

Hall Ticket No:

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

Question Paper Code : A1015



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**INDUSTRIAL MANAGEMENT AND PSYCHOLOGY**

(Common to Electrical and Electronics Engineering, Mechanical Engineering &amp; Civil Engineering)

Date: 27 May, 2014

Time: 3 hours

Max Marks: 75

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

1. a) List the Fayol's principles of Management. 7M
- b) "Management layers represent the shape of Pyramid" Describe. 8M
2. a) Differentiate line and staff organization structures. 7M
- b) Describe the Hertzberg's two factor theory. 8M

**Unit - II**

3. a) State the classification of production system in practice with one example each 5M
- b) The following data were recorded during a time study. 10M

Element	Observed time	Rating	Relaxation allowance	Frequency per cycle
A	0.15	120	15%	1
B	0.07	110	20%	3
C	1.25	90	20%	2
D	0.50	100	18%	1

Calculate the Standard time per Work cycle.

4. a) Differentiate product layout with process layout. 7M
- b) List the factors influencing selection of a chemical plant. 8M

**Unit - 3**

5. a) What is crashing? Explain the approach used in crashing. 5M
- b) The following table lists the jobs of a network with their estimates. 10M

Job i-j	Duration (days)		
	Optimistic ( $t_o$ )	Most likely ( $t_m$ )	Pessimistic ( $t_p$ )
1-2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-5	3	6	15
6-7	3	9	27
5-8	1	4	7
7-8	4	19	28

Draw the project network. Calculate the length and variance of the critical path  
What is the probability that the jobs on the critical path will be completed in 41 days.

Cont...2

6. a) Distinguish between: 8M  
i. Chance causes and assignable causes  
ii. Variables and attributes  
b) The following are the inspection results of 10 lots, each lot being 300 items. Number defectives in each lot are 25, 30, 35, 40, 45, 35, 40, 30, 20 and 50. Calculate the average fraction defective and three sigma limits for P-chart and state whether the process is in control. 7M

**Unit - IV**

7. a) Define materials management and explain its scope? 10M  
b) An oil engine manufacturer purchases lubricants at the rate of Rs. 42 per piece from a vendor. The requirements of these lubricants are 1800 per year. What should be the ordering quantity per order, if the cost per placement of an order is Rs. 16 and inventory carrying charges per rupee per year is 20 paise. 5M
8. a) Explain the recruitment process employed by organizations in selecting the competent employees. 8M  
b) What is product life cycle? Explain characteristics and marketing implications for each stage of product life cycle. 7M

**Unit - V**

9. a) Explain McGregor's Theory X and Theory Y. 8M  
b) What are the major leadership issues in the 21<sup>st</sup> century? Discuss. 7M
10. a) Mention the four parts of Hawthorne experiments. On what factors The Hawthorne Experiments are mainly criticized. 8M  
b) Explain the concept and characteristics of group dynamics. 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**HUMAN VALUES AND ETHICS**

(Common to Computer Science and Engineering & Information Technology)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) What are Common Professional Values? Highlight with suitable examples. 8M
- b) How do you contrast values from ethics and culture? 7M
2. a) Justify courage as a value? List its significance. 8M
- b) Differentiate Self -respect and Self –esteem with suitable examples. 7M

**Unit – II**

3. a) What are the skills-set required to improve the Moral Autonomy? 7M
- b) What are the three main levels of moral developments as suggested by Lawrence Kohlberg in his psychological theory? 8M
4. a) Write briefly about good ethical theories and mention about widely used tests for evaluating ethical theories. 7M
- b) Write about the following: 8M
  - i. Moral Relativism
  - ii. Moral Pluralism

**Unit – III**

5. a) What are the responsibilities of engineers to society and write about engineers as responsible experimenters. 7M
- b) In what respects engineering practice has contrasts with standard experimentation? 8M
6. a) What are the roles of codes in ethical conduct? 7M
- b) What are the problems with the law in engineering? 8M

**Unit – IV**

7. a) What is meant by “risk”? Write briefly about acceptability of risk. 7M
- b) Loyalty can be a desirable character attribute. Write about Agency loyalty and Identification loyalty. 8M
8. a) What is meant by confidential information? Write briefly about confidentiality. 7M
- b) Write short notes on: 8M
  - i. Intellectual Property Rights
  - ii. Trademarks
  - iii. Copyrights

**Unit – V**

9. a) How will you justify the obligation of confidentiality? Describe each one of them. 8M
- b) Differentiate eyewitness and expert witness .Give examples. 7M
10. a) Enumerate the different ways to create an ethical climate? Explain with justification. 8M
- b) What is the basic ethical and moral responsibility of a manager-engineer? Explain. 7M

Hall Ticket No:

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

Question Paper Code : A1018



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**ENTREPRENEURSHIP**

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

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

---

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

---

**Unit - I**

1. a) List the characteristics that you believe is necessary for an entrepreneur. Justify your answer. 8M
- b) Enumerate the different theories of entrepreneurship. 7M
2. a) Write short notes on stimulants in entrepreneurship. 8M
- b) Explain the role of an entrepreneur in economic development? 7M

**Unit – II**

3. What is the role of government in entrepreneurship? To what extent should it help to protect people from entrepreneurship or should it simply get out of the way and leave the market to reward or punish inappropriate behavior? Given your answer to the above question, what specific steps the government should take or what steps have they taken that should be reversed. 15M
4. Enumerate the role of IDBI and SIDO as support towards entrepreneurship. 15M

**Unit – III**

5. a) Explain the different functions of women entrepreneur? 8M
- b) Explain the profile of any two Indian women entrepreneurs? 7M
6. a) Explain the origin of women entrepreneurship development in India? 8M
- b) Explain the problems faced by women entrepreneurs? 7M

**Unit – IV**

7. a) Write short notes on social cost benefit analysis 8M
- b) Explain the advantages of good project management citing examples to justify your answer. 7M
8. Explain the following terms in classification of a project: 15M
  - i. Profitability appraisal
  - ii. Project report
  - iii. Project Planning

**Unit – V**

9. Explain how you would design appropriate training programmes to inculcate entrepreneurial spirit citing examples for your answer? 15M
10. a) Explain training for new and existing entrepreneurs in terms of entrepreneurship skills? 10M
- b) State the advantages of training provided to entrepreneurs. 5M

Hall Ticket No:

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

Question Paper Code : A1020



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

Four Year B. Tech VI Semester Regular Examinations June - 2014  
(Regulations: VCE-R11)

**INTELLECTUAL PROPERTY AND PATENT RIGHTS**  
(Electronics and Communication Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) What are the legislations covering various form of IPRs in India? Who are responsible for their administration? 10M
- b) Why do developing countries need Intellectual Property Rights? 5M
2. a) List the various form of intellectual property rights. Briefly explain any three of them. 8M
- b) What is WIPO? Explain its objectives and functions. 7M

**Unit – II**

3. a) Write short notes on the following: 8M
  - i. Purpose and functions of Trademark
  - ii. Infringement of trademark and remedies
- b) Give brief account on Collective marks. 7M
4. a) Write short notes on the following: 8M
  - i. Registration of Trademark
  - ii. Certification mark
- b) Give brief account on marks that are not Registerable. 7M

**Unit – III**

5. a) Write short notes on the following: 8M
  - i. Important features of Patent Rights
  - ii. Copyrights in Digital Era
- b) Does the law allow any use of a work without permission of the owner of the copyright, and, if so, which are they? 7M
6. a) Write short notes on the following: 7M
  - i. What is the term of a copyright with regard to literary work, cinematography and broadcasting
  - ii. If an employee in a company develops a program, would he/she claim the copyright?
  - iii. Is it necessary to deposit accompanying document of the computer program for which copyright being sought?
- b) Major provisions in the Copyright Act, 1999 with regards to computer program. 8M

**Unit – IV**

7. a) Write a note on Misappropriation right of publicity and false advertising. 8M
- b) In case of misappropriation on trade secrets, there lies a liability. Do you agree? Support your answer with suitable examples. 7M
8. a) Discuss the precautions to be taken to protect the trade secrets of an organization. 10M
- b) Write a note on Trade secrete litigation. 5M

Cont...2

::2::

**Unit – V**

- |     |    |  |    |
|-----|----|--|----|
| 9.  | a) | What is Trade Secret? What are the remedies for misappropriation?                      | 8M |
|     | b) | Write short notes on the following:  | 7M |
|     |    | i. Tools to protect Trade Secret   |    |
|     |    | ii. Trade Secret law in India  |    |
| 10. | a) | Give a brief account of Misappropriation of name and likeness.                         | 8M |
|     | b) | Compare potential cost and benefits of trade secret protection with Patent protection. | 7M |

Hall Ticket No:

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

Question Paper Code : A1122



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DESIGN OF STEEL STRUCTURES**

(Civil Engineering)

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) List the different types of steel structures and explain any two? 7M
- b) Briefly explain the various structural stability checks considered by the IS code. 8M
2. a) Explain special considerations required in the design of steel structures? 7M
- b) Explain briefly the necessity of partial safety factors and codes in structural design? 8M

**Unit – II**

3. a) Explain the behavior of a non slip joint with sketches? 5M
- b) Design a tension member using single angle subjected to a service load of 150 kN. Use M 16 property class 4.6 bolts. 10M
4. a) Briefly explain about any two types of welds with neat sketches and explain the strength calculations in butt welds. 10M
- b) Design a welded connection [three sides] for the tension member ISA 100 × 65 × 8mm subjected to 150 kN service load [Field weld]. 5M

**Unit – III**

5. A stanchion ISHB 300 @ 630 N/m in the lower storey of a building is to be jointed to a stanchion ISHB 200 @ 400 N/m of the next upper storey. A factored load of 900kN is to be transferred from the top storey stanchion. Design the column splice. The column ends are made flush. Use steel of grade Fe410 and M24 bolts of grade 4.6. Sketch the details. 15M
6. Design a suitable ISMB section as beam for a simply supported span of 3m carrying a dead load of 18 kN/m and live load of 40 kN/m. Assume full lateral restraint and stiff support bearing of 100 mm. Check for deflection, shear, web buckling and crippling. 15M

**Unit – IV**

7. Determine the design loads on the purlin of an industrial building near Visakhapatnam, given: 15M  
Class of building: general with life of 50 years:  
Maximum dimension: 40m.  
Width of building: 15m.  
Height at eave level: 8m  
Topography:  $\theta$  less than  $30^\circ$ .  
Permeability: Medium.  
Span of truss: 15:  
Pitch: 1/5.  
Sheeting: AC sheets.  
Spacing of purlin: 1.35m.  
Spacing of trusses: 4m.

