams for Simple Auto-Teller Machine.   10M
6. a) Explain any four design principles suggested by Mandel that enable an interface to reduce the users memory load.   5M
    b) Draw the Use case diagrams, class diagrams, sequence diagrams and collaboration diagrams for Library Management System.   10M

Unit – 4

7. a) Explain any five metrics used to measure the software project.   10M
    b) Why should some software metrics be kept "Private"? Provide examples of three metrics that should be private. Provide examples of three metrics that should be public.   5M
8. a) Describe the different metrics that are to be considered while measuring the web applications.   10M
    b) Discuss the difference between process and project metrics.   5M

Unit – 5

9. a) Describe the terms quality control and quality assurance. 7M
   b) Identify any two attributes and their corresponding metrics for achieving following 8M
   software quality goals.
   - Requirement quality
   - Design quality
   - Code quality
   - QC effectiveness
10. a) What does phrase "cost of quality" mean? Explain briefly prevention, appraisal and 10M
    failure cost with respect to cost of quality.
    b) Software quality assurance encompasses a broad range of concerns and activities that 5M
    focus on the management of software quality. Comment.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Date : 15 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Explain static characteristics of instrument and measurement systems in brief.   8M
   b) Describe the principle of operation of a thermocouple instrument. Give advantages and disadvantages of this type over the other types.   7M
2. a) With a neat circuit diagram, explain the working of multi range voltmeter.   7M
   b) The expected value of the voltage across a resistor is 80v, however the measurement gives a value of 79v. Calculate   8M
      i. Absolute error
      ii. Percentage of error
      iii. relative accuracy
      iv. Percentage of accuracy

Unit - 2

3. a) Explain function of Cathode Ray Tube with a neat block diagram.   9M
   b) The sketches shown in fig.1 display Lissajous patterns for cases where voltages of same frequency out of different phase are connected to Y and X plates of the oscilloscope. Find the phase difference in each case. The spot generating the patterns moves in the anticlockwise direction.   6M
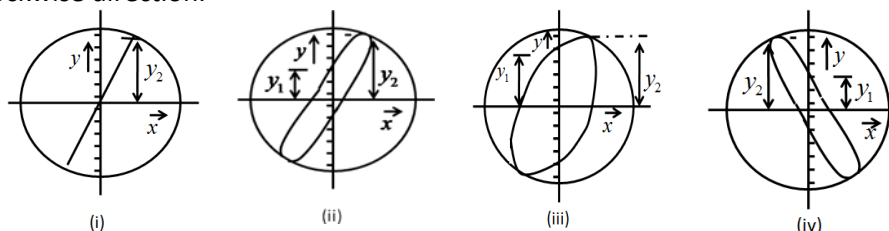

fig.1

4. a) With neat diagram, explain the delay of vertical signal allows the horizontal sweep to start prior to vertical deflection.   10M
   b) Explain how a frequency of waveform is measured using Cathode Ray Oscilloscope.   5M

Unit - 3

5. a) Explain the operation of sampling oscilloscope with the help of block diagram and necessary waveforms.   7M
   b) Sketch the deflection system for dual-trace oscilloscope. Explain its operation. Also, explain the use of a system in chopped mode and in alternate mode with waveforms.   8M
6. a) What are the different problems associated with measurement of low resistance? Explain the principle of working a Kelvin's double bridge. Draw the circuit of a Kelvin's double bridge used for the measurement of low resistances. Write the condition for balance.   8M
   b) Derive the equations of balance for an Anderson's bridge. Draw the phasor diagram for conditions under balance.   7M

Unit - 4

7. a) With a circuit diagram, explain the operation of bridge circuit with a resistance thermometer as one of the bridge elements.　　10M

b) A resistance strain gage with a gage factor of 2 is fastened to a steel member, subjected to a stress of 1050 kg/cm^2, the modulus of elasticity of steel is approximately 2.1×10^6 kg/cm^2. Calculate the change in resistance ΔR of the strain gage element due to applied stress.　　5M

8. a) With a neat circuit diagram, explain the wheat stone bridge employing two RTD's.　　10M

b) With a neat diagram, explain the elements of piezoelectric transducer.　　5M

Unit - 5

9. a) A strain gauge is used for measurement of dynamic strain as shown in fig.2. The strain gauge has a resistance of 1KΩ when unstrained. A resistance of 1KΩ is connected in the arm adjacent to strain gauge. The resistances of other two arms are 10KΩ each. The strain gauge is bonded to structural member and is subjected to a sinusoidal time varying strain. As a result of this strain, the resistance value of strain gauge between extremes of 999Ω and 1001Ω. The bridge output is connected to an amplifier. Determine the equivalent circuit. The supply voltages is 10V.　　8M
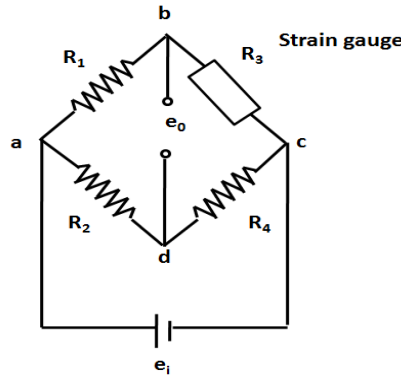

fig.2

b) What is a data acquisition system and describe the function of each component?　　7M

10. a) Where are sample and hold circuit used? Sketch the circuit arrangement along with output waveform and discuss briefly the operation of the circuit.　　7M

b) Explain the following methods of measurement of torque.　　8M
i. Digital methods
ii. Magnetostrictive methods

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013

(Regulations: VCE-R11)

SIGNAL ANALYSIS AND TRANSFORM TECHNIQUES

(Electrical and Electronics Engineering)

Date : 15 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit – 1

1. a) Given $x[n] = \{\ 2,6,3,5,\ 0,8\ \}$ 6M

    Sketch
    i. $x[n+2] + x[n-2]$
    ii. $x[2n + 1] + x[2 - n]$

    b) Find the exponential Fourier series representation of the signal x(t) shown in fig.1 below   9M

fig.1

2. a) Given $x[n] = u[n] – u[n-4]$, and $y[n] = n\{\ u[n+1] + u[n] - 2u[n-2]\}$ 8M
    sketch
    i. $y[2 - n]\ x[2+n]$
    ii. $\{y[n-3] + x[n+2]\}\ u[-n+2]$

    b) Determine Fourier series coefficients of the signal shown in fig.2, x(n) has amplitude A, and length N   7M

fig.2

Unit – 2

3. a) State and prove time scaling property of Fourier Transform   6M
    b) Find the inverse FT of $X(\omega) = 2\cos\omega$ for $|\omega| \le \pi$ 9M
    $X(\omega) = $ zero , otherwise.

4. a) Determine Fourier transform of the following signals: 6M
      i. $x(t) = e^{-3t} \cos \pi t \ u(t)$
      ii. $x(t) = | \sin 2\pi t |$
   b) Compute the 8 – point DFT of the following signal   9M
 $x(n) = \{ 1\ 1\ 1\ 1\ 1\ 1 \}$

Unit – 3

5. a) A system is described the following input-output relation $y[n] = T\{x[n]\} = x[n-n_o]$.   6M
      Check for the following system properties.
      i.   Stability
      ii.   Causality
      iii. Linearity
      iv.   Time-invariance
      v.   Memory
   b) Show that   9M
      i. $x[n]*\delta[n] = x[n]$

      ii. $x[n]*\delta[n-n_0] = x[n-n_0]$

      iii. $x[n]*\delta[n-n_0] = \sum_{k=-\infty}^{n-n_0} x[k]$

6. a) State and prove Associative property for convolution integral.   9M
   b) Determine whether the following systems are time invariant or not and prove   6M
      Associative not
      i. $y(t) = t\ x(t)$
      ii. $y(t) = x(t) \cos 50\pi t$
      iii. $y(t) = x\ (t^2)$
      iv. $y(t) = x(-t)$
      v. $y(t) = e^{x(t)}$
      vi. $y[n] = x[n]+nx\ [n-1]$

Unit – 4

7. a) Find the Laplace transform of $x(t) = e^{-b|t|}$ 8M

   b) State and prove time shift property for Laplace transform (unilateral).   7M

8. a) Find the inverse Laplace transform of   7M
      $$X(s) = \frac{2}{(s+4)(s-1)}$$
      If the region of convergence is
      i. $-4 < Re(s) < 1$
      ii. $Re(s) > 1$
   b) Find the impulse response of the system as shown in fig.3.   8M
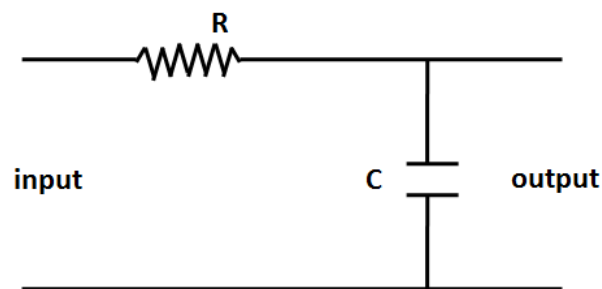
fig.3

Unit – 5

9. a) State sampling theorem. If $g_s(t)$ is the sampled version of signal $g(t)$, then show that   7M
the spectrum of sampled signal is

$$G_s(f) = \sum_{m=-\infty}^{\infty} G(f - mf_s)$$

b) Find the Z transform of the sequence   8M
$x[n] = \sin(\omega_o n)u[n]$

10. a) The signal $x(t) = 2\cos(400\pi t) + 6\cos(640\pi t)$ is ideally sampled at fs=500Hz. If the   6M
sampled signal is passed through an ideal low pass filter with cut off frequency of 400Hz.
Determine and sketch the spectrum of the sampled signal.
What frequency components will appear in the filter output?

b) Find the inverse Z transform of the sequence   9M

$$X(z) = \frac{z}{3z^2 - 4z + 1}$$

i. $|z| > 1$
ii. $|z| < 1/3$

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
DYNAMICS OF MACHINERY
(Mechanical Engineering)

Date : 15 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit – 1

1. a) What is a gyroscope? Mention the applications of gyroscope. With usual notations, obtain an expression for the gyroscopic couple. **7M**

    b) A ship is propelled by a turbine rotor which has a mass of 5000 kg and has a speed of 2100 rpm. The rotor has a radius of gyration of 0.5 m and rotates in clockwise direction when viewed from the stern. Find the gyroscopic couple and its effect when; **8M**
       i. The ship pitches 6^0 above and 6^0 below the horizontal position. The bow descends with its maximum velocity. The pitching motion is SHM with a periodic time of 20 seconds.
       ii. The ship rolls at a certain instant with an angular velocity of 0.03 seconds clockwise when viewed from the stern.

2. a) A load of 15 KN is raised by means of a screw jack. The mean diameter of the square threaded screw is 42 mm and the pitch is 10 mm. A force of 120 N is applied at the end of a lever to raise the load. Determine the length of the lever to be used and also the mechanical advantage obtained. Is the screw self-locking? Take $\mu=0.12$. **8M**

    b) A conical pivot with angle of cone 100^0 supports a load of 80 KN. The external radius is 2.5 times the internal radius. The shaft rotates at 150 rpm. If the intensity of uniform pressure is to be 300 Kpa and the coefficient of friction is 0.05, what is the power lost in friction? **7M**

Unit – 2

3. a) A multi-disc clutch has three discs on the driving shaft and two on the driven shaft. The outside diameter of the contact surfaces is 240 mm and inside diameter 120 mm. Assuming uniform wear and coefficient of friction as 0.3, find the maximum axial intensity of pressure between the discs for transmitting 25 kW at 1575 rpm. **7M**

    b) A centrifugal clutch is to transmit 15 kW at 900 rpm. The shoes are four in number. The speed at which the engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150 mm and the centre of gravity of the shoe lies at 120 mm from the centre of the spider. The shoes are lined with Ferrodo for which the coefficient of friction may be taken as 0.25. If angle subtended by the shoes at the centre of the spider is 60^0 and the pressure exerted on the shoes is 0.1 N/mm^2, determine: **8M**
       i. Mass of the shoes and
       ii. Size of the shoes

4. a) With a neat sketch, explain the principle of operation of Bevis-Gibson flash light torsion dynamometer.   7M

    b) The block type hand brake shown in fig.1 has a face width of 45 mm. The friction material permits a maximum pressure of 0.6 Mpa and a coefficient of friction of 0.24. Determine: 8M
        i.   Effort F
        ii. Maximum torque absorbed by the brake
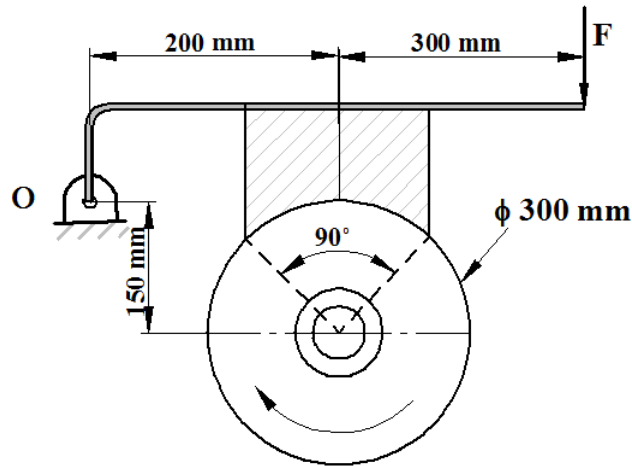   iii. Heat generated if the speed of the drum is 100 rpm & the brake is applied for 5 sec to stop the drum.

fig.1

Unit – 3

5. a) Draw a neat sketch of a Watt governor and explain its working.   8M

    b) In a porter governor each of the four arms is 400mm long. The upper arms are pivoted on the axis of the sleeve whereas the lower arms are attached to the sleeve at a distance of 45mm from the axis. Each ball has a mass of 8 kg and the load on the sleeve is 60kg. What will be the equilibrium speeds for the two extreme radii of 250mm and 300mm of rotation of the governor balls?   7M

6. a) What is a turning moment diagram? Mention its uses.   4M

    b) The torque required for a machine is shown in fig.2 The motor driving the machine has a mean speed of 1500 rpm and develop constant torque. The flywheel on the motor shaft is of rim type with mean diameter of 40 cm and mass 25 kg. Determine;   11M
        (i) Power of motor
        (ii) % variation in motor speed per cycle.
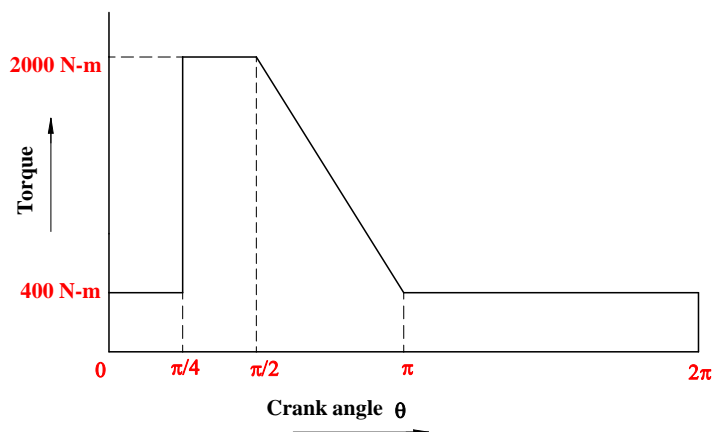
fig.2

Unit – 4

7. a) Write short notes on balancing of rotating masses   5M
    b) Explain the following concepts in balancing of locomotives   10M
        i.   Hammer blow
        ii. Variation of tractive force
        iii. Swaying couple
8. The fig.3 shows a system of four unbalanced masses. Determine the dynamic force   15M
    (reaction) at the bearings if the rotor speed is 600 rpm. Take the masses in planes A, B, C &
    D as 20 kg, 10 kg, 10 kg & 15 kg respectively. Their radii of rotation are 50 mm, 50 mm, 30
    mm & 40 mm respectively.
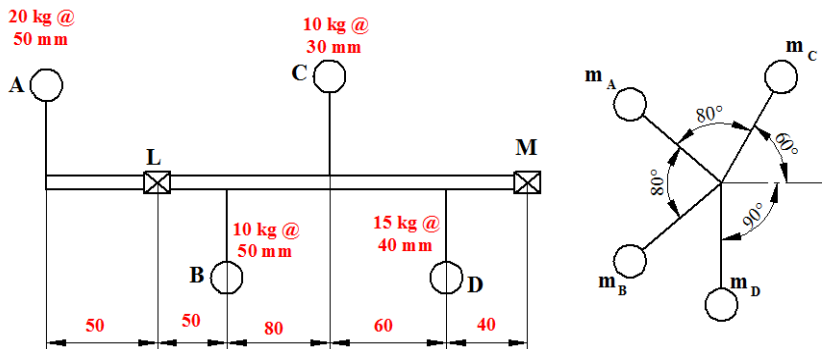
fig.3

Unit – 5

9. a) Define the following terms: 6M
        i.   Free vibrations
        ii.   Damped vibrations
        iii. Forced vibrations
    b) A rotor has a mass of 12kg and is mounted midway on a 24mm diameter horizontal   9M
        shaft supported at the ends of the two bearings. The bearings are 1m apart. The shaft
        rotates at 2400 rpm. If the center of the mass of the rotor is 0.11m away from the
        geometric center of the rotor due to a certain manufacturing defect, find the
        amplitude of vibration and the dynamic force transmitted to the bearing
        $E = 200GN/m^2$.
10. a) What is critical speed of shafts? With usual notations, obtain an expression for the   7M
        dynamic amplitude of vibrations due to eccentricity of a rotating shaft.
    b) A shaft 40mm diameter and 2.5 m long has a mass of 15kg per meter length. It is   8M
        simply supported at the ends and carries three masses 90kg, 140kg and 60kg at 0.8m,
        1.5m, 2m respectively from the left support. Take $E = 200GN/m^2$, find the frequency of
        the transverse vibrations.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
AEROSPACE PROPULSION-I
(Aeronautical Engineering)

Date : 15 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) With neat sketch explain the working principle of gas turbine.   8M
   b) A gas turbine plant operates on the brayton cycle between minimum and maximum temperature 300K and 1073K respectively. Determine the maximum work done and cycle efficiency.   7M
2. a) With block diagram explain the working procedure of turbo jet engine.   8M
   b) Draw the schematic of turbofan engine. Explain its working principle with the significance of bypass ratio and indicate its advantages and limitations.   7M

Unit – 2

3. a) Explain the boundary layer development in diffuser and types of flow in straight walled diffuses with relevant sketches.   7M
   b) What are the types of inlets? Explain the starting problems in supersonic inlets.   8M
4. a) Explain the concept of external compression and internal compression in supersonic inlets with relevant sketches.   8M
   b) Explain on the following: 7M
      i. Thrust reversing
      ii. Thrust vectoring

Unit – 3

5. a) What are the various steps of combustion process involved in combustion chamber?   7M
   b) What are the different operating variables which affect the performance of gas turbine engine an explain them.   8M
6. a) Give the different types of combustion theory as applied in combustion chambers. What are the functions of combustion chamber?   9M
   b) Explain the following: 6M
      i. Pressure losses.
      ii. Combustion intensity.
      iii. Combustion efficiency.

Unit – 4

7. a) What are the functions of exhaust nozzle and explain over expanded and under expanded nozzle.   7M
   b) What are the different types of thrust reversal control (TVC) applied in aircraft?   8M
8. a) Write a note on convergent nozzle, nozzle chocking.   8M
   b) Explain about types of losses in nozzle.   7M

Unit – 5

9. a) Explain the working principle of a centrifugal compressor with a neat schematic diagram. 7M

    b) Define degree of reaction for an axial flow compressor and obtain the expression of 50% degree of reaction. 8M

10. a) Draw a velocity triangle of a single stage turbine and derive the expression for working output. 10M

    b) A 10 stage axial flow compressor provides an overall pressure ratio of 5:1 with an overall isentropic efficiency of 87% when the temperature of air at inlet is 15^0C. The work is equally divided between the stages. A 50% reaction is used with a blade speed of 210m/sec and constant axial velocity of 170m/sec. Estimate the blade angles. Assume the work done factor is 1. 5M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
GEO TECHNICAL ENGINEERING-I
(Civil Engineering)

Date : 15 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit – 1

1. a) Explain the various corrections applied for hydrometer reading.   7M
    b) Following are the results obtained from a liquid limit test on a clay sample whose   8M
        plastic limit is 20% plot the flow curve and obtain the liquid limit flow index, plasticity
        index and toughness index.

No. of blows	12	18	22	34
Water content %	56	52	52	45

2. a) Explain Atterberg's limits and state their importance.   7M
    b) A fully saturated soil sample has a wager content of 27% and bulk unit weight of   8M
        19.5KN/m^3. Compute γ_d, e and G of soil. What will be the unit weight of the soil
        sample when degree of saturation goes down to 80% without change in void ratio.

Unit – 2

3. a) Differentiate between co-efficient of permeability and co-efficient of percolation. Derive   7M
        the relationship between them .
    b) A canal is running parallel to a stream at a distance of 300m. There is a permeable   8M
        stratum of 1m thickness connecting the two for a length of 100m. If the water level in
        the stream is 4m higher than that in the canal, calculate the seepage into the canal in
        m^3/ day , given k=7.5x10^{-4}cm/s for the permeable soil.

4. a) Write a note on quick sand condition.   7M
    b) In a falling head permeometer test, the initial head (t=0) is 40cm. The head drops by   8M
        5cm in 10minutes. Calculate the time required to run the test for the final head to be at
        20cm. if the sample is 6cm in height and 50 cm^2 in cross-sectional area, calculate the co-
        efficient of permeability, area of stand pipe=0.5 cm^2.

Unit – 3

5. a) Define compaction. How does compaction differs from consolidation?   7M
    b) The following results refer to a standard compaction test on soil. Plot the compaction   8M
        curve and determine OMC and MDD. Calculate the relative compaction if the dry unit
        weight of given soil is 18.63 KN/m^3. Also plot ZAV line. Take G=2.7.

Water content	6.8	8.5	9.4	10.2	11.3	12.5	13.6
Bulk unit wt. KN/m^3	20.3	20.97	21.44	21.69	21.85	21.68	21.51

6. a) How is classification of soil done based on consolidation? Explain Casegrande method of determination of pre-consolidation pressure.   8M

   b) A stratum of clay 8m deep has W_L=45%, the surface of clay is at 10m below the GL. The natural water content is 40%, specific gravity is 2.78 for clay. The GWT is at 4.5m below the GL. The average submerged unit weight of sand is 10.4KN/m^3 and unit weight of sand above GWT is 17KN/m^3. The clay is normally consolidated. The weight of the structure coming on top of sand above clay increases the over burden pressure on clay by 40KN/m^3. Estimate the settlement of the building.   7M

Unit – 4

7. a) Discuss the construction of Newmark's influence chart for vertical stress distribution.   7M

   b) A load of 1000kN acts as a point load at the surface of a soil mass. Estimate the stress at a point 3m below and 4m away from the point of action of the load by Boussinesq's formula. Compare the value with the result from westergaard's theory.   8M

8. a) State the assumptions made in the Boussinesq's and westergaard's theory.   8M

   b) A rectangular area 2mX 4m carries a uniform load of 80kN/m2 at the ground surface. Find the vertical pressure at 5m below the centre and corner of the loaded area by equivalent load method.   7M

Unit – 5

9. a) Explain Mohr-coulomb's failure theory.   7M

   b) A remoulded specimen of soil was used for consolidated undrained triaxial test with pore pressure measurements. The results are as follows:

Cell pressure kN/m^2	500	750
Deviator stress at failure kN/m^2	300	455
Pore pressure kN/m^2	250	350

   Plot the strength envelope and determine the values of effective shear strength parameter. Check the values using analytical method.