Cont...2

::2::

8. a) Draw the neat sketch of the roof truss with labeling the parts of it. 7M  
b) A roof truss shed is to be built in Chennai for an industry. The size of shed is 20mX5m. 8M  
The height of building is 10m at the eaves. Determine the basic wind pressure.

**Unit – V**

9. The girder showed in Fig.1 is fully restrained against lateral buckling throughout its span. The span is 36m and carries two concentrated loads as shown in Fig.1. Design a plate girder. 15M  
Yield stress of steel,  $f_y = 250N / mm^2$   
Material factor for steel,  $\gamma_m = 1.15$   
Dead Load factor  $\gamma_{fd} = 1.35$   
Imposed load factor,  $\gamma_{fe} = 1.50$

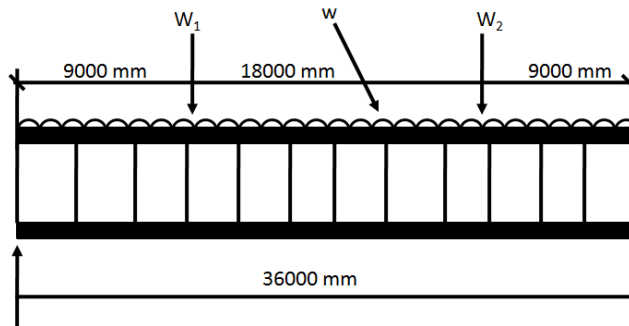


Fig.1

10. Design a welded plate girder of span 30m to carry on superimposed load of 35kN/m. Avoid use of bearing and intermediate stiffeners. Use Fe415 (FE250) steel. 15M



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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**GEO TECHNICAL ENGINEERING-II**

(Civil Engineering)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) What are disturbed, undisturbed and representative samples? Explain briefly. 8M
- b) The inner diameters of a sampling tube and that of a cutting edge are 70 mm and 68 mm respectively, their outer diameters are 72 mm and 74 mm. respectively. Determine the inside clearance, outside clearance and area ratio of the sampler. Outer and inner diameters are 72mm and 74mm. 7M
2. a) The measured N value at a depth of 10 m in a layer of fine sand was 23. The water table was at 2.0 m below ground surface. If the unit weight of sand above water table is  $18 \text{ KN/m}^3$  and below water table is  $21 \text{ KN/m}^3$ . Calculate the corrected N- value. 8M
- b) Explain in detail the different methods of boring for soil exploration. 7M

**Unit – II**

3. a) Distinguish between finite and infinite slope and also list the various causes of failure of slope and hence its protection. 7M
- b) A 1:1 slope having the following details, determine the FOS along the toe failure. Height of slope is 5m, unit weight of soil is  $18 \text{ kN/m}^3$ ,  $\alpha=37^\circ$ ,  $\beta=42^\circ$ ,  $C=20 \text{ kN/m}^2$ ,  $\Phi=30^\circ$ . Use method of slices. 8M
4. a) Explain briefly the various causes of failure of slopes, with explanatory sketches. 8M
- b) Explain the stability of slope of earth dam during steady seepage. 7M

**Unit – III**

5. a) A retaining wall of 9 m height has a cohesion less soil has backfill with horizontal surface. The soil has  $\phi = 30^\circ$ ,  $G = 2.65$  and  $e = 0.65$  The water table is at a depth of 3 m, uniform surcharge on the backfill is  $15 \text{ KN/m}^2$ . Draw the active earth pressure diagram and calculate the total horizontal thrust on the wall and its point of action. 8M
- b) What are the different types of retaining walls? 7M
6. a) A retaining wall of height 6.6m retains a cohesion less soil whose properties are  $\phi = 35^\circ$ ,  $G = 2.6$  and  $e = 0.6$  The water table is at a depth of 2.1 m below the backfill surface. Draw the earth pressure diagram and calculate the total lateral thrust on the retaining wall and its position above the base of the retaining wall. 8M
- b) Differentiate between Rankine's theory and Coulomb theory. 7M

**Unit – IV**

7. a) What will be the gross and net allowable bearing pressure of sand having  $\phi = 35^\circ$  and effective unit weight of soil  $18 \text{ KN/M}^3$  under the following cases: 8M
- i. Size of footing  $1\text{m} \times 1 \text{ m}$  square
  - ii. Circular footing of  $1\text{m}$  diameter
  - iii.  $1 \text{ m}$  wide strip footing
- The footing is placed at a depth of  $1 \text{ m}$  below ground surface and the water table is at great depth. Take Factor of safety =  $3.0$ ,  $N_c = 57.7$ ,  $N_Q = 41.4$  and  $N_\gamma = 42.4$ . Compute by Terzaghi's general shear failure theory.
- b) Differentiate between general and local shear failure in soil. 7M
8. a) Discuss the effect of water table on bearing capacity of soil. 7M
- b) With a neat sketch explain the plate load test to determine the safe bearing capacity of soil. 8M

**Unit – V**

9. a) What do you mean by tilts and shifts in the case of well foundation? Mention suitable measures to be taken to overcome sinking operations? 7M
- b) Design a friction pile group to carry a load of  $3000\text{kN}$  including the weight of the pile cap at a site where the soil is uniform clay to a depth of  $20 \text{ m}$ , underlain by rock. Average unconfined compressive strength of the clay is  $70\text{kN/m}^3$ . The clay may be assumed to be normal sensitivity and normally loaded with liquid limit of  $60\%$ . A factor of safety of  $3$  is required against shear failure. 8M
10. a) Write a note on negative skin friction. How it can be computed. 8M
- b) A wooden pile is being driven with a drop hammer weighing  $20\text{kN}$  and having a free fall of  $1.0 \text{ m}$ . The penetration in the last blow is  $5\text{mm}$ . Determine the load carrying capacity of the pile according to the Engineering News Formula. 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**WATER RESOURCES ENGINEERING-II**

(Civil Engineering)

Date: 3 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Discuss the advantages and disadvantages of Detention Reservoir and Retarding Reservoir. 6M
- b) Mention the investigations to be made for reservoir planning. 9M
2. a) Explain the procedure for determining the reservoir capacity by mass curve method. 9M
- b) Find the useful life of a Reservoir having initial capacity of 3700 ha-m, average annual inflow of 7400 ha-m, and average annual sediment inflow of  $2 \times 10^6$  KN. Assume sediment weight of  $11.2 \text{ KN/m}^3$ , and useful life of the Reservoir shall terminate when 80% of the capacity is filled with sediment. Use data of the table below: 6M

Capacity-Inflow Ratio	0.1	0.2	0.3	0.4	0.5
Trap Efficiency (%)	87	93	95	95.5	96

**Unit - II**

3. a) Explain the various forces acting on a gravity dam. 7M
- b) Following data were obtained from the stability analysis of a concrete gravity dam: 8M
  - i. Total overturning moment above toe =  $1 \times 10^5$  t-m.
  - ii. Total resisting moment above toe =  $2 \times 10^5$  t-m.
  - iii. Total vertical force above base = 5000 t.
  - iv. Base width of the dam = 50 m.
  - v. Slope of the down stream face = 0.8 (H) : 1 (V).
 Calculate the maximum and minimum vertical stress to which the foundation will be subjected to. What is the maximum principal stress at toe? Assume there is no tail water.
4. a) Explain the design criteria for earth dams. 7M
- b) Explain the causes of failure of earth dams. 8M

**Unit - III**

5. Design an unflumed straight glacis non-meter fall for the following data: 15M
  - i. Full supply discharge: u/s = 40 cumecs  
d/s = 40 cumecs
  - ii. full supply level: u/s = 218.3 m  
d/s = 216.3 m
  - iii. full supply depth: u/s = 1.8 m  
d/s = 1.8 m
  - iv. Bed width: u/s = 26 m  
d/s = 26 m
  - v. Drop: 1.5 m
  - vi. Permissible exit gradient : 1/6
6. Describe the procedure for designing a cross regulator and distributary head regulator. 15M

::2::

**Unit – IV**

- |    |   |    |
|----|---|----|
| 7. | a) List the limitations of Bligh's creep theory.  | 7M |
|    | b) Draw the typical layout of the various components of a diversion headwork and label the parts. | 8M |
| 8. | a) What are the causes of failure of weirs and their remedies?                                    | 9M |
|    | b) Enumerate the differences between a weir and a barrage.  | 6M |

**Unit – V**

- |     |  |    |
|-----|--|----|
| 9.  | a) What is a Spillway? What are its functions? Explain with a sketch the Siphon Spillway.                | 7M |
|     | b) Explain with the help of a sketch, the components and working of a vertical lift gates.               | 8M |
| 10. | a) What are the various factors which affect the selection of the suitable type of cross-drainage works. | 7M |
|     | b) Explain with the help of sketches aqueduct and Siphon aqueduct.                                       | 8M |

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**ENVIRONMENTAL ENGINEERING-I**

(Civil Engineering)

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Explain how the water borne diseases are transmitted. List different water borne diseases and mention their causative agents. 7M
- b) Discuss surface and subsurface sources of water regarding their quality and quantity. 8M
2. a) Discuss different factors that affect per capita demand. How fire demand is estimated. 8M
- b) Draw a sketch of reservoir intake and label its parts. 7M

**Unit – II**

3. a) Discuss briefly about dosage of coagulants. Mention the factors on which the dosage of coagulants depend? 8M
- b) Mention the methods employed to disinfect water. For disinfecting water supply, it is required to treat 500,000 litres of daily supply with 0.5 ppm. of chlorine. If the disinfectant is available in the form of bleaching powder containing 30% of available chlorine, calculate the amount of bleaching powder required to treat the daily flow of water. 7M
4. a) Provide comparative characteristics of slow sand filters and rapid sand filters. 8M
- b) Design a primary clarifier which can remove 65% of the suspended solids at average flow of  $4500 \text{ m}^3/\text{d}$  with peak flows as high as  $13000 \text{ m}^3/\text{d}$  of any wastewater treatment plant. Given the required surface area of basin =  $150 \text{ m}^2$ . 7M