10. a) What are the advantages and limitations of direct shear test over triaxial test?   7M

    b) Unconfined compressive strength of soil is 150KN/m^2. A sample of same soil failed at a derivator stress of 200KN/m^2 when it is tested in triaxial compression test with a cell pressure of 50KN/m^2. Determine the shear strength parameters of soil .   8M
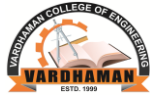
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
UNIX PROGRAMMING
(Common to Computer Science and Engineering & Information Technology)

Date : 7 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Outline the history of UNIX.   7M
    b) Write Unix command(s) for   8M
        i.   Create a cpio archive only with *.c files.
        ii.   copy the files and sub-directories of objects directory into /mnt/out directory using cpio
        iii. connect to ftp.netscape.com
        iv.   querying the information on currently logged in users
        v.   searching the word "this" in a file h.txt

2. a) Explain briefly grep, egrep and fgrep   12M
    b) Assume that the umask value is 0027. Explain briefly how to compute actual permissions using this value.   3M

Unit – 2

3. a) Write shell program to find the largest of three numbers.   5M
    b) Write the syntax of case statement. Write a shell program to create a menu which displays the list of files, current users, and process status of system based on the user choice.   10M

4. a) Write syntax and File Access Functions for open, create, write, read, and close system calls.   8M
    b) Define shell. Describe the different types of shell available in UNIX. How do you confirm which shell you are currently working?   7M

Unit - 3

5. a) Assume that you have been asked to write a code snippet to execute a command say ls –aF using the concept of process. The program requirement states that the main process should create a child process which in turn will execute the ls program, running the "ls -aF /" command. Five seconds later, the parent should print a message saying, I'm still here!.   10M
    b) Write a C function to lock or unlock a region of a file.   5M

6. a) Explain briefly how record locking can be done in Unix using fcntl().   7M
    b) Write a C program to trap a ctrl-c but not quit on this signal. Define a function sigproc() that is executed when you trap a ctrl-c. Design another function to quit the program if it traps the SIGQUIT signal so that you can terminate your program.   8M

Unit - 4

7. a) Explain briefly the concept of shared memory with respect to IPC in Unix. Give prototypes for shmat and shmctl.   10M
    b) What is a FIFO? What are the two uses of FIFO?   5M

8. What is a message queue? Discuss the System limits that affect message queues and write the syntax of msgctl function and list the cmd argument specified by the command to be performed on the queue specified by msqid.   15M

Unit - 5

9. a) What is a socket? What are the steps followed by client and server to establish communication using sockets.   7M
    b) Explain briefly bind system call.   8M

10. Using TCP/IP sockets, write a client-server program in C to make client send the file name and the server to send back the contents of the requested file if present.   15M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
INTEGRATED CIRCUITS APPLICATIONS

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

Date : 7 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) With a neat circuit diagram and suitable input and output waveforms, explain the working of a non-inverting and inverting Operational amplifier.   8M
   b) Explain the following DC characteristics of an Op-amp: input offset current, input offset voltage and total output offset voltage.   7M
2. a) List any five ideal op-amp characteristics.   5M
   b) In the basic differential amplifier, given R_c = 2KΩ, R_e = 4.3KΩ, V_{cc} = $|V_{ee}|$ = 5V, $β_0$ = 200, V_{be} = 0.7V. Determine for $V_1=V_2=0$, I_{BQ}, I_{CQ}, V_{01}, V_{02}, V_{CEQ}, A_{DM}, A_{CM}, CMRR.   10M

Unit - 2

3. a) Explain the working of an Inverting summing amplifier and subtractor with a neat circuit diagram.   8M
   b) Explain the working of a Logarithmic amplifier.   7M
4. a) With suitable input and output waveforms explain the working of an inverting and non-inverting Comparator.   9M
   b) Explain the working of a Schmitt trigger with relevant input and output waveforms.   6M

Unit - 3

5. a) With a neat circuit diagram, explain the working principles of " All Pass filter". Mention its applications.   7M
   b) List the applications of PLL.   4M
   c) Design a pulse generator using 555 timer for pulse width T_P = 1 ms. Draw the circuit with designed values.   4M
6. a) Design a second order butterworth high pass filter for the following specifications: 8M
      A_V = 5 ; f_L= 1.5 KHz
      Draw the circuit diagram and insert the values.
   b) Draw the internal architecture of 555 timer and explain.   7M

Unit - 4

7. a) Draw the circuit schematic of a DC power supply showing rectifier with filter and a dc voltage regulator. Define the following performance parameters.   8M
      i. Line regulation
      ii. Load regulation
      iii. Ripple rejection
   b) With a neat circuit diagram of R-2R ladder DAC, obtain the expression for output voltage.   7M

Cont…2

8. a) Design a voltage regulator using IC LM723   8M

    Given data: $V_{0,max}$= 10 V

                 I_{max}= 150mA
    Draw the designed circuit.

    b) What are integrating type ADCs? Explain the working principles of Dual slope ADC with
        diagram and waveforms.   7M

Unit - 5

9. a) Implement a full adder using IC 74138 and two OR gates. Show the realization of 4:16   8M
        decoder using two 3:8 decoder ICs.

    b) Draw the circuit diagrams for CMOS NAND and NOR and explain with function table.   7M

10. a) Draw the circuit of a CMOS inverter and explain its operation. Define noise margin and   10M
         power dissipation.

    b) Explain the working of 1 to 4 line De-Multiplexer.   5M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013

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

Date : 7 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Draw a neat sketch and explain the nomenclature of single point cutting tools.   10M
    b) Write short notes on coolants used in metal cutting.   5M

2. a) In orthogonal turning of a 50mm diameter mild steel bar on a lathe, the following data   10M
       were obtained. Rake angle = 15^0, cutting speed = 100m/min, feed = 0.2mm/revl,
       cutting force = 180kg, feed force = 60kg. Calculate the shear plane angle, coefficient of
       friction, cutting power, chip flow velocity, shear force, if the chip thickness = 0.3mm.
    b) Write a short note on chip breakers.   5M

Unit - 2

3. a) Illustrate the neat block diagram of lathe & label the parts.   8M
    b) Explain the following operation in lathe: 7M
       i.   Eccentric turning
       ii.   Facing

4. a) List out the different operation which can be performed on automatics, turret & capstan   8M
       lathes and its requirement which carry specifications.
    b) Describe the consideration while planning the process sheet for a particular job during   7M
       manufacturing.

Unit - 3

5. a) Describe the main parts of a shaper with neat sketch.   8M
    b) What is planning? Explain the working principle of a planer.   7M

6. a) Mention the different types of milling machine. Explain vertical milling machine with   8M
       neat sketch.
    b) Explain the following milling methods with neat sketch: 7M
       i.   Up or conventional milling
       ii.   Down or climb milling

Unit - 4

7. a) Draw a neat sketch of a twist drill and explain the nomenclature.   8M
    b) Draw a neat sketch and explain the following operations on a drilling machine: 7M
       i.   Boring
       ii.   Tapping

8. a) Draw a neat sketch of a surface grinding machine and explain its working.   8M
    b) What are the materials used in the manufacture of grinding wheels? What properties   7M
       do they impart to the wheels?

Unit - 5

9. a) What is the use of fixtures? List out the different types of broaching machines.   8M
    b) Explain with neat sketch of continuous broaching machine.   7M

10. a) List out the difference between jigs and fixtures.   7M
    b) What are the important considerations in jigs and fixtures?   8M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11
AERODYNAMICS-II
(Aeronautical Engineering)

Date : 7 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Define isentropic process. Derive general isentropic relations for static temperature rise and Static pressure rise of gas flow. **8M**

   b) Draw the propagation of disturbance waves for subsonic and supersonic condition. **7M**

2. a) Derive relationship between the ratio of stagnation pressure to static pressure and Mach number for an isentropic flow. Derive similar relations for temperature and density ratios. **11M**

   b) Define static and stagnation pressure. **4M**

Unit - 2

3. a) Derive the relation for velocity change and pressure change in terms of area change dA/A, assuming 1-D isentropic flow. **9M**

   b) Explain the phenomenon of choking in a nozzle. **6M**

4. a) Derive an expression for choked mass flow rate through a converging diverging nozzle in terms of total pressure, total temperature and throat area. **9M**

   b) Discuss the principle of wave reflection from a free boundary. **6M**

Unit - 3

5. a) Obtain the relation relating wave angle (β), deflection angle (θ) and mach number (M) for an oblique shock wave and hence plot the graph between them and explain the various oblique shock solution. **9M**

   b) Write short notes on **6M**
      i.   Critical mach number
      ii. Drag divergence mach number

6. a) Based on small perturbation theory, obtain the expression for velocity potential equation for compressible flow. **8M**

   b) Consider the supersonic flow over an expansion corner. The deflection angle θ=23.38. If the flow upstream of the corner is given by M_1=2, P_1=0.7atm, T_1=305k, calculate M_2, P_2, T_2, ρ_2, P_{02} and T_{02} downstream of the corner. Also obtain the angles the forward and rearward mach lines make with respect to upstream direction. **7M**

Unit - 4

7. a) Consider an infinitely thin flat plat at 5^0 angle of attack in mach 2.6 free stream. Calculate the lift and drag coefficient. **8M**

   b) Derive the expression $(M_\infty^2 -1)\phi_{xx} + \phi_{rr} + \frac{1}{r}\phi_r + \frac{1}{r^2}\phi_{\theta\theta} = 0$ **7M**

   The governing equation for supersonic flows in cylindrical coordinates.

8. Consider a hypersonic vehicle with a spherical nose flying at mach 20 at a standard altitude of 45.72km, where the ambient temperature and pressure are 277.8k and 146.5N/m^2 respectively. At the point on the surface of the nose located 20^0 away from the stagnation point, estimate: **15M**
    i.   Pressure
    ii. Temperature
    iii. Mach number
    iv. Velocity of flow
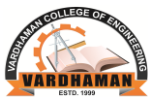   Assume an isentropic flow from the stagnation point to point A.

Unit - 5

9. a) With neat sketch, discuss the working of low speed wind tunnel.   **9M**
    b) What are the measurement errors induced in wind tunnel?   **6M**
10. a) Discuss the principle of hot wire anemometer.   **5M**
    b) With neat sketch explain the pressure measurement in wind tunnel for open section and closed section.   **10M**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
WATER RESOURCES ENGINEERING-I
(Civil Engineering)

Date : 7 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. a) Explain types of precipitation. 10M
   b) A catchment has five rain gauge stations. In a year, the annual rainfall recorded by the gauges are 78.8cms, 90.2cms, 98.6cms, 102.4cms and 70.4cms, for a 6% error in the estimation of the mean rainfall, determine the additional number of gauges required in the catchment. 5M

2. a) Define Infiltration capacity, Infiltration rate. What are the factors affecting Infiltration? 9M
   b) Explain Infiltration Indices. 6M

Unit - 2

3. a) What are the factors affecting Hydrograph. How the shapes of the catchment basin influences the spaces of the hydrograph. 8M
   b) The flood data and base flow in a storm are estimated for a storm in a catchment of area of 60 Sq.km. plot the resulting hydrograph. 7M

Time in days	0	1	2	3	4	5	6	7	8	9
Discharge (Cumecs)	20	63	151	133	90	63	44	29	20	20
Base flow (Cumecs)	20	22	28	28	26	26	23	21	20	20

4. a) What are the procedures for designing silt free channels using Lacey's theory? 6M
   b) Design a regime channel for a discharge of 50cumecs, with a silt factor of 1.0 using theory. 9M

Unit - 3

5. a) Define the following : 10M
      i.   Porosity.
      ii. Specific yield.
      iii. Permeability.
      iv. Transmissibility.
      v.   Storage coefficient.
   b) At station A, the water table elevation is 642m above the mean sea level, and at B, the elevation is 629m. The stations are 1100 m apart. The aquifer has a permeability of 1.5×10^{-6} m/s and a porosity of 24 percent. What is the actual velocity in the aquifer? 5M

6. a) Write any five advantages and ill effects of irrigation. 5M
   b) Briefly explain surface and subsurface irrigation methods. 10M

Unit - 4

7. a) The mean annual flood of a river is 600 m^3/s and the standard deviation of the annual   7M
        flood time series is 150 m^3/s. What is the probability of a flood of magnitude 1000 m^3/s
        occurring in the river within next 5 years? Use Gumbel's method and assume the sample
        size to be very small.
    b) Distinguish between: 8M
        i.   Hydraulic and hydrologic method of flood routing.
        ii.   Prism storage and wedge storage.

8. a) Derive the Muskingum channel routing equation $Q2 = C_0 I_2 + C_1 I_1 + C_2 Q_1$ with usual   7M
        notations.
    b) In a 350 ha watershed the CN value was assessed as 70 for AMC-III. Estimate the value   8M
        of direct runoff volume for the following 4 days of rainfall. The AMC on July 1st was of
        category III. Use standard SCS-CN equations.

Date	July 1	July 2	July 3	July 4
Rainfall (mm)	50	20	30	18

Unit - 5

9. a) How do you classify soil water? Explain.   8M
    b) Find the field capacity of a soil for the following: Root Zone Depth -2m; Existing water   7M
        constant -5%; Dry density of soil-15KN/m^3; Water applied to the soil -500m^3; Water
        loss due to evaporation and percolation-10%; Area of plot-1000m^2.

10. a) Define Duty, Delta and Base Period. Establish a relationship between Duty, Delta and   9M
        Base Period.
    b) The left branch canal carrying a discharge of 20 cumecs has culturable command area   6M
        of 20,000 hectares. The intensity of Rabi is 80%, and base period is 120days. The right
        branch canal carrying discharge of 8cumecs has culturable command area of 12,000
        hectares, intensity of irrigation of Rabi crop is 50% and the base period is 120days.
        Compare the efficiencies of the two canal systems.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
COMPUTER NETWORKS
(Common to Computer Science and Engineering & Information Technology)

Date : 10 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) What is OSI Model? Explain all the layers of OSI model in detail. 9M
   b) Suppose two hosts, A and B, are separated by 10,000 kilometers and are connected by a direct link of R=1 Gbps. Suppose the propagation speed over the link in $2.5 \bullet 10^8$ meters/sec. 6M
   Calculate the bandwidth-delay product, $R \bullet t_{prop}$
   Consider sending a file of 400,000 bits from Host A to Host B. Suppose the file is sent continuously as one big message. What is the maximum number of bits that will be in the link at any given time?