**Unit – III**

5. a) With sketch explain aerobic and anaerobic decomposition cycles. 8M
- b) Explain One and Two pipe system of plumbing 7M
6. a) Define BOD and COD. Calculate 3-day at  $27^\circ\text{C}$ , 5-day at  $20^\circ\text{C}$  and ultimate BOD of the sample of sewage using the following data obtained from a BOD test. 8M
  - i. D O of the original sample = 0.5 mg/l
  - ii. D O of the dilution water = 7.2 mg/l
  - iii. D O of the diluted sample after 3 days of incubation at  $27^\circ\text{C}$  = 0.6 mg/l
  - iv. Dilution factor = 2%
 Assume de oxygenation coefficient as 0.1 for the base 10 at  $20^\circ\text{C}$ .
- b) Sketch a circular manhole and explain its functioning. Mention the locations where manholes are constructed. 7M

**Unit – IV**

7. a) Describe about the primary sedimentation tank indicating about the retention time, water velocity and tank dimensions. 7M  
b) A grit chamber with a proportionate flow weir at its outlet to be designed to handle a sewage flow from a population of 50,000 and a per capita daily consumption of water of 135 litres. Design the grit chamber. 8M
8. a) Summarize the processes involved in primary treatment of sewage waste water, highlighting on role of screening, a communitor, grit chamber and sedimentation. 7M  
b) What are trickling filters? Discuss about their merits and demerits. 8M

**Unit – V**

9. a) Sketch and explain the working of septic tank with soak pit. 8M  
b) Describe the hardy cross method of pipe design. 7M
10. a) Sketch and explain the working of a sludge digester. 7M  
b) With sketch explain laying and testing of a sewer line. 8M

Hall Ticket No:

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

Question Paper Code : A1148



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**AIR POLLUTION AND CONTROL METHODS**

(Mechanical Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) List the major gaseous air pollutant and elaborate on the sources and effects of these on human health. 8M
- b) Acid rain is the one of the worst form of air pollution. Justify the statement. 7M
2. a) Differentiate with examples 8M
  - i. Primary and secondary air pollutants
  - ii. Stationary and mobile sources
- b) Green house effect is a global issue. Explain the term green house effect and its consequences. 7M

**Unit – II**

3. a) Explain the control of NO<sub>x</sub> emission removal from stack gas using the chemical sorption process (H<sub>2</sub>SO<sub>4</sub> solution). 8M
- b) In brief, write the various methods available to control gaseous pollutants. 7M
4. a) List the meteorological parameters that influence air pollution. 8M
- b) Discuss the role of wind direction and speed in dispersion of air pollutant. 7M

**Unit – III**

5. a) With a neat diagram illustrate the temperature profiles for different cases of atmospheric stability. 8M
- b) What are topographical effects? Explain with suitable examples? 7M
6. a) Derive the equation used for a Gaussian plume model. Also state its assumptions and limitations. 8M
- b) Discuss the effects of wind velocity in the atmospheric boundary layer with height during day and night. 7M

**Unit – IV**

7. a) Identify the major components of electrostatic precipitator and discuss the efficiency of ESP. 8M
- b) Scrubbers are utilized to removal air particulates. Explain the principles of involved scrubbing mechanisms. List any two advantages and disadvantages of scrubbers. 7M
8. a) Explain in detail the importance of cyclones and their applications. 8M
- b) Discuss the importance of combustion processes to control gaseous air pollutants. 7M

**Unit – V**

9. a) Explain briefly the source correction methods used in various industrial operations to control air pollution? 7M
- b) Discuss any two methods for monitoring nitrogen oxides and state their limitations. 8M
10. a) Write the average concentration of the following pollutants in the environment and state the methods for their measurement (SPM, SO<sub>2</sub>, NO<sub>x</sub>, CO) 8M
- b) Discuss briefly the various factors to be considered for environment management. 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**COMPUTER METHODS IN POWER SYSTEMS**

(Electrical and Electronics Engineering)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

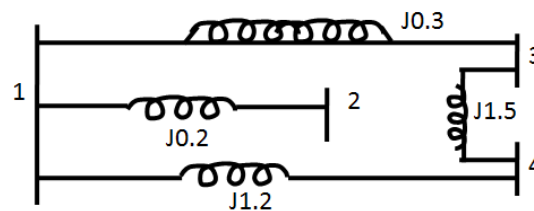
**Unit - I**

1. a) Define per unit value of impedance. List out the advantages of per unit system of calculations. 7M
- b) The bus incidence matrix of an 8- element, 5- node system is given in Fig. 1. Obtain the element- node incidence matrix, the oriented graph and hence the single line diagram indicating the generator positions of the network involved. The columns represent elements. 8M

$$\begin{vmatrix} 1 & 0 & 0 & 0 & -1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & -1 & -1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & -1 & 1 & 0 \end{vmatrix}$$

**Fig. 1**

2. a) Formulate Z bus for the power system shown in Fig. 2. by adding the elements in the sequence 4-1, 1-2, 1-3, 4-3 by selecting the node – 4 as the reference. The per unit reactance values of all the lines are indicated on the diagram. 10M



**Fig.2**

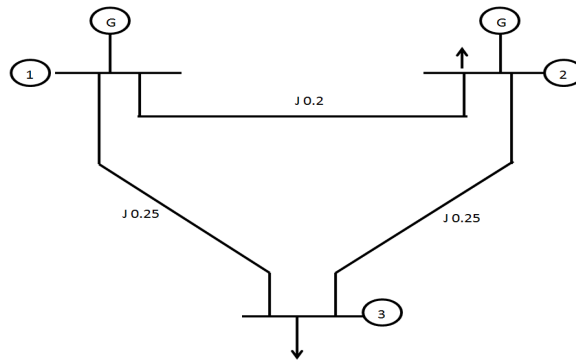
- b) What are the advantages of  $Z_{BVS}$  building algorithm? 5M



**Unit – II**

3. a) Explain how the buses are classified in carrying out load flow analysis in power system. 8M  
 Also what is the significance of slack bus?  
 b) For the power system shown in Fig.3, compute the voltages at buses 2 and 3 at the end of first iteration using Gauss-Siedal method with  $Y_{BUS}$ . The bus data is given as per the table below. Values given are in P.U. 7M

BUS	Voltage	Gen		Load		Remarks
		P	Q	P	Q	
1	$1.20 \angle 0$	-	-	-	-	Slack bus
2	-	0.7	0.5	0.3	0.2	-
3	-	0	0	0.6	0.4	Load bus



**Fig. 3**

4. a) Explain the Gauss-Siedal method of conducting the load-flow analysis on a power system with  $Y_{BUS}$ . Draw the flow chart also. 10M  
 b) What are acceleration factors? How are they used in Gauss-Siedal method of conducting load flow analysis? 5M

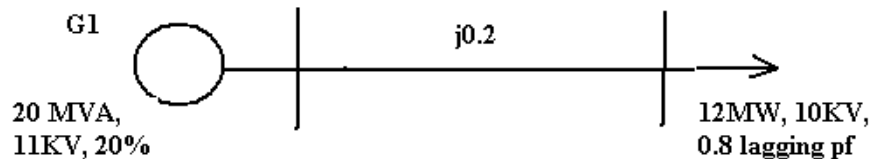
**Unit – III**

5. a) What are the elements of the Jacobian matrix if there are 2 PQ buses and 1 PV bus? 6M  
 b) The Ybus is given for a power system (with 2 PQ buses and 1 reference bus) as follows: 9M

-5j	J1	J2
J1	-j10	J1
J2	J1	-j8

$V_1 = 1.04 + 0j$  pu;  $P_2 = -0.1$  pu;  $Q_2 = -0.4$  pu;  $P_3 = -0.2$  pu;  $Q_3 = -0.5$  pu  
 Find the mismatch vector using NR method.

6. a) What is the difference between NR and FDLF method? 5M  
 b) A generator is supplying a balanced 3 phase load through a short line as shown in Fig.4 10M  
 Find the fault current if there is a three phase symmetrical fault at the generator terminals. The line has a 0.2pu reactance on the machine rating.



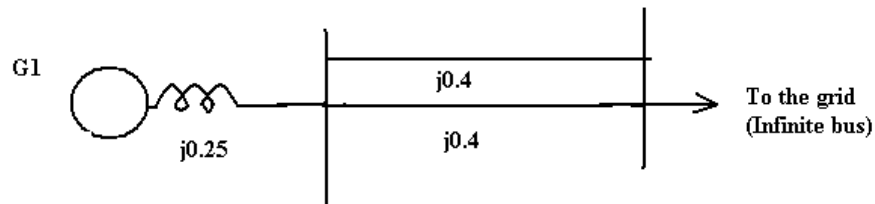
**Fig.4**

**Unit – IV**

- |    |   |     |
|----|---|-----|
| 7. | a) Define the 3 types of sequence impedances.   | 5M  |
|    | b) A 10 MVA, 33KV synchronous generator has 0.25 pu, 0.2 pu and 0.1 pu its positive, negative and zero sequence reactances respectively. Find the fault current if there is a SLG fault at unloaded generator terminals. The neutral of the generator is grounded directly. | 10M |
| 8. | a) Define Steady state stability as referred to power system.   | 5M  |
|    | b) Using power angle curve, explain about the point of stable operation.  | 10M |

**Unit – V**

- |    |  |     |
|----|--|-----|
| 9. | a) What is the application of equal area criteria in power system?   | 5M  |
|    | b) The emf of the generator is 1.5 pu and the infinite bus is maintained at 1.0pu. The equivalent reactances of the generator and transformer (through which it is supplying power to the infinite bus) is 0.25pu. Both the transmission lines are having equal reactances as depicted in the Fig.5 There is 3 phase fault at bus closer to the generator. The same is cleared and the original operation is resumed. Prior to the fault, the infinite bus is receiving 2 pu power. Calculate the critical clearing angle. | 10M |



**Fig.5**

- |     |  |    |
|-----|--|----|
| 10. | a) Explain the term 'critical clearing time' with the help of power angle curve.   | 7M |
|     | b) A 50 Hz, 4 pole synchronous generators, rated 20 MVA and 11KV has an inertia constant of 4.5MJ/MVA. Theoretically, for how much time can it supply a load of 5MW if the mechanical power input is suddenly stopped? | 8M |

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**ELECTRICAL MEASUREMENTS**

(Electrical and Electronics Engineering)

Date: 3 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit – I**

1. a) Explain different types of forces that are needed for satisfactory operation of any indicating instrument. 7M
- b) With the help of a neat diagram, explain the construction of PMMC instrument and also prove that deflection is directly proportional to the current passing through the meter in PMMC instrument. 8M
2. a) What are Shunts and Multipliers? Derive an expression for both with reference to the meters used in electric circuits. 8M
- b) With a neat sketch, explain the construction and working of an electro-dynamometer type single phase power factor meter. 7M

**Unit – II**

3. a) Explain how the range of a wattmeter can be extended using instrument transformers 8M
- b) Describe with neat sketch the working of a single phase Induction type energy meter. 7M
4. a) Explain the errors in dynamo meter type wattmeter due to method of connection of current coil and pressure coil. 8M
- b) The meter constant of a 230V, 10A watthour meter is 1800 revolutions per kwh. The meter is tested at half load and rated voltage and unity power factor . the meter is found to make 80 revolutions in 138 s. Determine the meter error at half load. 7M

**Unit – III**

5. a) With the help of a neat diagram explain the construction of Crompton's type potentiometer. Describe the steps followed when making measurements with Crompton's type potentiometer. 7M
- b) Mention the differences between DC and AC Potentiometer and explain certain important factors which must be considered for AC Potentiometer operation. 8M
6. a) With the help of neat circuit diagram, explain the measurement of unknown resistance using DC Potentiometer. 8M
- b) With the help of neat diagram explain the working principle of Co-Ordinate type A C Potentiometer. 7M

**Unit – IV**

7. a) With a neat sketch, explain Kelvin double bridge. Obtain an expression for unknown low resistance. 8M
- b) With the help of a neat circuit diagram explain how carry foster slide wire bridge can be used to measure unknown resistance. 7M

::2::

8. a) Explain how wheatstone bridge can be used to measure medium resistance. Obtain expression for the balance of wheatstone bridge. 8M
- b) A 4 terminal resistor of approximately  $50 \mu\Omega$  resistance was measured by means of a Kelvin bridge having the following component resistances: 7M  
Standard resistor =  $1000.03 \mu\Omega$ , Inner ratio arms =  $100.31\Omega$  and  $200\Omega$  : Outer ratio arms =  $100.24\Omega$  and  $200\Omega$ ; Resistance of link connecting the standard and the unknown resistance =  $700 \mu\Omega$ . Calculate the unknown resistance to the nearest  $0.01\mu\Omega$ .

**Unit – V**

9. a) Explain the operation of the Wien bridge with a neat circuit diagram. Derive the expression for frequency. 7M
- b) Explain the working of dual slope type digital voltmeter with the help of block diagram. 8M
10. a) Obtain the balance equation for Owen's bridge with phasor diagrams. 8M
- b) Explain the principle of successive approximation technique adopted in digital voltmeters. 7M



**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

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

**(Regulations: VCE-R11)**

**POWER ELECTRONICS**

**(Electrical and Electronics Engineering)**

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) With neat waveforms, discuss about the dynamic characteristics of SCR. 8M
- b) With neat circuit diagram and two dimensional graph, explain the operation of parallel connection of SCRs. 7M
2. a) Draw and explain the output (I-V) characteristics of n-channel enhancement mode MOSFET. 8M
- b) What are  $dV/dt$  and  $di/dt$  ratings of SCRs . What happens if these ratings are exceeded? Explain? 7M

**Unit – II**

3. a) Draw and explain the operation of 1-phase full-wave controlled rectifier with mid-point configuration feeding R-L load. Draw the output voltage, input current waveforms for  $\alpha=150^\circ$ . 8M
- b) If the half-wave controlled rectifier has a purely resistive load of R and the delay angle of  $\alpha=\pi/3$ . Determine: (i) Rectification efficiency (ii) Form Factor (iii) Ripple Factor (iv) Peak inverse voltage of SCR 'T'. 7M
4. a) With a neat circuit diagram and neat waveforms, explain the operation of 1-phase half controlled bridge converter (symmetrical) feeding R-L load. Assume  $\alpha=45^\circ$ . Derive an expression for average value of an output voltage. 8M
- b) A single phase fully controlled thyristor bridge converter supplies a load consisting of R, L and E. The inductance L in the circuit is so large that the output current may be considered to be virtually constant. Assume the SCR to be ideal with following data. Input voltage = 220 V (RMS), load resistance=0.5  $\Omega$ , output current  $i_0=10$  A. Determine i) Firing angle  $\alpha$ , if E=135 V (ii)  $\alpha$ , if E= -145V. 7M

**Unit – III**

5. a) When 3-phase converters are preferred? With a neat circuit diagram, explain the operation of 3-phase full wave bridge converter feeding highly inductive load. Draw the output line voltage waveform for  $\alpha=60^\circ$ . Derive the expression average value of output voltage. 8M
- b) A single phase AC voltage regulator with R-L load has the following details: supply voltage 230 V (RMS), 50 Hz,  $R=4\Omega$ ,  $\omega L=3\Omega$ . Calculate: (i) the control range of firing angle (ii) maximum value of RMS load current (iii) Maximum power and power factor. 7M
6. a) Discuss in brief about the effect of source impedance of three-phase fully-controlled converter; derive the expression for its output voltage in terms of maximum supply voltage  $V_m$ , firing angle  $\alpha$ , and overlap angle  $\mu$  8M
- b) Draw and explain the operation of single-phase AC voltage controller feeding R-L load. Draw the output voltage, input current waveforms for  $\alpha<45^\circ$  7M

**Unit – IV**

7. a) Draw the circuit diagram of a single phase to single phase centre tapped cycloconverter when delivering power to a resistive load . The frequency ratio is  $f_s / f_o = 1/3$ . The firing angle  $\alpha$  for all the thyristors is the same. Sketch the following waveforms for  $\alpha = 0^\circ$  and  $\alpha = 45^\circ$  i) output current ii) Supply current . Indicate the conduction of all thyristors. 9M
- b) With circuit diagram and waveforms explain the operation of a step – up chopper. 6M
8. a) What is a cycloconverter ? Enumerate some of its industrial applications. 6M
- b) A step down chopper has a resistive load of  $20\Omega$  and input voltage of 220V. When the chopper remains ON the voltage drop is  $V_{CH} = 1.5$  V and chopping frequency is  $f = 10$  KHz. If the duty cycle is 80% determine:
- i. Average output voltage
  - ii. RMS output voltage
  - iii. Chopper efficiency
  - iv. Effective input resistance

**Unit – V**

9. a) State the various methods of voltage control in an inverter. Explain any one of them 7M
- b) For a single phase half bridge inverter dc input voltage is 200V and it feeds a resistive load of  $5\Omega$  . Determine 8M
- i. RMS output voltage
  - ii. Average current of each power MOSFET
  - iii. Output power
  - iv. 3<sup>rd</sup> and 5<sup>th</sup> harmonic rms content of output
10. a) With circuit diagram and waveforms explain the operation of a single phase bridge inverter. 7M
- b) With circuit diagram and waveforms explain the operation of a single phase McMurray – Bedford full bridge inverter. 8M

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

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

(Regulations: VCE-R11)

**PRODUCTION PLANNING AND CONTROL**

(Mechanical Engineering)

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

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

1. a) Define the term "Production Planning and control". List and explain the objectives of Production planning and control 8M
- b) Explain the different types of production systems and state applications of each type. 7M
2. a) Are the moving averages method and the exponential smoothing method of forecasting related? How and why? 7M
- b) Explain functions of production planning & control department. 8M

**Unit - II**

3. a) Compute the EBO for manufacture of the given data: 5M  
Monthly demand = 500 units, Daily production rate = 25 units, Days in a month: 25 days.  
Cost of set up – Rs. 1500, Cost of holding inventory – Rs. 10 per unit.
- b) What is the use of ABC, VED and other classifications to departments other than inventory control? What is the use for purchasing, for maintenance for quality control? 10M
4. a) Explain the different types of inventory costs with examples 8M
- b) List the assumptions in EOQ formula and state the importance of correct value of EOQ in production planning 7M

**Unit - III**

5. a) Explain various aggregate planning strategies? 5M
- b) Citing examples explain the RPW method and the largest candidate method of line balancing. 10M
6. a) Briefly explain factors affecting Routing. 5M
- b) For the given data formulate aggregate planning model by transportation method for optimum production plan. 10M

Period	I	II	III	Production cost per unit in Rs
Demand (units)	500	700	750	
Capacity (units) (i) Regular	500	500	500	60
(ii) Overtime	50	50	50	80
(iii) Subcontract	120	120	120	90

Inventory carrying cost = Re 1/ unit/ period

Starting inventory = 100 units

Closing inventory required = 80 units

Back ordering is not permitted.

**Unit – IV**

7. a) Explain steps in Line of balance. 5M  
 b) Consider the two machines & six jobs flow shop scheduling problem as shown in table. 10M  
 Using Johnson's algorithm, obtain the optimal sequence which will minimize the make span, also determine the corresponding make span, draw Gantt chart for the same.

<b>Job, i</b>	1	2	3	4	5	6
<b>Machine -1</b>	4	10	14	8	18	16
<b>Machine-2</b>	6	12	10	12	6	8

8. a) List the different priority decision rules. 5M  
 b) Use graphical method to minimize the time needed to process the following jobs on the machines shown. Also, calculate the total time elapsed to complete both jobs. 10M

<b>Job 1</b>	<b>Sequence</b>	A	B	C	D	E
	<b>Time (Hrs).</b>	3	4	2	6	2
<b>Job 2</b>	<b>Sequence</b>	B	C	A	D	E
	<b>Time (Hrs)</b>	5	4	3	2	6

**Unit – V**

9. a) Explain the activities of a dispatcher? 8M  
 b) Give the names of various documents maintained by dispatching department and give the specimen of the document which shows the material move during manufacture and explain why it is necessary 7M
10. a) What is expediting? Why is it necessary in production control? 6M  
 b) Write explanatory notes on applications of computers in production and control and state the advantages of it. 9M



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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DESIGN OF MACHINE MEMBERS-II**

(Mechanical Engineering)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) State any five desirable properties of a good bearing materials. 5M
- b) A lightly loaded journal bearing has a load of 1 kN. The oil used is SAE 60 and mean effective temperature of operation is 40° C. The journal has a diameter of 50 mm and the bearing has a diameter of 50.5 mm. The speed of the journal is 15000 rpm. The L/d ratio is limited to 1.2. Determine the coefficient of friction and power loss. 10M
2. a) Define equivalent dynamic load in rolling contact bearing and explain briefly. 5M
- b) A ball bearing is operating on a work cycle consisting of three parts, i) A radial load of 3000 N at 1440 rpm for ONE quarter cycle, ii) A radial load of 5000 N at 720 rpm for ONE half cycle, and iii) A radial load of 2500 N at 1440 rpm for the remaining cycle. The expected life of bearing is 10,000 hrs. Calculate the dynamic load carrying capacity of the bearing. 10M

**Unit – II**

3. Design a connecting rod for a high-speed IC engine using the following data: 15M  
Cylinder bore = 125mm, Length of connecting rod = 300mm, Max gas pressure = 3.5MPa, length of stroke = 125mm, Mass of reciprocating parts = 1.6kg, Engine speed = 2200 rpm. Assume suitable data and state the assumptions made.
4. The bore of a cylinder of the four stroke diesel engine is 150mm. The max gas pressure inside the cylinder is limited to 3.5MPa. The cylinder head is made of grey cast iron FG200( $S_{ut} = 200\text{N/mm}^2$ ) and the factor of safety is 5. Determine the thickness of the cylinder head. Studs are used to fix the cylinder head to the cylinder and obtain a leak proof joint. They are made of steel FeE250( $S_{yt} = 250\text{N/mm}^2$ ) and the factor of safety is 5. Calculate: 15M
  - i. Number of studs
  - ii. Nominal Diameter of studs
  - iii. Pitch of studs.