2. a) What advantages does a circuit-switched network have over a packet-switched network? What advantages does TDM have over FDM in a circuit-switched network? Explain in detail. 6M
   b) What are the five layers in the Internet Protocol Stack? What are the principal responsibilities of each of these layers? 9M

Unit – 2

3. a) Explain the Ethernet Frame Structure in detail. 10M
   b) What do you mean by Connectionless and Connection Oriented Service? Explain in detail with example. 5M

4. a) Explain slotted ALOHA protocol in detail. 10M
   b) What's the difference between error detection and error correction techniques? Explain in detail. 5M

Unit - 3

5. a) Explain IPv6 datagram format with diagram in detail. 12M
   b) Describe how packet loss can occur at input ports. Describe how packet loss at input ports can be eliminated (without using infinite buffers). 3M

6. a) What do you mean by congestion control? Explain the various approached of congestion control? 10M
   b) Describe how packet loss can occur at output ports. 5M

Unit - 4

7. a) Explain UDP segment format with a neat diagram. 8M
   b) Compare UDP and TCP. Also mention at least two applications which use TCP and UDP. 7M

8. a) Explain how connection establishment and termination happen in TCP. 10M
   b) Explain multiplexing and demultiplexing with respect to UDP. 5M

Unit - 5

9.   a)   With an example explain how the name resolution takes place in DNS.   10M
     b)   With a neat diagram explain DN hierarchy.   5M

10. Describe with an example how does a HTTP request retrieves the document   15M
     usr/users/doc/doc1. Use atleast two general headers, two request headers and one entity
     header. Show the response if the document has moved to usr/reads/doc/doc1 and if there
     is a syntax error in the request.

Unit – 1

1. a) What is the need for synthesis? Briefly discuss the two common approaches for hardware realization using synthesis tool.   5M
    b) Discuss different levels of design description in Verilog with suitable examples.   10M
2. a) Discuss the different driving strengths in Verilog with strength level, keyword and element modeled.   12M
    b) Write the structure of typical simulation module and explain.   3M

Unit – 2

3. a) For AOI gate write Verilog module and test bench module.   8M
    b) Draw a 3-to-8 decoder using 2-to-4 decoder and write the Verilog module for the same.   7M
4. a) Draw the gate level circuit of edge-triggered flip-flop and write the Verilog module.   7M
    b) Explain 'wand' and 'wor' types of nets with examples.   8M

Unit – 3

5. a) With an example explain the blocking and non-blocking assignments in Verilog.   8M
    b) Design a module for 4-bit four functions ALU and also a test bench for the same by using behavioral modeling.   7M
6. a) Design a module for a 2-bit priority encoder using the 'casez' statement and test bench for the same.   8M
    b) Design a 2:4 demultiplexer module and test bench using the if-else-if construct in a Verilog.   7M

Unit – 4

7. a) Design BCD adder module and test bench using data flow level.   8M
    b) Design a CMOS inverter formed by connecting NMOS and PMOS transistors in series.   7M
8. a) Write a Verilog design description module of a CMOS NOR gate.   8M
    b) Design a module for a ring counter and write a test bench for the same.   7M

Unit – 5

9. a) With an example explain how 'specparam' statements used in Verilog.   8M
    b) Write a module for parity generation through a 'function'.   7M
10. a) With an example explain the use of path delay assignments in Verilog.   7M
    b) Design a module for 32-bit adder with the addition done in successive clock pulses.   8M
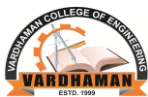
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
POWER SYSTEM TRANSMISSION AND DISTRIBUTION
(Electrical and Electronics Engineering)

Date : 10 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Derive expression for the inductance of a symmetrical three phase line.   7M
    b) A 50 Hz, 123 kV overhead line has conductors placed in a horizontal plane 4.56 m   8M
        apart. Radius of conductor is 1.12 cm and line length is 100 km. Calculate the charging
        current per phase assuming complete transposition.

2. a) Derive the expression for capacitance of a two wire line. What is the effect of ground   8M
        on the capacitance?
    b) A three phase 50 Hz line consists of three conductors each of diameter 21 mm. The   7M
        spacing is a-b : 3m; b-c : 5m; c-a :3.6 m. Find the inductive reactance per phase per
        km.

Unit - 2

3. a) The per phase quantities of a 60 Hz, 200 km line are R=2.07 Ω, L= 310.8 mH and   8M
        C=1.4774 µF. The line supplies 100 MW, star connected load at 215 kV (L-L) and 0.9 pf
        lag. Calculate sending end voltage using nominal T representation.
    b) A 3-phase , 50 Hz transmission line is 250 km long. The load is 125 MW operating at   7M
        220 kV upf. Evaluate the incident and reflected voltages at receiving end.
        R = 0.172 Ω/km, L=2.1 mH/km and C=0.01 µF/km.

4. a) A single phase 50 Hz system supplies an inductive load of 5000 kW at 0.8 pf lag through   7M
        a line 25 km. R=0.0195Ω/km and L=0.63 mH/km. V_R = 10 kV. Find the sending end
        voltage, regulation and transmission efficiency.
    b) A 60 Hz, 250 km line has an impedance of (33+j104) Ω and admittance of 10^{-3} mho.   8M
        The receiving end load is 50 MW at 208 kV with 0.8 pf lag. Find the sending end voltage,
        current, power and power factor using ABCD constants for a nominal π model.

Unit - 3

5. a) Define skin effect, proximity factor, and Ferranti effect.   7M
    b) Derive an expression for the sag when supports are at unequal levels.   8M

6. a) Distinguish between disruptive critical voltage and visual critical voltage. Give   8M
        expressions for the same.
    b) Calculate the sag for a span of 200 m if the ultimate tensile strength of conductor is   7M
        5788 kg. Factor of safety is 2. Weight of conductor is 604 Kg/km.

Unit - 4

7. a) Show that the most economical size of the conductor in a cable is obtained when its   7M
        sheath diameter is 2.718 times the core diameter.
    b) A string of 4 insulators has a self capacitance equal to 10 times pin to earth   8M
        capacitance. Find
        i.   Voltage distribution of various units as a % of total voltage across the string.
        ii. String efficiency.

8. a) Obtain expressions for the voltages across 4 units of an insulator string in terms of voltage across its top most unit.   8M

   b) A single core lead covered cable has a conductor diameter of 3cm with insulation diameter of 8.5cm. The cable is insulated with 2 dielectrics with permittivities 5 & 3 respectively. The maximum stresses in the two dielectrics are 38kV/cm and 26kV/cm respectively. Calculate the radial thickness of insulating layers and the working voltage of the cable.   7M

Unit - 5

9. a) Four power loads ABCD are connected to a ring distributor and take 20A, 30A,25A and 30A respectively. The ring is supplied from a substation at 'E' between A and D. An interconnector cable joins the points B and D. At 'F' on the interconnector, a load of 20A is connected. The resistances of different sections are AB=0.03Ω, CD=0.03Ω, EA=0.04Ω, FB=0.02Ω, BC=0.02Ω, DE=0.04Ω and DF=0.01Ω. Find the current in all sections of distributor and interconnector.   9M

   b) Prove that the volume of copper required for single phase 2 wire system is more than three phase 4 wire system.   6M

10. a) A single phase ring distributor ABC is fed at point 'A' with 230V. The impedances of sections AB, BC, AC are 2+j1Ω, 2+j3Ω and 1+j2Ω respectively. Load at 'B' is 40A at 0.8pf lagging while at 'C' is 60A at 0.9pf lagging both with respect to voltage at 'A'. Find current in the three sections of the distributor with respect to voltage at 'A'.   8M

   b) Discuss why open loop feeders are better than radial feeders.   7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
THERMAL ENGINEERING-II
(Mechanical Engineering)

Date : 10 December, 2013　　　　Time : 3 Hours　　　　Max. Marks : 75

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

Unit – 1

1. a) Explain reheat cycle and compare it with simple Rankine cycle. 　7M
   b) A steam turbine plant operates on Rankine cycle with steam entering turbine at 40bar, 350^{0}C and leaving at 0.05 bar. Determine the network per kg of steam and thermal efficiency of cycle. 　8M

2. a) What do you mean by stoichiometric air-fuel ratio? 　5M
   b) Calculate the amount of theoretical air required for the combustion of 1kg of acetylene (C_2H_2) to CO_2 and H_2O. 　10M

Unit – 2

3. a) What is the function of boiler mountings? Can boiler work without mountings? 　5M
   b) Calculate the height of chimney required to produce a draught equivalent to 1.7 cm of water if the fuel gas temperature is 270^{0}C and ambient temperature is 22^{0}C and minimum amount of air per kg of fuel is 17 kg. 　10M

4. a) Define the term steam nozzle? Explain various types of nozzles. 　5M
   b) Dry saturated steam enters a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2 bar, if the dryness fraction of discharge steam is 0.96. What will be the final velocity of steam? Neglect the initial velocity of steam. If 10% of heat drop is lost in friction find the percentage reduction in the final velocity. 　10M

Unit – 3

5. a) List any five reasons for inefficiency in surface condensers. 　5M
   b) The air leakage into the condenser operating in conjunction with a steam turbine is estimated at 0.681Kg per minute. The vacuum near the outlet to the air pump is 710mm when the barometer reads 760 mm and temperature at this point is 18 ^{0}C. Find
      i.   The minimum capacity of air pump in m^3/min
      ii. The mass of vapour extracted with the air/min
      　10M

6. a) Write a short note on impulse turbine. 　5M
   b) The velocity of steam exiting the nozzle of the impulse stage of a turbine is 400 m/s, the blades operate close to the maximum blading efficiency. The nozzle angle is 20^0 considering equiangular blades and neglecting blade friction, calculate for a steam flow of 0.6 kg/s, the blade power and blade efficiency. 　10M

Unit – 4

7. a) Draw a neat velocity diagram of a reaction turbine and label it. 　4M
   b) In a reaction turbine, the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are 35^0 and of the discharging tips is 20^0. Find the power developed per pair of blades for a steam consumption of 2.5 kg/s, when the blade speed is 50m/s. if the heat drop per pair is 10.04 kJ/kg, find the efficiency of the pair. 　11M

8. a) Draw a neat sketch and explain the process of intercooling to improve the thermal   10M
        efficiency of an open cycle gas turbine plant.
    b) Draw a neat sketch of an open cycle gas turbine plant   5M

Unit – 5

9. A turbo jet engine consumes air at the rate of 60.2 kg/s when flying at a speed of   15M
    1000km/hr. Calculate
    i.   Exit velocity of the jet when the enthalpy change for the nozzle is 230 kJ/kg and
         velocity coefficient is 0.96.
    ii. Fuel flow rate in kg/s when air fuel ratio is 70:1.
    iii. Thrust specific fuel consumption.
    iv. Thermal efficiency of the plant when the combustion efficiency is 92% and calorific
         value of the fuel used is 42000 kJ/kg.
    v.   Propulsive power.
    vi. Propulsive efficiency.
    vii. Overall efficiency.

10. a) List the requirements of an ideal rocket propellant.   5M
    b) Draw a neat sketch and explain the working of any one type of a rocket propellant 10M
        engine
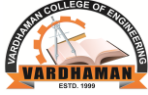
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013

(Regulations: VCE-R11)

FLIGHT MECHANICS - II

(Aeronautical Engineering)

Date : 10 December, 2013   Time : 3 Hours   Max. Marks : 75

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

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Unit - 1

1. a) Discuss the categories of aircraft flight?   7M
   b) What is the purpose to control system in airplanes? Explain inherently stability of airplanes?   8M

2. a) Explain static and dynamic stability of airplanes.   8M
   b) Discuss the equations governing the translation and rotational motion of an airplane.   7M

Unit - 2

3. a) Differentiate between stability derivative and control derivative.   8M
   b) Explain flight configuration.   7M

4. a) Discuss any two method of determining the derivative values.   8M
   b) With block diagram explain aircraft sizing.   7M

Unit - 3

5. a) Derive an expression for angle of attack and elevator angle required for a flight at steady cruise, descent condition.   10M
   b) Write short notes on trim tabs.   5M

6. a) With neat sketch explain the concept of pitch damping.   10M
   b) Write short notes on total aerodynamic forces.   5M

Unit - 4

7. a) Obtain an expression for tail contribution to the longitudinal stability in the form   9M

$$\left(\frac{dc_m}{de_L} \right)_{tail} = -\eta_t . V_H . \frac{a_t}{a_w} \left(1 - \frac{d \in}{d\alpha} \right)$$

   b) A general aviation air plane has the following characteristics   6M

   Gross weight = 2750kg, $\overline{c}$ = 5.7m, B=33.4m, S=184m2, S_t=43m2, L_t=16m,

   $X_{C.G}$=0.295$\overline{c}$, V=176m/sec. The pitching moment coefficient curve for the most forward C.G is given as $C_{m\alpha}$=-0.20-0.035α. Estimate the size of the elevator to trim the air plane at angle of attack of 10^0 and assume that the elevator angle constrained to $+20^0$ and -25^0.