**Unit – III**

5. a) Explain why conjugate curves must be used for tooth profiles rather than just any curved surfaces which might be arbitrarily selected. 5M
- b) A spur gear reducer is to transmit 4 kW at 1500 rpm of the pinion of cast steel ( $\sigma_o = 138\text{MN/mm}^2$ ). The gear is made from phosphor bronze ( $\sigma_o = 83\text{MN/mm}^2$ ). The velocity ratio is 3.5 to 1.0. Assume a pressure angle of 20°. Design the gears for strength only. Assume number of teeth on pinion to be 16. 10M
6. a) What are the limits on helix angle of helical gears? 5M
- b) A helical gear pair has to reduce speed from 500 rpm to 100 rpm for 12 hours running time per day continuously. The pinion is of 40 Ni 14 steel and 40 teeth and the wheel is of 40C8 steel normalised and has 200 teeth. The gears are of 6 mm module, 100 mm face width, 30° helix angle and 20° pressure angle. Determine power rating based on strength and wear. 10M

**Unit – IV**

7. a) Define the following terminologies used in Bevel gears 7M
- i. Pitch cone
  - ii. Cone Distance
  - iii. Pitch angle
  - iv. Addendum angle
  - v. Dedendum angle
  - vi. Back cone
  - vii. Back cone distance
- b) State the reasons for using a Bevel Gear. What are the advantages of using Bevel gear over Worm Gears 8M
8. a) A pair of worm gears is designated as 1/30/10/8. Calculate: 8M
- i. The center distance
  - ii. The speed reduction
  - iii. The dimensions of the worm
  - iv. The dimensions of the worm wheel.
- b) Where do we use worm gear drive. List the advantages and disadvantages of a worm gear drive 7M

**Unit – V**

9. a) How does the stress concentration effect the design of power screw when i) It is used in Tension, ii) it is used in Compression. 5M
- b) The lead screw of a lathe has single start ISO metric trapezoidal threads of 52 mm nominal diameter and 8 mm pitch. The screw is required to exert an axial force of 2 kN in order to drive the tool carriage during turning operation. The thrust is carried on a collar of 100 mm outer diameter and 60 mm inner diameter. The values of coefficient of friction at the screw threads and the collar are 0.15 and 0.12 respectively. The lead screw rotates at 30 rpm. Calculate: 10M
- i. The power required to drive the lead screw
  - ii. The efficiency of the screw
10. a) Why a combination of flat and V – type of slide ways is preferred for machine tools. 7M
- b) Which type of cross section is preferred for beds of machine tools, why? And also explain the principle of slider with neat sketch. 8M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**HEAT TRANSFER**

(Mechanical Engineering)

Date: 3 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Write explanatory notes on modes and mechanism of heat transfer 10M
- b) An electric current is passed through a wire 1mm in diameter and 10cm long. The wire is submerged in liquid water at atmospheric pressure and the current is increased until the water boils. For this situation  $h = 5000 \text{ W/m}^2 \cdot ^\circ\text{C}$ , and the water temperature will be  $100^\circ\text{C}$ . How much electric power must be supplied to the wire to maintain the wire surface at  $114^\circ\text{C}$ . 5M
2. a) Suppose a person stated that heat cannot be transferred in vacuum. How do you respond? 7M
- b) Explain the sequence of events which would happen when 8M
  - i. A copper plate is heated
  - ii. A vessel containing water is heated

**Unit - II**

3. a) A thin metal sphere of diameter 300 mm is used to store a liquefied gas at  $-200^\circ\text{C}$ . To reduce the heat leakage from atmosphere at  $30^\circ\text{C}$ , it is insulated by two layers of insulation each 30 mm thick. The first layer of insulating material has a thermal conductivity  $0.06 \text{ W/m} \cdot ^\circ\text{C}$  and the second layer has the thermal conductivity of  $0.6 \text{ W/m} \cdot ^\circ\text{C}$ . Determine the heat leakage: 8M
  - i. When the better insulator is next to sphere
  - ii. When the better conductor is immediately next to sphere
- b) A 5 cm thick iron plate ( $k = 60 \text{ W/m} \cdot ^\circ\text{C}$ ,  $C_p = 460 \text{ J / kg} \cdot ^\circ\text{C}$ ,  $\rho = 7850 \text{ kg/m}^3$ ,  $\alpha = 1.6 \times 10^{-5} \text{ m}^2/\text{s}$ ) is initially at  $T_i = 225^\circ\text{C}$ . Suddenly both surfaces are exposed to an ambient at  $T_\infty = 25^\circ\text{C}$  with heat transfer co-efficient of  $500 \text{ W/m}^2 \cdot ^\circ\text{C}$  7M
  - i. Calculate the centre temperature at  $t = 2 \text{ min}$  after the start of cooling
  - ii. Calculate the temperature at a depth of 1 cm from the surface at  $t = 2 \text{ min}$  after the start of cooling
4. a) A furnace wall is made up of three layers of thickness 250mm, 100mm, 150mm with thermal conductivities of 1.65, K,  $9.2 \text{ W/m} \cdot ^\circ\text{C}$  respectively. The inside is exposed to gases at  $1250^\circ\text{C}$  with convective coefficient of  $25 \text{ W/m}^2 \cdot ^\circ\text{C}$  and the inside surfaces at  $1100^\circ\text{C}$ . Outside surface is exposed to air at  $25^\circ\text{C}$  with convection coefficient of  $12 \text{ W/m}^2 \cdot ^\circ\text{C}$ . Determine: 8M
  - i. The unknown thermal conductivity 'K'
  - ii. The overall heat transfer coefficient
  - iii. All surface temperatures
- b) A 5 cm diameter sphere  $k = 60 \text{ W/m} \cdot ^\circ\text{C}$ ,  $C_p = 460 \text{ J / kg} \cdot ^\circ\text{C}$ ,  $\rho = 7850 \text{ kg/m}^3$ ,  $\alpha = 1.6 \times 10^{-5} \text{ m}^2/\text{s}$  Initially  $T_i = 225^\circ\text{C}$  suddenly both surfaces are exposed to an ambient temperature at  $T_\infty = 25^\circ\text{C}$ , with heat transfer co-efficient of  $500 \text{ W/m}^2 \cdot ^\circ\text{C}$  7M
  - i. Calculate the centre temperature at 1 min after the start of cooling
  - ii. Calculate the temperature at a depth of 1 cm from the surface, 1 min after the start of cooling

::2::

**Unit – III**

5. a) Using Buckingham theorem obtain the correlation in terms of Nusselt number, Reynolds number and Prandtl number. 8M
- b) A fine wire having a diameter of 0.02 mm is maintained at a constant temperature of 54 °C by an electric current. The wire is exposed to air at 1 atm. and 0 °C. Calculate the electric power necessary to maintain the wire temperature if the length is 50 cm. 7M
6. a) Sketch temperature and velocity profile of natural convection of vertical wall. 7M
- b) A water at mean temperature  $T_m = 25$  °C and mean velocity of  $u_m = 1.5$  m/s enters a brass condenser tube L =6 m long, 1.34 cm ID, 1.58 cm OD and  $K = 110$  w/m°C. The heat transfer coefficient for condensation at the outer surface of the tube is  $h_o = 12,000$  w/m<sup>2</sup> °C. Calculate the overall heat transfer coefficient  $U_o$  based on the outer surface. (Assume fouling factor  $f_i = f_o = 0$ ) 8M

**Unit – IV**

7. a) A heated brass plate is submerged in a container of water at atmospheric pressure. The plate temperature is 117°C. Calculate the heat transfer per unit area of the plate. 8M
- b) Write explanatory notes on regimes of pool boiling. 7M
8. a) Discuss the classification of heat exchanger. 7M
- b) Saturated water at 100 °C is boiled with a copper heating element. If the surface heat flux is 400 kW/m<sup>2</sup>, calculate the surface temperature. 8M

**Unit – V**

9. a) Two parallel black plates 0.5 by 1m are spaced 0.5m apart. One plate is maintained at 1000°C and the other at 500°C. What is the net radiant heat exchange between the two plates? 7M
- b) Explain the following terms and state the applications of each one of them: 8M
- i. Gray body
  - ii. Radiation shape factor
10. a) Two concentric cylinders having diameters of 10 and 20 cm have a length of 20cm. Calculate the shape factor between the open ends of the cylinders. 10M
- b) Discuss the following laws: 5M
- i. Stefan Boltzmann's law
  - ii. Laws of Planck

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**FINITE ELEMENT METHODS**

(Mechanical Engineering)

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

- Consider the bar element as shown in the Fig.1. An axial load  $P = 200 \times 10^3 \text{ N}$  is applied as shown. Using the penalty approach for handling boundary conditions do the following:
  - Determine the nodal displacements
  - Determine the stress in each material

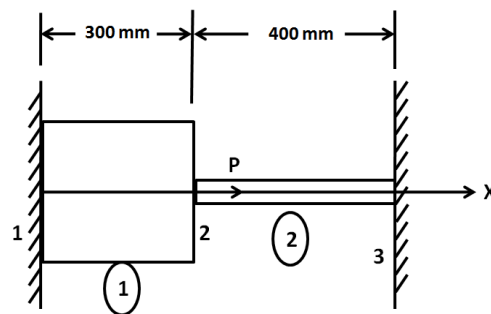


Fig.1

$$A_1 = 2400 \text{ mm}^2, A_2 = 600 \text{ mm}^2, E_1 = 70 \times 10^9 \text{ N/m}^2, E_2 = 200 \times 10^9 \text{ N/m}^2$$

- Compare FEM with other methods in terms of efficiency and performance. 7M
  - Enumerate the applications of FEM in various facets of the industry. 8M

**Unit - II**

- Write difference between the plane trusses and space trusses. 3M
  - For two bar truss shown in Fig.2, Determine displacement at node and stresses in both elements. Take  $E = 2 \times 10^5 \text{ N/mm}^2$ . 12M

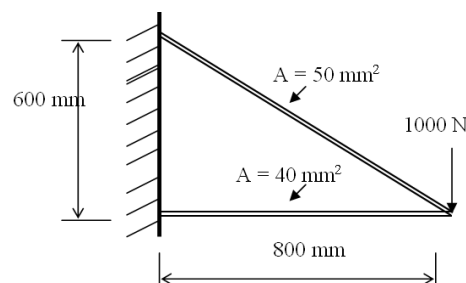


Fig.2.

::2::

4. a) Derive Hermit shape function for linear bar element. 7M  
b) A cantilever beam subjected to point load of 250KN as shown in Fig. 3. Determine the slope and deflection at the load application point. Take  $E = 200 \text{ GPa}$  and  $I = 4 \times 10^4 \text{ mm}^4$ . 8M

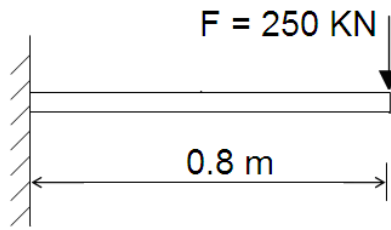


Fig. 3

**Unit – III**

5. a) Explain convergence criterion. 8M  
b) What are iso parametric, sub parametric and super parametric elements? 7M
6. a) Integrate  $I = \int_{-1}^{+1} \int_{-1}^{+1} (1 + \xi\eta + 2\xi^2) d\xi d\eta$  by using Gaussian two point method and compare the solution with convention method. 8M  
b) Explain the shape functions for CST element. 7M

**Unit – IV**

7. A long bar of rectangular cross section having thermal conductivity of  $1.5 \text{ W/m}^\circ\text{C}$  is subjected to the boundary conditions as shown in Fig.4. Two opposite sides are maintained at a uniform temperature of  $180^\circ\text{C}$ , one side is insulated and the remaining side is subjected to a convection process with  $T_\infty = 25^\circ\text{C}$  an  $h = 50 \text{ W/m}^2 \cdot ^\circ\text{C}$ . Determine the temperature distribution in the bar. 15M

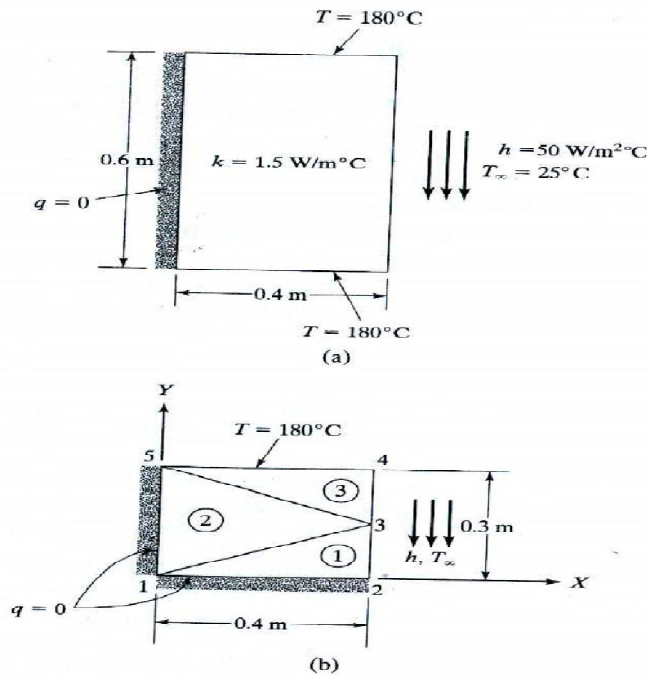


Fig.4

8. Consider the shaft with rectangular cross section as shown in Fig.5. Determine in terms of  $M$  and  $G$ , the angle of twist per unit length. 15M

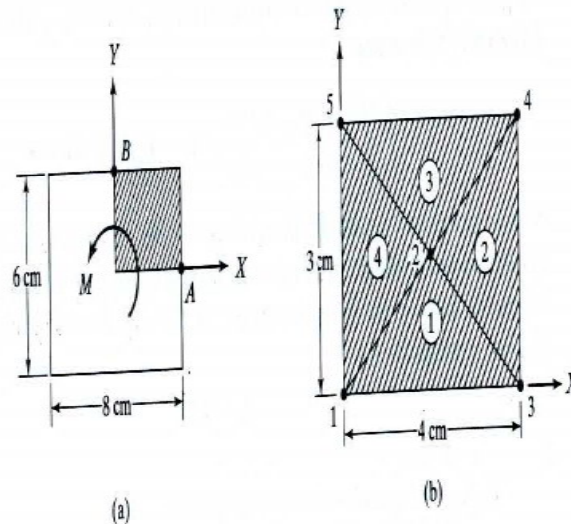


Fig.5

Unit - V

9. Determine the eigen values and eigen vectors for the stepped bar as shown in Fig.6. 15M  
 $E = 30 \times 10^6 \text{ psi}$   
 Specific weight  $f = 0.283$

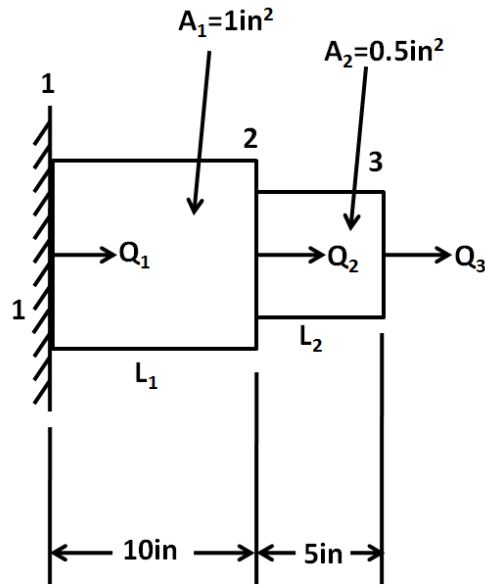


Fig.6

10. Derive the following equation  $KU = \omega^2 MU$  for a solid body with distributed mass. 15M

**VARDHAMAN COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

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

(Regulations: VCE-R11)

**OPERATIONS RESEARCH**

(Aeronautical Engineering)

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

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

1. a) List and Explain phases of Operations Research. 7M  
b) Solve the following LPP by Simplex method. 8M

$$\begin{aligned} &\text{Minimize} && Z = 5x_1 + 6x_2 \\ &\text{S.T.} && 2x_1 + 5x_2 \geq 1500 \\ &&& 3x_1 + x_2 \geq 1200 \\ &&& x_1, x_2 \geq 0 \end{aligned}$$

2. a) Explain unbounded solution and infeasible solution. 6M  
b) The furniture shop manufacturing desks and chairs. The following table gives the resources required and their availability. The profit per desk is Rs 30 and per chair is Rs 20. Determine number of tables and chairs to be manufactured to maximize profit. 9M

Resource	Availability	Requirements	
		Per desk	Per chair
Carpentry (man-hours)	200	8	4
Upholstery (man hours)	120	-	3
Wood (m <sup>3</sup> )	17	0.5	0.4
Laminate (m <sup>3</sup> )	20	1	-

**Unit - II**

3. a) Explain degeneracy in transportation problem and how to resolve it? 5M  
b) A company has 3 plants located at different places but producing an identical product and supply to 3 warehouses. The warehouse capacity is 80, 110 and 150. The plant capacity is 150, 10 and 130. The table below gives profit matrix between factories and warehouses. Find the distribution pattern to maximize profit/minimize loss. 10M  
Profit matrix:

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>
F <sub>1</sub>	6	6	3
F <sub>2</sub>	-2	-2	-4
F <sub>3</sub>	3	2	2

4. a) Differentiate between transportation problem and assignment problem. 5M  
b) Given the matrix of setup cost, show how to sequence production so as to minimize setup cost per cycle. 10M

	A1	A2	A3	A4	A5
A1	∞	2	5	7	1
A2	6	∞	3	8	2
A3	8	7	∞	4	7
A4	12	4	6	∞	5
A5	1	3	2	8	∞

Cont...2



**Unit – III**

5. a) There are 5 jobs each of which has to go through the machines A and B in the order A, B. The processing times are given below. Determine the sequence of these jobs that will minimize total elapsed time. 5M

<b>Job</b>	1	2	3	4	5
<b>Machine A</b>	5	1	9	3	10
<b>Machine B</b>	2	6	7	8	4

- b) Find the optimum sequence that minimizes the total time required for completing the following jobs on machines processed in order CBA. Determine the corresponding elapsed time and idle time for each machine. 10M

<b>Job</b>	1	2	3	4	5	6
<b>Machine A</b>	8	7	6	9	10	9
<b>Machine B</b>	3	4	5	2	1	6
<b>Machine C</b>	8	3	7	2	5	1

6. a) Explain Kendall notation for single server queuing system with infinite capacity. 5M  
 b) The time spent on processing 2 jobs on 5 machines and the necessary technological sequence of operations are as follows: 10M  
**Job 1:** A-2 to B-3 to C-4 to D-3 to E-2.  
**Job 2:** C-4 to A-2 to B-6 to E-2 to D-5  
 Determine the minimum elapsed time for completing both the jobs and the sequence of jobs on each machine.

**Unit – IV**

7. Electronic equipment consists of 500 resistors, when any resistor fails, it is replaced. The cost of replacing a resistor individually is Rs 20. If all resistors are replaced at the same time, the cost per resistor is Rs 5. The percentage surviving, S(i) at end of month "I" is given in table. 15M

<b>Month, i</b>	0	1	2	3	4	5
<b>S(i)</b>	100	90	75	55	30	0

- What is the optimum replacement plan?
8. a) An aircraft manufacturing company uses certain parts at a constant rate of 2500/year. Each unit costs Rs 30, the company estimates that it costs Rs 130 to place an order and inventory carrying cost is 10% per year. How frequently should order be placed? Also determine optimum size of the order. 8M  
 b) Illustrate deterministic demand model with uniform and production rate infinite of inventory management and derive the EOQ formula. 7M

**Unit – V**

9. a) Explain forward and backward recursive function. 3M  
 b) A corporation is entertaining proposals from its 3 plants for possible expansion facilities. 12M  
 The corporation is budgeting Rs 5 million for allocation for all 3 plants. The following table summarizes the costs and revenues. Zero cost proposals are introduced to allow for probability of not allocating funds to individual plants. Maximize the revenues resulting from allocation to plants. Use forward recursive method.