8. a) Define stick fixed neutral point and obtain the expression for the same and also discuss the effect of C.G shift on the stability with relevant graphs.   8M
   b) Describe the effects of power on the stability of jet air plane and obtain the stability equation   7M

$$\left(\frac{dc_m}{de_L} \right)_{jet} .$$

Unit - 5

9. a) What is meant by coupling effect and derive the expression for rolling moment with rudder.   5M

    b) Consider an airplane in rolling moment with yaw rate and derive the expression in the form   10M

$$C_{l_r} = \frac{C_L}{6}\left(\frac{1+3\lambda}{1+\lambda}\right) + C_{y_r}\frac{Z_v}{b}.$$

10. Write short notes on the following: 15M

    i)   Phugoid mode and short period mode.
    ii) Spiral approximation.
    iii) Dutch roll approximation.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
STRUCTURAL ANALYSIS-II
(Civil Engineering)

Date : 10 December, 2013　　　　Time : 3 Hours　　　　Max. Marks : 75

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

Unit - 1

1.　a)　Differentiate between two hinged and three hinged arches.　　3M
　　b)　A three hinged parabolic arch hinged at the supports and at the crown has a span of　12M
　　　　24 m and central rise of4m.It carries concentrated loads of 75 KN at 18m from left
　　　　support and a uniformly distributed load of 45 KN/m over the left half of the portion.
　　　　Determine the moment, normal thrust and radial shear at a section 6m from left
　　　　support.

2.　a)　Explain the effect of temperature changes on a two hinged arch.　　3M
　　b)　A two hinged parabolic arch of span 30m and rise 6m carries two point loads each　12M
　　　　60KN acting at 7.5m and 15mfrom the left end respectively. The moment of inertia
　　　　varies as the secant of slope. Determine the horizontal thrustand maximum positive
　　　　and negative bending moment.

Unit - 2

3.　a)　Explain the step by step procedure to analyse a structure by Slope Deflection method.　　5M
　　b)　Find the support moments for the frame shown in fig.1 by Kani's method.　　10M

fig.1
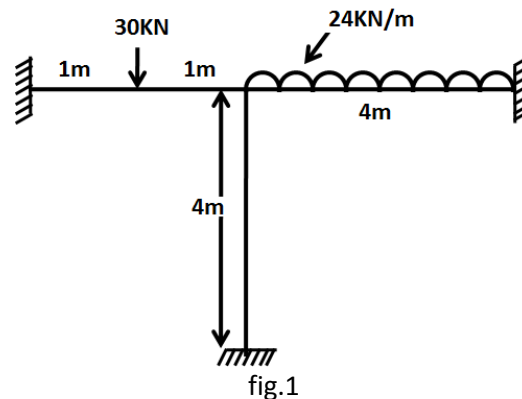
4.　a)　Explain stiffness factor and rotation factor.　　5M
　　b)　Determine the support moments for the continuous girder shown in fig.2 .Support B　10M
　　　　sinks by 2.5mm. I=3.5×10^7mm^{4}and E=200KN/mm$^{2.}$ Use S D Method.

fig.2

Cont...2
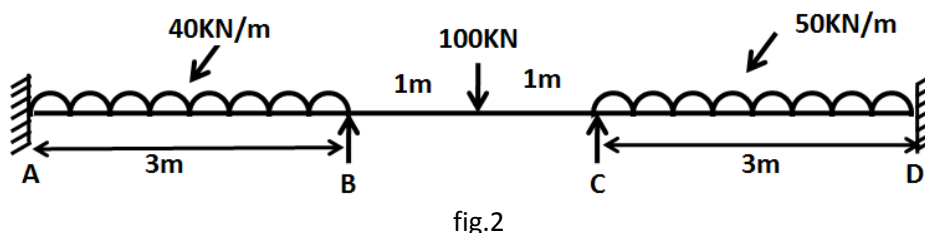
Unit - 3

5. Analyse the continuous beam loaded as shown in the fig.3 by slope deflection method and   15M
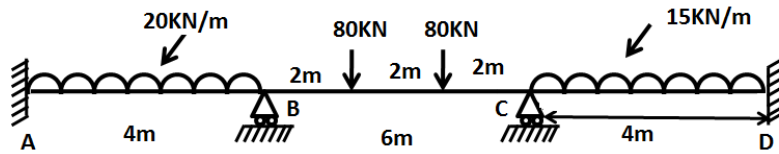sketch the bending moment diagram , given $2I_{AB} = I_{BC} = 2I_{CD} = 2I$

fig.3

6. a) Explain Distribution factor with an example   3M
   b) A continuous beam ABC is supported on an elastic column BD and is loaded as shown in   12M
   the fig.4. Treating joint B as rigid, analyze the frame and draw the B.M.D and also
   sketch the deflected shape of the structure. Use moment distribution method.
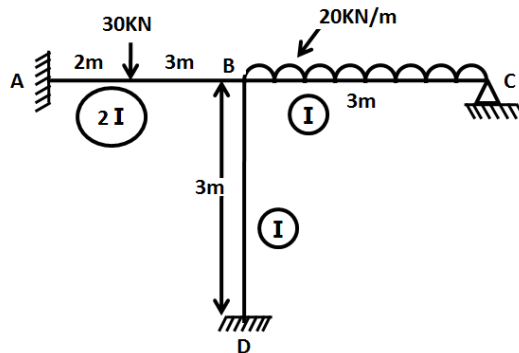
fig.4

Unit - 4

7. a) Differentiate between Flexibility Method and Stiffness method of analysis.   5M
   b) Analyze the continuous beam shown in fig.5 by flexibility method and draw the bending   10M
   moment diagram.
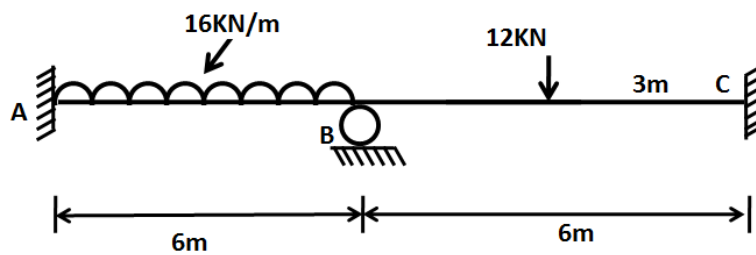
fig.5

8. a) Explain briefly the procedure involved in the analysis by flexibility method.   5M
   b) A Continuous beam ABC has two spans and is loaded as shown in the fig.6. Determine   10M
   the moments at supports and plot the bending moment diagram. Use flexibility method.
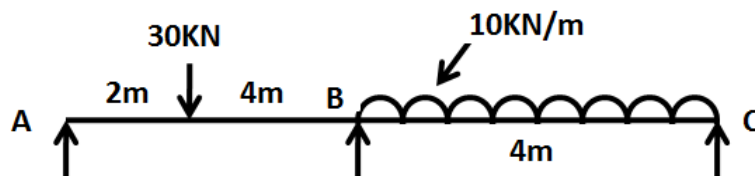

fig.6

Unit - 5

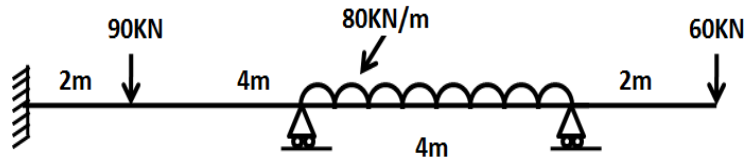9.   Analyse the continuous beam shown in fig.7 by stiffness matrix method.   15M

fig.7

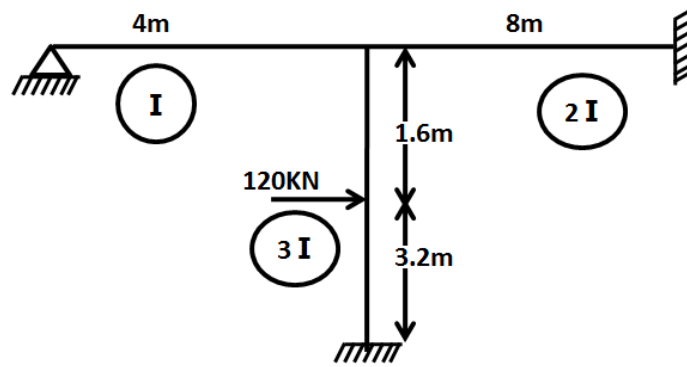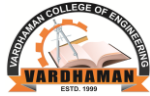10.   Analyse the frame shown in fig.8 by stiffness matrix method.   15M

fig.8

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013

(Regulations: VCE-R11)

SYSTEMS PROGRAMMING

(Computer Science and Engineering)

Date : 12 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1.	a)	Explain the architecture of Simplified Instruction Computer machine.	7M
	b)	List the various data structures used in the assembling process. With an algorithm, explain the usage of these data structures in pass-one of a two-pass assembler.	8M
2.	a)	Compare a two pass assembler with a single-pass assembler. How are forward references handled in one-pass assembler?	6M
	b)	What is program block? How are multiple program blocks handled by assembler?	9M

Unit – 2

3.	a)	With a neat block diagram, explain the process of dynamic linking. Discuss its advantages.	6M
	b)	What is a loader? List the functions of a loader. Develop an algorithm for a bootstrap loader.	9M
4.	a)	With neat diagrams, explain and differentiate between linkage editor and linking loader.	9M
	b)	Explain with an example, how program relocation is accomplished in SIC and SIC/XE.	6M

Unit – 3

5.	a)	Explain the process of macro definition and expansion. Discuss different data structures used by a macro processor	7M
	b)	Explain the following macro processor features	8M
		i. Concatenation of Macro Parameters	
		ii. Generation of unique labels	
6.	a)	Explain the concept of Recursive Macro Expansion in detail.	9M
	b)	Explain the various Macro Processors design options.	6M

Unit - 4

7.	a)	Write the algorithm for processing an I/O interrupt.	5M
	b)	Explain three-level scheduling system. Discuss different job scheduling algorithms with examples.	10M
8.	a)	What is a process? Write algorithms for Wait and Signal functions for efficient process scheduling.	7M
	b)	Explain the process of dynamic address translation and demand paging.	8M

Unit - 5

9.	a)	What do you mean by embedded system software? Explain in detail.	5M
	b)	What is cloud computing? Explain the public and private cloud computing in detail.	10M
10.	a)	Explain the Android system architecture in detail.	10M
	b)	Explain the concept of virtualization in cloud computing.	5M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
THEORY OF COMPUTATION
(Information Technology)

Date : 12 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. a) Find Finite Automata for the following languages on Σ={a,b}   7M
       L ={w : na(w) mod 5 >1} and show that string aaaa is accepted by the automata.
   b) Convert the following NFA to a DFA   8M

δ	0	1
→p	{p,q}	{p}
q	{r}	{r}
r	{s}	Φ
*s	{s}	{s}

2. a) Convert the following ε – NFA to DFA   8M
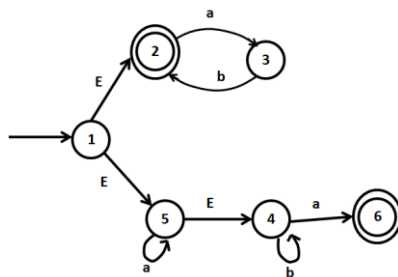
   b) Minimize the states of the following DFA using table-filling algorithm.   7M

δ	0	1
→A	B	E
B	C	F
*C	D	H
D	E	H
E	F	I
*F	G	B
G	H	B
H	I	C
*I	A	E

Unit - 2

3. a) Obtain a Regular expression for the finite automata shown below: 7M
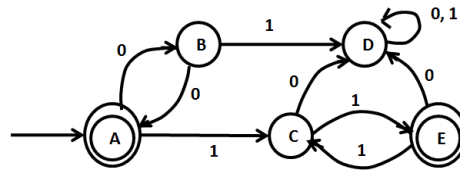
b) Define the Language of Finite Automata. Convert the following regular expression to ε-NFA.   RE = (00+1)*011 8M

4. a) Prove that there exists a finite automata to accept the language L(R) corresponding to the regular expression R. 7M

b) Convert the following DFA to a regular Expression using the state elimination method. 8M

	0	1
→ *p	S	P
Q	P	S
R	R	Q
S	Q	R

Unit - 3

5. a) Obtain a CFG to generate strings of a's and b's consisting of equal number of a's and b's. Also justify 7M

b) Define leftmost and rightmost derivations. Also obtain LMD and RMD for the string aabbbb and grammar G is 8M

   S→AB|ε   A→aB   B→Sb   Also construct the parse trees

6. a) Define ambiguous grammar. Also show that the grammar is ambiguous for the string abababa and the grammar is 7M
   S→SbS|a

b) Convert the following CFG to Chomsky normal form: 8M
          S→0A|1B
       A→0AA|1S|1
       B→1bb|0S|0

Unit - 4

7. a) Design PDA for the following language accepted by final state. Also write its transition diagram and instantaneous description on the string "aacccbb". 8M
   L = { $a^n c^m b^n$: m ≥ 1 , n ≥ 1}

b) Write the procedure to convert CFG to PDA and also convert the following CFG to PDA. 7M
   S→ aABB | aAA
   A→ aBB | a
   B→ bBB | A
   C→ a

8. a) Design PDA for the following language accepted by final state. Also write its transition diagram and instantaneous description on the string "aaabb". 8M
   L = { w | w ∈ (a,b)* and $n_a(w) > n_b(w)$}

b) Design PDA for the following language accepted by final state. Also write instantaneous description for the string "aabbbbbccc".   L = { $a^n b^{n+m} c^m$: n ≥ 0 , m ≥ 1} 7M

Unit - 5

9. a) Explain the working of a Turing machine with a diagram. 5M
   b) Design a Turing Machine that accepts the language L = {$0^n 1^n$ | n ≥1}. 10M
10. a) Write a note on Modified PCP and Multi stack Turing machine. 5M
   b) Obtain a Turing machine to accept the language L= { w | w is even and ∑∈ { a , b }. 10M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

Date : 12 December, 2013   Time : 3 Hours   Max. Marks : 7

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

Unit - 1

1. a) Explain the demodulation of an AM wave using an envelope detector.   8M
    b) When a broadcast AM Transmitter is 50 percent modulated its antenna current is   7M
       12A. What will be the current when the modulation depth is increased to 0.9?

2. a) With a neat block diagram explain the synchronous receiving system for receiving   8M
       DSBSC modulated wave.
    b) A 360W carrier is simultaneously modulated by two sin waves with waves with   7M
       modulation percentage of 55 and 65 respectively what is the total sideband power
       radiated.

Unit - 2

3. a) Explain SSB wave generation using phase shift method with relevant diagrams and   8M
       equations.
    b) In a coherent detection of SSBSC, if the carrier applied is Cos $(2\pi f_c t + \phi)$ prove that   7M
       there is a phase error in the output i.e output consists not only the message signal
       but also its Hilbert transform.

4. a) Explain vestigial side band modulation. Represent the VSB modulated wave in time   8M
       domain.
    b) Calculate the percentage power saving when the carrier and one of the side bands   7M
       are suppressed in an AM wave modulated to a depth of
       i) 100%   ii) 50%

Unit - 3

5. a) Derive the equation for FM wave, derive Modulation Index and Frequency Deviation   8M
       for single tone.
    b) Describe with necessary diagram generation of Narrow Band Frequency Modulation   7M
       and also compare Narrow Band FM and Single tone AM.

6. a) an angle modulated signal is defined by s(t)=10Cos[$2\pi \cdot 10^6 t$ +0.2sin 2000πt] volts   8M
       find the following:
       i.   The power in the modulated signal
       ii.   The frequency deviation Δf
       iii. Phase deviation Δ
       iv.   Approximate transmission bandwidth
    b) Explain with a block diagram the phase locked loop for the demodulation of FM   7M
       signal.

Unit - 4

7. a) Clearly explain the improvement in SNR for frequency modulation using preemphasis and de-emphasis. 8M

    b) With the help of a neat wave forms explain the principle of PWM and PPM generation. Briefly explain the demodulation of PWM and PPM. 7M

8. a) Find the figure of merit of Double side band suppressed carrier signal. 8M

    b) Write the expressions for signal to Noise ratio in case of SSB-SC and DSB-SC signals. A received DSB-SC signal of strength 1 mW has a power spectrum which extends over the frequency range f_c = 1MHz to f_c - f_m = 0.995 MHz, f_c+ f_m = 1.005MHz. The accomplished noise has uniform power spectral density 10^{-9} W/Hz. This is multiplied by a local oscillator of frequency 1MHz and followed by a base band filter of cut off frequency fm to get message signal. Find the signal and energy at the output of baseband filter and calculate the SNR. 7M

Unit - 5

9. a) Explain different methods of tracking which will overcome the tracking error. 8M

    b) Explain automatic gain control which prevents the signal overloading in super heterodyne receiver. 7M

10. a) In a super heterodyne receiver having no RF amplifier the loaded Q of the antenna coupling circuit is 60 if the intermediate frequency is 455 kHz, calculate the image frequency and its rejection ratio at 1500 kHz. 8M

    b) Explain FM transmitters which use frequency multiplier and mixer to increase frequency deviation. 7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
AC MACHINES-II
(Electrical and Electronics Engineering)

Date : 12 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) Discuss in brief about armature reaction of an alternator.   8M
    b) Find the synchronous impedance, synchronous reactance, and the terminal voltage   7M
        when full load is thrown off, of a 250 Amp, 6600 V, 0.8 power factor alternator, in
        which, given field current produces an armature current of 250 Amp on short circuit and
        a generated EMF of 1500 V on open circuit. The armature resistance is 2 Ohm.
2. a) From the basics, derive an expression for generated EMF/Ph equation of an alternator.   8M
    b) Discuss in brief about the effect of distribution applicable to distributed winding of an   7M
        Alternator.

Unit - 2

3. a) Describe the procedure to compute the voltage regulation of a synchronous machine   8M
        through EMF method.
    b) The data obtained on 100 kVA, 1100 V, 3-phase alternator is: DC resistance test, E   7M
        between line 6 V dc, I in lines = 10 A dc. Open test, field current 12.5 A dc, line voltage
        420 V ac. Short circuit test, field current = 12.5 A, line current =rated value. Calculate
        the voltage regulation of alternator at 0.8 power factor lagging. Assume alternator is
        star connected.
4. a) With relevant characteristics, describe how voltage regulation of a synchronous   8M
        machine can be found through zero power factor method.
    b) A 3-phase star connected alternator is rated at 100 kVA. On a short-circuit a field   7M
        current of 50 Amp gives the full load current. The EMF generated on open circuit with
        the same field current is 1575 V/phase. Calculate the voltage regulation at
        i.   0.8 power factor lagging
        ii. 0.8 power factor leading
        Assume armature resistance is 1.5 Ω.

Unit - 3

5. a) What are the conditions to be fulfilled for parallel operation of two synchronous   8M
        machines? Explain with diagram two dark and one bright lamp method.
    b) A 3MVA, 6-pole alternator runs at 1,000 rpm on 3.3 kV bus bars. The synchronous   7M
        reactance is 25%. Calculate the synchronising power and torque per mechanical degree
        of displacement when the alternator is supplying full-load at 0.8 pf lag.
6. a) Two alternators are running in parallel and sharing a load in desired proportion. Explain   8M
        what will happen if the excitation of alternators are changed while their prime mover
        inputs are fixed.
    b) Two identical, three-phase alternators operating in parallel share equally a load of 1000   7M
        kW at 6600 V and 0.8 lagging power factor. The field excitation of the first machine is
        adjusted so that the armature current is 50 A at lagging power factor. Determine (i) the
        armature current of the second alternator, and (ii) the power factor at which each
   machine operates.

Unit - 4

7. a) What do you understand by a synchronous condenser? Explain with the help of phasor diagrams its operation and application.   8M

    b) A 1000 kVA, 11000 V, 3-phase star connected synchronous motor has an armature resistance and reactance per phase of 3.5 Ω and 40Ω respectively. Determine the induced emf and angular retardation of the rotor when fully loaded at   7M
        i.   Unity power factor
        ii. 0.8 power factor lagging

8. a) Write short notes on V and inverted V curves.   8M

    b) A 3-phase, 400V synchronous motor takes 52.5 A at a power factor of 0.8 leading. Determine the induced e.m.f. and the power supplied. The motor impedance per phase is (0.25+j 3.2)Ω.   7M

Unit - 5

9. a) With a neat sketch and phasor diagram, explain the operation of resistance split phase motor.   8M

    b) With a neat sketch, explain the principle of operation of a 1-phase series motor.   7M

10. a) Describe in detail about the revolving field theory of single-phase induction motor.   7M

    b) With a neat sketch, explain the principle of operation of shaded pole motor.   8M
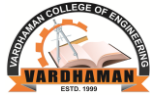
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
DESIGN OF MACHINE MEMBERS-I
(Mechanical Engineering)

Date : 12 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. a) List the factors which govern the selection of a material for a machine element.   7M
    b) Draw the stress strain diagram for mild steel material and show the salient points on them.   8M

2. a) A steel shaft is subjected to a bending moment of 9 kN-m and a twisting moment of 12 kN-m. The yield strength of steel is 360mpa in tension and compression and the Poisson's ratio is 0.3. if the factor of safety is 2 with respect to failure determine the permissible diameter of the shaft according to   10M
    i. Maximum shear stress theory of failure
    ii. Maximum normal stress theory of failure
    iii. Maximum distortion theory of failure
    b) Write a short notes on theories of failure.   5M

Unit - 2

3. a) Write a note on approximate estimation of endurance limit.   8M
    b) A rotating beam specimen made of steel 45C8 (S_{ut} = 630N/mm^2) is subjected to a completely reversed bending stress. Calculate the endurance strength of the specimen for a life of 90,000 cycles.   7M

4. a) A transmission shaft of cold drawn steel 27Mn2 (S_{ut} = 500N/mm^2 and S_{yt} = 300N/mm^2) is subjected to a fluctuating torque which varies from -100 N-m to +400N-m. The factor of safety is 2 and the expected reliability is 90%. Neglecting the effect of stress concentration, determine the diameter of the shaft. Assume the distortion energy theory of failure.   10M
    b) Write short notes on reduction of stress concentration.   5M

Unit - 3

5. a) Explain the various possible modes of failure of riveted joint.   8M
    b) A single riveted lap joint is to be made of 8mm plates. Find the diameter of rivets, pitch, shank length, margin and efficiency of the joint. The allowable tensile stress of the plate is 124MPa, the allowable shear stress of the rivet is 93MPa and the allowable crushing stress of rivet or plate is 165MPa.   7M

6. a) Explain the stresses considered in designing of bolts with static loading.   10M
    b) Define the following i) pitch diameter ii) Lead iii) thread angle iv) Depth and v)Helix angle with respect to screw thread.   5M

Unit - 4

7. a) A square key is to be used to a key gear to a 35mm diameter shaft, The hub length of gear is 60mm. Both shaft and key are made of same material having an allowable shear stress of 55MPa. What are the dimensions of the square key if 395N-m torque is to be transmitted.   **5M**

    b) Design a knuckle joint to connect two mild steel rods to sustain in an axial pull of 150kN. The pin and the rods are made of same material. Assuming the working stresses in the material as 80MPa in tension, 40mpa in shear and 120MPa in crushing.   **10M**

8. a) A wire rope is used with a hoisting drum of 1meter diameter to lift a load of 20kN. Determine the diameter of the shaft to which the drum is keyed if the safe shear stress in the shaft material is 45MPa. Neglecting the effect of bending.   **5M**

    b) How shafts can be designed?   **2M**

    c) A hallow shaft is mounted between bearings 4meter apart transmits 1mW at 100rpm. The shaft weighs 27kN. The outside and inside diameters of the shaft are 0.45m and 0.3m respectively then determine, i) shear stress induced in the shaft by taking K_b=1.5 and K_t =1.0 ii) angular deflection between bearings by taking 'G' as 80GPa.   **8M**

Unit - 5

9. a) A rigid coupling is used to transmit 20kW of power at 720 rpm. There are four bolts and the pitch circle diameter of the bolts is 125mm. The bolts are made of steel 45C8 (S_{yt} = 380N/mm^2) and the factor of safety is 3. Determine the diameter of the bolts. Assume that the bolts are finger tight in reamed and ground holes.   **10M**

    b) Write short notes on Couplings.   **5M**

10 a) Derive an expression for Energy stored in helical springs.   **6M**

    b) A helical springs is made from a wire of 6mm diameter and has outside diameter of 75mm. If the permissible shear stress is 350N/mm^2 and modulus of rigidity 84kN/mm^2, find the axial load which the spring can carry and the deflection per active turn   **9M**
    i.   Neglecting the effect of curvature
    ii. Considering the effect of curvature

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
AEROSPACE VEHICLE STRUCTURES-II
(Aeronautical Engineering)

Date : 12 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. a) Explain briefly about complete and incomplete diagonal tension beams.   8M
    b) Explain the importance of Wagner's theory of beams?   7M

2. a) Explain the following: 8M
        i.   Stability of stiffened Panel
        ii. Monocoque and semi monocoque
    b) Derive the equation for shear force at any section of an incomplete tension field   7M
        beam?