PROPOSAL	Plant-I		Plant-II		Plant-III	
	Cost-1	Revenue-1	Cost-2	Revenue-2	Cost-3	Revenue-3
1	0	0	0	0	0	0
2	1	5	2	8	1	3
3	2	6	3	9	-	-
4	-	0	4	12	-	-

10. a) Explain the following with respect to game theory: strategy, mixed strategy, pure strategy, saddle point. 8M

- b) 7M
- |   |     |    |    |   |
|---|-----|----|----|---|
|   |     | B  |    |   |
|   |     | 1  | 2  | 3 |
| A | I   | -4 | 6  | 3 |
|   | II  | -3 | -3 | 4 |
|   | III | 2  | -3 | 4 |

Solve the above game.

Hall Ticket No:

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

Question Paper Code : A1338



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**COMPOSITE MATERIALS**

(Aeronautical Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

---

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

---

**Unit - I**

1. a) Give the characteristics of composite materials. Also give the classification of composites based on matrix and reinforcement? 8M
- b) What are advanced composites? Mention the limitations of composite materials? 7M
2. a) Give the classification of composites based on reinforcement. In brief discuss the types of continuous fibres. 9M
- b) Discuss in roles/functions served by matrix and reinforcement in composite materials. 6M

**Unit - II**

3. a) Differentiate between dispersion strengthened and particle strengthened composites. 10M
- b) What is the basic principle used in fibre reinforced composites? 5M
4. a) What are 'whiskers'? Name some whiskers that are currently available? 8M
- b) Name the various grades of glass fibres used as reinforcement in glass fibre reinforcement plastic (GRP). Discuss any one. 7M

**Unit - III**

5. a) With the help of sketch/flow chart explain the stages involved in hand lay-up method for the production of polymer based composites. 11M
- b) What are bags used in Bag molding? What characteristics they should exhibit? 4M
6. a) With illustration and giving all the details explain filament winding process used to manufacture polymer matrix composites. 10M
- b) Explain the curing cycle in autoclave molding with neat sketches? 5M

**Unit - IV**

7. a) Explain in detail the liquid metal infiltration? 8M
- b) Explain the In site processing by controlled unidirectional solidification of a eutectic alloy? 7M
8. With neat sketches, explain the Sinter-forging technique for producing near-net shape, low cost MMCs? 15M

**Unit - V**

9. a) Calculate the modulus of elasticity of a composite material consisting of 60% by volume of continuous E-glass fiber and 40% epoxy resin for the matrix when stressed under isostress conditions. (i.e the material is stresses perpendicular to the continuous fiber). The modulus of elasticity of the E glass is 72.4 GPa and that of the epoxy resin is 3.1 GPa. 5M
- b) What happens when a Composite is Stressed? Explain with a neat sketch? 10M
10. Derive the equation for elastic modulus of a composite laminate. 15M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**MICROPROCESSORS AND INTEFACING**

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

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) With a neat block diagram explain the internal architecture of the 8086 microprocessor. 10M
- b) Write 5 memory addressing modes of 8086 microprocessor with an example for each. 5M
2. a) Explain the segmentation of 8086 microprocessor with a neat diagram? 7M
- b) Explain the register organization of 8086 microprocessor and give special function of general purpose registers with an example for each? 8M

**Unit – II**

3. a) Explain the following instructions and the assembler directives: 7M
  - i. XLAT
  - ii. SCASB
  - iii. AAD
  - iv. ROL BX,CL
  - v. DW
  - vi. ENDP
  - vii. EQU
- b) Write an ALP to sort a given array of data in ascending order using bubble sort? 8M
4. a) What is a Macro? What are the differences between a macro and a subroutine? How do you pass parameters to macro? 8M
- b) Write a program to add two multi-byte number and store the result as a third number. The number are stored in the form of the byte lists stored with the lowest byte first? 7M

**Unit – III**

5. a) Interface two 4K×8 EPROMS and two 4K×8 RAM chips with 8086. The starting address of EPROM is FE000H and RAM starting address is FC000H. Use 3 to 8 decoder to select the memory chips. 7M
- b) Interface ADC0808 with 8086 using 8255 Ports. Use Port A of 8255 for transferring digital data output of ADC to the CPU and Port C for control signals. Assume that an analog input is present at input 2 of the ADC and a clock input of suitable frequency is available for ADC. Draw the schematic and write the required ALP. 8M
6. a) Draw the block diagram of 8255 (PPI). Explain in brief various modes of operation with the help of its control register contents? 8M
- b) Interface five 7-segment display's with 8255. Write a sequence of instructions to display 1, 2, 3, 4 and 5 over the multiplexed 5 displays. 7M

::2::

**Unit – IV**

7. a) What is interrupt vector table? Explain how this is used in branching to interrupt service routines? 7M  
b) What are the registers available in DMA controller? What are their functions? 8M
8. a) Draw the internal architecture of 8259A and explain the initialization sequence of the same. 8M  
b) With a block diagram, explain 8086 connections made for MAX mode operation. 7M

**Unit – V**

9. a) Design the hardware interface circuit for interfacing 8251 with 8086. Set the 8251A in asynchronous mode as a transmitter and receiver with even parity enabled, 2 stop bits, 8 bit character length, frequency 160KHz and baud rate 10K. Write an ALP to receive 10 bytes of data string and store it at 3000:4000H. 10M  
b) Explain the procedure of converting a linear address into a physical address in 80386 microprocessors? 5M
10. a) Explain the mode instruction and control word format of 8251? 8M  
b) Explain Physical address formation in protected virtual address mode in 80286 microprocessors? 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DIGITAL COMMUNICATIONS**

(Electronics and Communication Engineering)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) With the neat block diagram of digital communication system, explain each block in detail. 8M
- b) The bandwidth of an input signal to the PCM is restricted to 4 kHz. The input signal varies in amplitude from -3.8 V to +3.8 V and has the average power of 30 mW. The required signal to noise ratio is given as 20 db. The PCM modulator produces binary output. Assuming uniform Quantization,
  - i) Find the number of bits required per sample.
  - ii) Outputs of 30 such PCM coders are time multiplexed. What would be the minimum required transmission bandwidth for this multiplexed signal? 7M
2. a) Explain DPCM with neat diagram for transmitter and receiver with relevant mathematical equations. 9M
- b) Show that for  $\mu = A$ , the  $\mu$ -Law and the A-Law have the same companding gain. 6M

**Unit - II**

3. a) Explain the operation of Binary Frequency Shift Keying (BFSK) transmitter and receiver with necessary block diagrams. 9M
- b) Explain non coherent ASK receiver with a neat block diagram. 6M
4. a) Derive an expression for probability of error of a coherent binary FSK modulation scheme. 9M
- b) A binary data is transmitted over an AWGN channel using binary phase shift keying at a rate of 1MBPS. It is desired to have average probability of error  $p_e \leq 10^{-4}$ , noise power spectral density  $\frac{N_0}{2} = 10^{-12} \text{ W/Hz}$ . Determine the average carrier power required at the receiver input, if the detector is of coherent type. Note:  $\text{erfc}(3.5) = 0.00025$ . 6M

**Unit – III**

5. a) The output of an information source consists of 128 symbols, sixteen of which occur with a probability of  $\frac{1}{32}$  and the remaining occurs with a probability of  $\frac{1}{224}$ . The source emits 1000 symbols per second. Assuming that symbols are chosen independently. Find the average information rate of this source. 8M
- b) A source produces four symbols X1, X2, X3 and X4 with probabilities 0.4, 0.3, 0.2 and 0.1 respectively. 7M
- i. Code the symbols using Shannon – Fano encoding procedure
- ii. Calculate the code efficiency
6. a) Two noisy channels are cascaded whose channel matrices are given by 9M

$$P\left(\frac{Y}{X}\right) = \begin{bmatrix} \frac{1}{5} & \frac{1}{5} & \frac{3}{5} \\ \frac{1}{2} & \frac{1}{3} & \frac{1}{6} \end{bmatrix}, \quad P\left(\frac{Z}{Y}\right) = \begin{bmatrix} 0 & \frac{3}{5} & \frac{2}{5} \\ \frac{1}{3} & \frac{2}{3} & 0 \\ \frac{1}{2} & 0 & \frac{1}{2} \end{bmatrix} \quad \text{with } p(x_1) = p(x_2) = \frac{1}{2}.$$

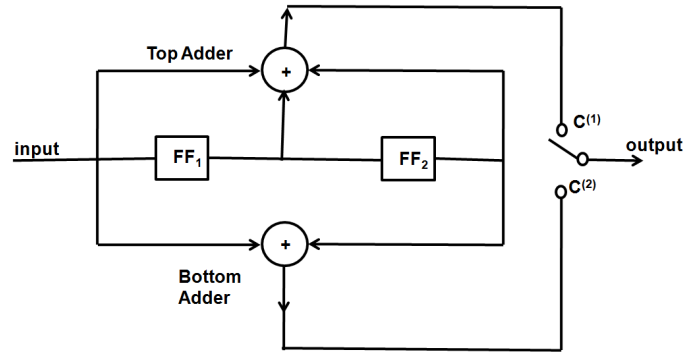
- Find the overall mutual information I(X, Y). Sketch the relevant channel diagram. 6M
- b) Derive an expression for channel capacity of a binary erasure channel. 6M

**Unit – IV**

7. A (15, 5) linear cyclic code has a generator polynomial 15M  
 $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$ .
- i. Draw the block diagram of an encoder and syndrome calculator for this code
- ii. Find the code polynomial for the message polynomial  $D(x) = 1 + x + x^4$  in systematic form.
- iii. Is  $V(x) = 1 + x^4 + x^6 + x^8 + x^{14}$  a code polynomial?
8. a) What are binary cyclic codes? Explain the advantages of cyclic codes over the linear codes. Mention the properties of cyclic codes. 7M
- b) The parity check bits of a (8,4) block code are generated 8M  
 $c_5 = d_1 + d_2 + d_4$ ,  $c_6 = d_1 + d_2 + d_3$ ,  $c_7 = d_1 + d_3 + d_4$ ,  $c_8 = d_2 + d_3 + d_4$  where  $d_1, d_2, d_3$  and  $d_4$  are the message bits.
- i. Find the generator matrix and parity check matrix for this code
- ii. Find the minimum weight of this code

**Unit – V**

9. Consider the (3,1,2) convolution code with  $g^{(1)} = (1\ 1\ 0)$ ,  $g^{(2)} = (1\ 0\ 1)$  and  $g^{(3)} = (1\ 1\ 1)$ . 15M
- i. Draw the encoder block diagram.
  - ii. Find the generator Polynomials
  - iii. Find the code- word corresponding to the information sequence ( 1 1 1 0 1) using time – domain and transform- domain approach
10. Consider the binary convolution encoder shown in Fig.1 Draw the state table, state transition table, state diagram and the corresponding code tree. Using the code tree, find the encoded sequence for the message (1 0 1 1 1). Verify the output sequence so obtained using transform domain approach. 15M



**Fig.1**



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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DIGITAL SIGNAL PROCESSING**

(Electronics and Communication Engineering)

Date: 3 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Determine whether the system  $y[n] = n \cdot x[n]$  is memory less, causal, stable, linear and time-invariant. 5M
- b) Find the impulse response of the LTI system described by the following difference equation 10M

$$y[n] - \frac{5}{2}y[n-1] + y[n-2] = x[n] - x[n-1].$$

Also find the stability of the system.