Unit - 2

3. The doubly symmetrical fuselage section shown in fig.1 has been idealized into an   15M
    arrangement of direct stress carrying booms and shear stress carrying skin panels; the
    boom areas are all 150 mm^2. Calculate the direct stresses in the booms and the shear flows
    in the panels when the section is subjected to a shear load of 50 kN and a bending moment
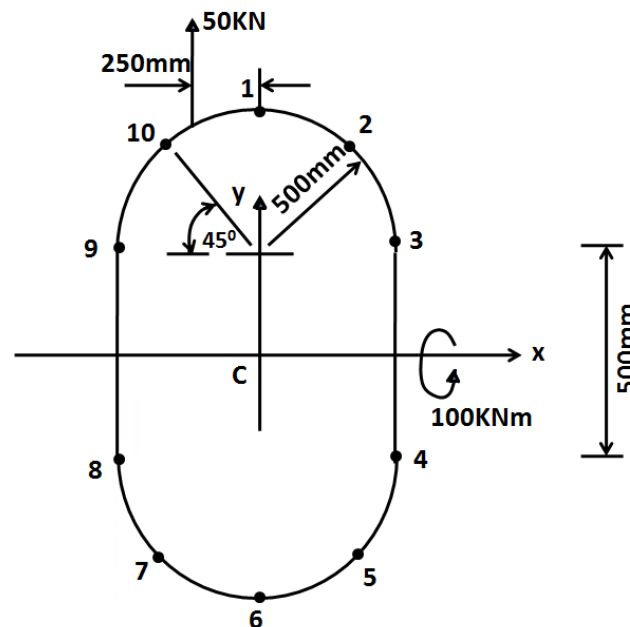   of 100 kN m.

fig.1

4. Figure .2 shows the cross section of a two-cell torque box. If the shear stress in any wall   15M
    must not exceed 140N/mm^2, find the maximum torque which can be applied to the box. If
    this torque were applied at one end and resisted at the other end of such a box of span
    2500mm, find the twist in degrees of one end relative to the other and the torsional rigidity
    of the box. The shear modulus G=26600N/mm^2 for all walls. Data are as follows:

    Shaded areas: A34 = 6450mm2, A16 = 7750mm2
    Wall lengths: S34 = 250mm, S16 = 300mm
    Wall thickness: t12 = 1.63mm, t34 = 0.56mm, t23 = t45 = t56 = 0.92mm, t61 = 2.03mm,
    t25 = 2.54mm.

fig.2

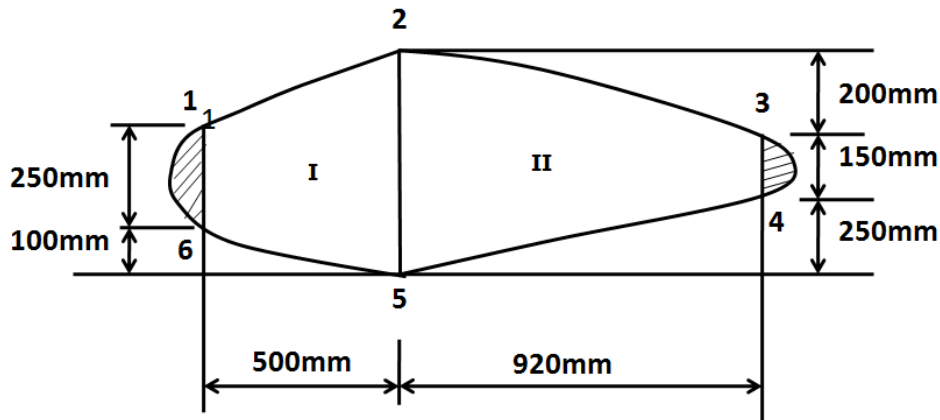## Unit - 3

5. a) Explain effective skin width concept in skin stringer construction.   7M
    b) Briefly discuss about stability of stiffened Panel.   8M
6. a) Derive an expression for share flow in open section?   8M
    b) Give a brief note about unsymmetrical beams and mention its assumptions.   7M

Unit - 4

7. Derive the expression for primary wrapping of thin walled open section beam.   15M
8. The cold-formed section shown in fig.3 is subjected to a torque of 50Nm. Calculate the   15M
    maximum shear stress in the section and its rate of twist. G= 25000N/mm2.
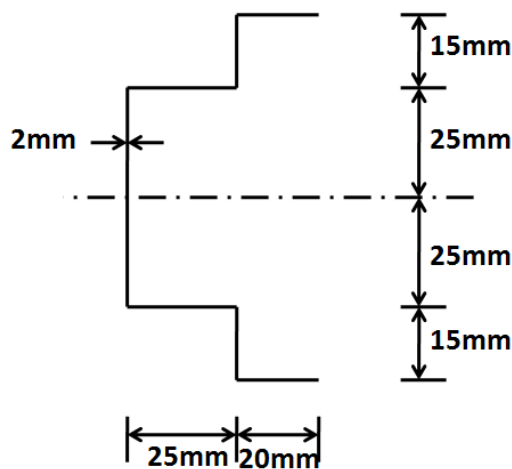

fig.3

Unit - 5

9. a) Derive an equation for torsion in thin walled open section beams?   8M
    b) What is primary and secondary warping? Derive the equations for the same?   7M
10. a) Explain the effect of axial constraint in an open section beams subjected to torsion?   7M
    b) Determine maximum shear stress and warping distribution in the channel section shown   8M
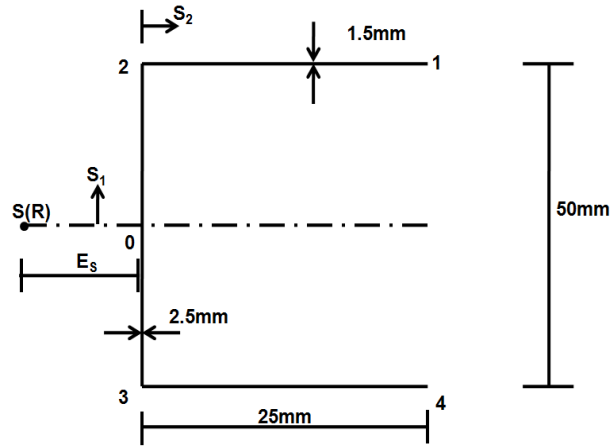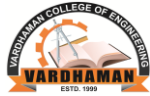   in fig.4, when it is subjected to an anticlockwise torque of 10Nm, G=25000N/mm².

fig.4

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
ENGINEERING GEOLOGY
(Civil Engineering)

Date : 12 December, 2013	Time : 3 Hours	Max. Marks : 75

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

Unit - 1

1. a) Explain the process of weathering.   8M
    b) Mention any seven failures of different kinds of important civil constructions due to   7M
       geological drawbacks.
2. a) What is the importance of weathering with reference to dams?   8M
    b) Give a brief account on weathering of Granite.   7M

Unit - 2

3. a) Explain the properties exhibited by minerals due to light (such as color, streak, lusture   8M
       and diaphaneity).
    b) Explain the important properties of following rock forming minerals: 7M
       i) Grey Quartz   ii) White Calcite   iii) Biotite   iv) Talc
4. a) What is Ore mineral? List out any 5 ore minerals with composition.   7M
    b) Explain the properties of the following economic minerals and its uses: 8M
   i) Hematite   ii) Galena   iii) Pyrolusite   iv) Magnesite

Unit - 3

5. a) What are the characteristics of igneous rocks? Explain briefly the classification of   8M
       igneous rocks.
    b) How sedimentary rocks are formed? Briefly explain structures exhibited by sedimentary   7M
       rocks.
6. a) What is Dip and Strike? Explain with neat sketch. Add a brief note on objectives of dip   8M
       and strikes in civil engineering projects.
    b) Explain the following with neat sketches: 7M
       i)Normal Fault   ii)Anticline and syncline fold

Unit - 4

7. a) What are the principles of geophysical study by gravity method?   7M
    b) What are the applications of gravity method of geophysical investigation?   8M
8. a) What is grouting? Describe the various methods of grouting adopted in the construction   7M
       of civil engineering structures.
    b) What is the controlling property, principle and applications of electrical method of   8M
       geophysical exploration?

Unit - 5

9. a) What is a dam? Discuss briefly the geological considerations in selecting a suitable site   8M
       for the construction of a dam.
    b) Add a note on tunneling through folds.   7M
10. a) What are the considerations for successful reservoir?   7M
    b) What is silting? Write the remedial measures of silt control.   8M
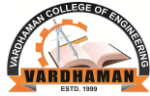
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to Computer Science and Engineering & Information Technology)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) Describe the worst case analysis for quick sort algorithm.   7M
    b) Apply quick sort on the following data with 6 as the pivot element: 8M
        2 5 8 3 9 4 1 7 10 6
2. a) Explain the Stassen's matrix multiplication and compare it with basic matrix   7M
        multiplication method.
    b) Give a big-O estimate for each of these functions. Use a simple function in the big-O   8M
        estimate.
        i. $3n + n^3 + 4$.
   ii. $1 + 2 + 3 + \ldots\ldots + n$.

Unit – 2

3. a) Explain the Real knapsack problem with an example.   7M
    b) Explain the concept of job scheduling with deadlines. Find a feasible solution and job   8M
        processing sequence such that each job can be completed by its deadline so as to
        maximize its profit. Consider n = 4, (p1, p2, p3, p4) = (100, 10, 15, 27) and (d1, d2, d3,
        d4) = (2, 1, 2, 1)
4. a) Write the differences between Prim's and Kruskal's algorithm. Mention the   8M
        applications of spanning tree.
    b) Find the minimum spanning tree using Kruskal's algorithm.   7M
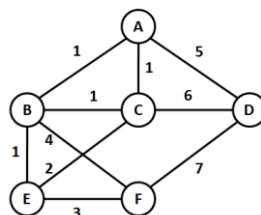
Unit – 3

5. a) Explain the dynamic programming approach for problem solving. Discuss the   7M
        difference between greedy approach and dynamic approach of problem solving.
    b) Write an algorithm to find all-pairs shortest path of a given graph. Apply the algorithm   8M
        to find all-pairs shortest path for the following graph:
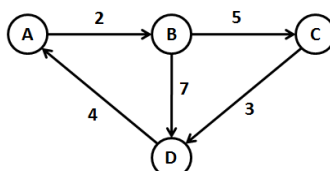
6. a) Explain the travelling salesman problem with an example. 7M

   b) Solve the 0/1 knapsack problem for the following data: 8M

Item	Weight	Value
10	9	10
11	8	4
12	9	9
13	8	11

The maximum weight the knapsack can hold is 20.

Unit - 4

7. a) What is branch and bound? How is it different from back tracking? 5M

   b) What is backtracking? Apply backtracking algorithm to solve the following instance of the subset sub problem S = {5,7,8,10} and d=15. 10M

8. a) Explain the travelling salesman problem using the branch and bound technique. 7M

   b) Explain the 0/1 knapsack problem using branch and bound technique. 8M

Unit - 5

9. a) What do you mean by Non-deterministic algorithm? Explain with examples. 6M

   b) Distinguish between P, NP and NP-complete problems. Give examples for each category. 9M

10. a) Write brief note on Cooks theorem and comparison trees. 9M

    b) Draw decision trees for the following: 6M
       i. Three element insertion sort
       ii. Binary decision tree for binary search in a four-element array
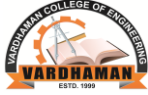
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)

ANTENNAS AND WAVE PROPAGATION

(Electronics and Communication Engineering)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) Define   10M
    i.   Isotropic and Directional Antenna
    ii. Radiation Pattern
    iii. Near and Far Fields
    iv. Polarization of an antenna
    v.   Directivity of an antenna
    b) An antenna has a radiation resistance of 72Ω, loss resistance o 8Ω and power gain of   5M
        12dB. Determine the antenna efficiency and it's directivity.

2. a) Obtain the expressions for radiation resistance, maximum directivity and effective   7M
        aperture assuming the expression for average power density for an infinitesimal
        dipole .
    b) Discuss the far field conditions for an antenna of length L and assuming far field   8M
        conditions, calculate the amplitude and phase errors for an antenna of length
        6λ when observations are made at a distance of 80λ .

Unit – 2

3. a) Show that the radiation resistance of a small loop antenna is $R_r = 31171(A/\lambda^2)^2$.   9M
    b) Explain briefly the following: 6M
    i.   Broadside array
    ii. End fire array
    iii. Scanning array

4. a) Given a linear uniform array of 16 elements with a separation of $\lambda/4$ between the   6M
        elements. Compare the directivity of the array if the array is (i) Broadside array (ii)
        Ordinary end fire array.
    b) Assuming the array factor for an uniform planar array, find the progressive phase shift   9M
        between the elements in the x and y directions for a desired beam at $\theta = \theta_0, \; \emptyset = \emptyset_0$
        and the conditions for principal maxima and grating lobes to occur.

Unit – 3

5. a) What are the advantages and drawbacks of rhombic antenna? Design an alignment   7M
        type rhombic antenna for an elevation angle $\alpha = 17.5^0$ to be operated at $\lambda = 3cm$.
    b) Explain the principle of operation of V-dipole antennas. Design a V-dipole antenna to   8M
        be operated at 20MHz with directivity of 7.5 dB.

6. a) Draw the basic geometry of a helical antenna and define the various parameters. 9M

   b) A 10 turn axial mode helix antenna has the following specifications: 6M
   $\alpha = 13^0, f = 8\ GHz$ and circumference of the helix C = 3.4 cm. Find the gain, HPBW and axial ratio of the antenna.

Unit – 4

7. a) Discuss the method adopted to obtain optimum flare angles of a pyramidal horn and the conditions on horn length to realize such a horn. 9M

   b) Explain briefly the parameters affecting the performance of a parabolic reflector antenna. 6M

8. a) Write the advantages offered by dielectric lens antennas. 7M

   b) Design a rectangular patch antenna on a dielectric substrate with $\epsilon_r = 2.65$ to be operated at 3GHz.Determine the antenna parameters, bandwidth and VSWR, if the antenna is fed by a transmission line of 100Ω. Assume the thickness of the substrate as 2% of λ. 8M

Unit – 5

9. a) Discuss the prominent modes of wave propagation and factors affecting them. 10M

   b) In an ionospheric propagation, the angle of incidence made at a particular layer at a height of 200km is 45^0 with a critical frequency of 6MHz.Calculate the skip distance. 5M

10. a) Define the terms surface and elevated ducts and duct gradient. Also discuss the duct propagation. 9M

    b) Two towers of height 80m and 20m for transmission and reception respectively are spaced at a distance of 10Km. If the transmitted power is 50 W at a frequency of 6 GHz, find the power received when the antennas are 6M
    i. Isotropic and
    ii. Directional with 20dB gain and aligned for maximum signal

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
Four Year B. Tech V Semester Regular Examinations December - 2013
(Regulations: VCE-R11)
SOFT COMPUTING
(Electrical and Electronics Engineering)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit - 1

1. a) With a neat diagram explicate about the structure and working of a biological neural network.   8M
   b) Write in detail about the following models of artificial neural network neuron: 7M
      i.   Perceptron Model
      ii. Adaline Model
2. a) Briefly explain the different characteristic and activation functions of artificial neural networks.   8M
   b) Discuss about the basic learning laws used in modification of weights in an artificial neural network.   7M

Unit - 2

3. a) With a basic learning algorithm converse about Rosenblatt's Perceptron model.   7M
   b) What is supervised learning? Differentiate supervised and unsupervised learning.   8M
4. a) Discuss in detail about the training algorithm used in back propagation network for a multilayered Artificial Neural Networks.   8M
   b) With a neat architecture discuss about multi layer feed forward neural networks.   7M

Unit – 3

5. a) What is a discrete Hop field neural network? Draw a neat architecture of Hopfield neural network and explain.   8M
   b) Mention the applications of self organizing feature map.   7M
6. Explicate in detail about the following
   a) Bidirectional associative memory   7M
   b) Bam stability analysis   8M

Unit - 4

7. a) With examples discuss about Crisp sets and operations on crisp sets.   8M
   b) Let A={(x$_1$,0.3), (x$_2$,0.6), (x$_3$,0.5)} and B={(y$_1$, 0.4), (y$_2$,0.7)} be the two fuzzy sets defined on the disclosure X={x$_1$, x$_2$, x$_3$} and Y={y$_1$, y$_2$} respectively. Find the cartesian product AxB.   7M
8. a) Define fuzzy and crisp sets. Write about fuzzy relations and crisp relations with examples.   8M
   b) Elaborate the control technique applied in Fuzzy control of Blood Pressure.   7M

Unit - 5

9. a) Explain in detail about the involvement of fuzzy logics in data base systems.   7M
   b) Investigate the fuzzy relational data models and the operations involved in the data models.   8M
10. Discuss in detail about the following :
    a) Design theory for fuzzy relational databases   7M
    b) Fuzzy information   8M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)
METROLOGY AND SURFACE ENGINEERING
(Mechanical Engineering)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) Define Fit. Give classification of different types of fits and explain each of them with suitable example.   7M

    b) Calculate the limits of tolerance allowance for a 35mm shaft and hole pair designated H_8d_9. The following assumptions may be made, 35mm lies in diameter step of 30 and 50mm. The IT grades for IT8 and IT9 are 25i and 40i. The fundamental deviation for 'd' shaft is given by $-16D^{0.41}$ microns.   8M

2. a) Explain the need for providing tolerance on a dimension. Explain the difference between Allowance and Tolerance.   7M

    b) A hole and shafting system has the following dimensions $50[H_8/c_8]$. The standard tolerance is given by $i=0.45(D)^{1/3} +0.001D$, where D=dia(mm) of geometric mean of steps i=standard tolerance, microns. The multiplier for grade IT8 is 25i. The fundamental deviation for shaft c, for D>40mm is given by $-(9.5+0.8D)$ microns. The diameter range lies between 50 to 80mm. Sketch the fit and show these upon the actual dimension of hole and shaft.   8M

Unit – 2

3. a) State the Taylor's principle for the design of limit gauges. Draw a diagram to show the different classes of fit which can be obtained in a hole based system.   7M

    b) Calculate the dimensions of plug and ring gauges to control the production of 50mm shaft and hole pair of H_7d_8 as per I.S specification. The following assumptions maybe made , 50mm lies in diameter step of 30 and 50mm and the upper deviation for 'd' shaft is given by $-16D^{0.41}$ and lower deviation for hole H is zero.
    Tolerance factor $i(microns) = 0.45(D)^{1/3}+0.001D$ and IT7 = 16i and above IT8=25i. Calculate the 10% gauge tolerance and wear tolerance of the shaft and hole.   8M

4. a) Draw a schematic diagram of a mechanical bevel protractor with Vernier and optical angle attachment, explain briefly.   7M

    b) What is an angle gauge? Also write the uses of angle gauges.   8M

Unit – 3

5. a) Explain the construction of Tool maker's Microscope with a neat sketch and give its applications.   7M

    b) Describe with a neat sketch the measurement of major diameter of a screw thread using fudicial dial indicator.   8M

6. a) Explain the different 'screw thread' errors commonly encountered during manufacturing. How can they be identified? Give remedies for their elimination.   7M

    b) Compare 2-wire and 3-wire methods of measuring the effective diameter of a screw.   8M

Unit – 4

7. a) What is meant by roughness and waviness of machined surfaces? Explain.   7M
   b) Calculate the CLA (R_a), R_z, R.m.s value of a surface for which the sampling length was 0.8mm. The graph was drawn to a vertical magnification of 10,000 and a horizontal magnification of 100, and the areas above and below the datum line were: 8M

Above:	150	80	170	40	mm^2
Below:	80	60	150	120	mm^2

8. a) State the possible causes of each of the various types of irregularities found in surface texture. Show how surfaces having the same numerical assessment may have different properties and textures.   7M
   b) Classify comparators and explain in details. What are the advantages and limitations of optical comparator?   8M

Unit – 5

9. a) What are the important features of Coordinate measuring machines? What are the possible causes of errors in CMM?   8M
   b) What are the different remedial measures for protecting the surface from corrosion?   7M
10. a) List out different surface treatment processes. Briefly discuss.   8M
    b) Distinguish between organic and in-organic coatings &give their applications.   7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech V Semester Regular Examinations, December - 2013
(Regulations: VCE-R11)

INTRODUCTION TO SPACE TECHNOLOGY
(Aeronautical Engineering)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) Discuss the orbital characteristics of   9M
    i.   Remote sensing
    ii. Communication satellite missions
    b) Explain the effect of atmosphere on the life – time of near earth satellite.   6M
2. a) What are the important criteria for selecting a launch system?   8M
    b) Write short notes on PSLV.   7M

Unit – 2

3. a) Describe the basic operating principles of a solid rocket motor. Give examples for their applications.   8M
    b) Explain how the shape of the propellant grain can affect the thrust profile of a solid rocket motor.   7M
4. a) Explain how the thrust of a rocket develops. Derive the equation for the thrust. Differentiate between under-expanded and over-expanded nozzle performance.   10M
    b) Compare the various types of supersonic nozzles.   5M

Unit – 3

5. a) With the help of a two dimensional free – body force diagram for a flying vehicle with wings, write down the differential equations of motion along and perpendicular to flight path.   9M
    b) Determine the burnout velocity of a rocket launched vertically, using fuel of I_{SP}=250s and mass fraction $\dfrac{m_f}{m_0} = 0.2$ and thrust ratio Ψ=2.   6M
6. a) List and discuss competing requirements of re – entry vehicle design.   9M
    b) Define ballistic coefficient. What is the effect of ballistic coefficient on the vehicle descent?   6M

Unit – 4

7. Write a note on Keplerian Orbital elements and derive Kepler's equation of orbit.   15M
8. Explain Hohmann transfer technique for transferring a satellite from one orbit to another.   15M
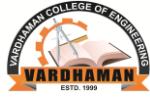
Unit – 5

9. a) Write down Euler's moment equation for a rigid body.   7M
    b) Explain any two passive attitude control techniques used for near earth satellites.   8M
10. a) What are the main functions of a spacecraft power system?   6M
    b) Write short notes on :   9M
       i.   Telemetry system
       ii. Tracking system
       iii. Telecomm and system
       iv. Transponder

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
Four Year B. Tech V Semester Regular Examinations December - 2013
(Regulations: VCE-R11)
ESTIMATING AND COSTING
(Civil Engineering)

Date : 14 December, 2013   Time : 3 Hours   Max. Marks : 75

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

Unit – 1

1. a) List the functions of an abstract of an estimate.   5M
    b) Prepare a preliminary estimate of a double storied building having floor area 2200sqm   10M
        for obtaining the administrative approval with the following data. 30% of the built up
        area may be taken for verandah 20% staircase & lavatories and 10% foe walls.

Plinth area rate	Rs 300 per sqm
Extra for foundation	1% of building cost
Architectural design and drawing	1% of building cost
Water supply and sanitary installation	6% of building cost
Electricity installation including fans etc	10%of building cost
Extra for other services	5% of building cost
Contingencies	3% of overall
Supervision charges	3% of overall

2. a) List the various methods of estimate and briefly explain what is detailed estimate.   3M
    b) Write an explanatory note on the following   12M
        i.   Circulation area
        ii.   Carpet area
        iii. Floor area
        iv.   Supplementary estimate

Unit – 2

3. Estimate the quantity of earth work for a portion of a road 300 meter in length for the   15M
    following data: Formation width = 10 meter, side slopes of 2:1 and 1.5:1 for banking and
    cutting respectively. Formation RL =102.00 m with a falling gradient of 1 in 150 up to the
    first 120 meter and later to a falling gradient of 1 in 100

Distance (m)	0	30	60	90	120	150	180	210	240
RL (m)	101	100.9	100.5	100.7	100.8	100.6	100.0	99.8	99.2

4. Prepare a detailed Estimate for 1 Kilometer length of a lime Concrete track way with 60   15M
    centimeter wide tracks 1.50 meter center to center over 30 centimeter thick rammed
    Kankar. Assume local rates and suitable cross section. Any other missing data may be
    reasonably assumed.

Unit – 3

5. a) What are the factors affecting Rate analysis. Briefly explain overhead costs ? 6M
   b) Workout the rate analysis for a 12 cm thick RCC slab portion (1:2:4) with steel reinforcement for 10 Sq m. 9M
6. a) List the difference between Schedule of rates and Analysis of rates. 5M
   b) Work out the rate analysis for a RCC Beam portion (1:1.5:3) with steel reinforcement for 1 cu m. Also prepare bar bending schedule. 10M

Unit – 4

7. a) What is security deposit in tender document and explain the typical form of tender notice. 8M
   b) What is Earnest Money Deposit (EMD)? What are the different modes of acceptance of tender? 7M
8. a) Explain the following 6M
      i.   Turn-key contract
      ii. Package deal contract
      iii. Lump sum contract
   b) What is a contract document? Explain the details to be attached to a contract document. 9M

Unit – 5

9. a) What are the various methods of depreciation? Differentiate between depreciation and Obsolescence. 9M
   b) The total cost of a new building is Rs 15, 00,000. Work out the depreciated cost of the building after 20 years by straight line method if the Scrap value is Rs 1, 50,000 assuming the life of the building to be 80 years. 6M
10. Calculate the standard rent of a Government owned building that is constructed at the cost of Rs 7, 50,000. Data given: 15M
    i.   Cost of water supply and Sanitation @ 10% of the total cost
    ii. Cost of electrical installations @ 8% of the total cost
    iii. Cost of internal roads and compound wall @ Rs 1,00,000
    iv. Municipal and other Taxes @ Rs 3500 per annum