2. a) Compute the convolution sum  $y[n] = \beta^n u[n] * \alpha^n u[n-10]$ ; where  $|\beta| < 1$  and  $|\alpha| < 1$  5M
- b) Determine the response of LTI system described by the following difference equation: 10M

$$y[n] - \frac{3}{2}y[n-1] + \frac{1}{2}y[n-2] = x[n]; \text{ when } x[n] = \left(\frac{1}{4}\right)^n u[n] \text{ with}$$

$$y[-1] = 4, y[-2] = 10$$

**Unit - II**

3. a) Determine the DTFS coefficients to evaluate DTFS representation of the following sequence: 10M

$$x(n) = \cos\left[\frac{6\pi n}{13} + \frac{\pi}{6}\right]. \text{ Show the magnitude and phase response.}$$

- b) Compute the 4 point DFT for the sequence  $x_1(n) = \{1, 2, 1, 0\}$  5M
4. a) Find the 8-point DFT of a real sequence  $x(n) = \{1, 2, 2, 1, 0, 0, 0\}$  using Decimation in Frequency FFT algorithm 8M
- b) State and prove the following properties of discrete Fourier transform: 7M
- Symmetry property of real valued sequence
  - Circular time shift

**Unit - III**

5. a) Using differentiation property, determine the inverse Z-transform for 6M

$$X(Z) = \frac{az^{-1}}{(1-az^{-1})^2}; \quad |z| > a$$

- b) Sketch the direct form-I and direct form-II realization for the system function given below 9M

$$H(Z) = \frac{2z^2 + z - 2}{z^2 - 2}$$

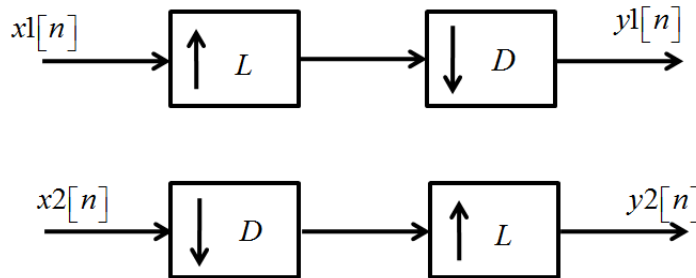
6. a) Determine the Z transform of following sequence: 6M  
 i.  $(0.2)^n \{u(n) - u(n-4)\}$   
 ii.  $\alpha^{|n|}, 0 < \alpha < 1$   
 b) Realize an FIR filter with impulse response  $h(n)$  given by 9M  
 $h(n) = \left(\frac{1}{2}\right)^n [u(n) - u(n-4)]$  using direct form 1 realization.

**Unit – IV**

7. a) Using bilinear transformation, design a digital IIR Butterworth low pass filter which satisfies the following specifications; 8M  
 $0.8 \leq |H(e^{j\omega})| \leq 1 \quad ; 0 \leq \omega \leq 0.2\pi$   
 $|H(e^{j\omega})| \leq 0.2 \quad ; 0.6\pi \leq \omega \leq \pi \quad ; \text{Assume } T_s = 1\text{sec}$   
 b) An analog signal with frequency band from 0 to 8 kHz is sampled at 50 kHz. It is desired to pass the signal through an FIR filter that has a transition band of 5 kHz with a stop band attenuation of at least 50 dB. Use suitable window function and determine the impulse response. It is assumed to have linear phase characteristics. 7M
8. a) Design a digital IIR chebyshev lowpass filter structure that will satisfy the following equivalent analog specifications: 8M  
 Passband ripple:  $\leq 1$  dB, Passband edge: 2 kHz, Assume  $T_s = 1\text{sec}$ ,  
 Stopband attenuation:  $\geq 13$ dB, Stopband edge: 6 kHz. Use bilinear transformation.  
 b) Discuss the frequency sampling method of designing FIR filters. Using frequency sampling method, design a lowpass filter having cutoff frequency of  $\pi/2$  rad. The filter should have linear phase and length  $N=9$ . 7M

**Unit – V**

9. a) State and prove identities for multirate systems. 8M  
 b) Determine the poly phase decomposition for the following filters: 7M  
 i.  $H(z) = 2 - 3z^{-1} + 2z^{-2} - 4z^{-3} - 5z^{-4} + 2z^{-5} - 6z^{-6} + 2z^{-7}, M=3$   
 ii.  $h(n) = (1/2)^n u(n), M=2$
10. a) Consider the two different ways of cascading a decimator with an interpolator shown in figure. 9M



If  $D=I$ , show that the outputs of the two configurations are different.  
 Show that the two systems are identical if and only if  $D$  and  $I$  are relatively prime.

- b) Explain up sampling and down sampling with an example for each. What is the effect of up sampling and down sampling in frequency domain? 6M

Hall Ticket No:

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

Question Paper Code : A1426



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**MICROWAVE ENGINEERING**

(Electronics and Communication Engineering)

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) Briefly explain the different frequency bands used for Microwave communication. 3M  
b) Derive expression for  $H_z$  starting from the wave equation for a rectangular wave guide operating in TE mode assuming wave propagation along Z axis. 12M
2. a) The cross section of a rectangular wave guide is 20cmx5cm. Find 6 lowest order modes which will propagate on the waveguide and their cut-off frequencies. 8M  
b) Derive the resonant frequency of a rectangular cavity starting from TE and TM fields on the waveguide and forcing the boundary conditions on the end walls of the resonator. 7M

**Unit - II**

3. a) With the help of neat constructional details, derive S-matrix for H-plane tee and also prove that H plane is 3 dB splitter. 7M  
b) List some important applications of Directional couplers. Explain the working of a multirole directional coupler. 8M
4. a) Explain the working principle of a circulator and derive its S -Matrix. 8M  
b) A 3- port device has insertion loss of 1 dB, isolation of 30 dB and VSWR =1.5. Find the S-matrix. 7M

**Unit - III**

5. a) With a neat sketch explain the mechanism of oscillations in a reflex klystron. 9M  
b) A reflex klystron is operated under the following conditions: 6M  
 $V_o = 600$  v,  $L = 1$ mm,  
 $R_{sh} = 15$ k $\Omega$ ,  $e/m = 1.75 \times 10^{11}$   
 $f_r = 9$ GHz and  $n = 2$  (mode = 1 3/4)  
Assuming that the transit time through the gap and the beam loading can be neglected, Find the value of repeller voltage.
6. a) With the help of neat diagram explain the working principle of a TWT Amplifier. 9M  
b) A TWTA operates under the following conditions: 6M  
Beam voltage  $V_o = 3$ Kv  
Beam current  $I_o = 30$  mA  
Characteristic impedance  $Z_o = 10$  $\Omega$   
Circuit length  $N = 50$   
Frequency  $f = 10$  GHz  
Determine  
i. The Gain parameter C  
ii. The output power gain  $A_p$

Cont...2

::2::

**Unit – IV**

7. a) Briefly explain crossed field devices. Give the different classifications of Magnetron. 9M  
b) An X-band pulsed conventional magnetron has the following operating parameter 6M  
Anode voltage:  $V_o=5.5\text{KV}$ ; Beam current:  $I_o=4.5\text{A}$ .  
Operating frequency:  $f=9\text{GHz}$ ; Resonator conductance:  $G_r=2\times 10^{-4}$  mho  
Loaded conductance:  $G_l=2.5\times 10^{-5}$  mho; Vane capacitance  $C=2.5\text{pF}$ .  
Duty cycle:  $\text{DC}=0.002$ ; power loss:  $P_{\text{loss}}=18.5\text{kw}$   
Compute:  
i. The angular resonant frequency  
ii. The unloaded quality factor  
iii. The loaded quality factor  
iv. The external quality factor  
v. The circuit efficiency  
vi. The electronic efficiency
8. a) Draw the current – voltage characteristics and energy band diagram of n-type Gallium 8M  
Arsenide (GaAs) Gunn diode and explain the “negative resistance effect” in these diodes.  
b) What are avalanche transit time devices? With neat graphs explain IMPATT diode 7M  
operation.

**Unit – V**

9. a) Explain the measurement of impedance using reflectometer at microwave frequency. 9M  
b) Calculate the SWR of a transmission system operating at 10GHz. Assume TE<sub>10</sub> wave 6M  
transmission inside a waveguide of dimensions  $a=4\text{cm}$ ,  $b=2.5\text{cm}$ . The distance measured  
between twice minimum power points= $1\text{mm}$  on a slotted line.
10. a) Briefly explain the different techniques used to measure frequency at microwave 10M  
frequencies.  
b) You have two directional couplers (20dB) in a guide to sample the incident and reflected 5M  
powers. The outputs of the two couplers are 3mw and 0.1mw respectively. What is the  
value of VSWR in the main guide? What is the value of reflected power?

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**VLSI DESIGN**

(Electrical and Electronics Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) With the help of neat figure, explain the behavior of nMOS device under the influence of different terminal voltages. 7M
- b) With the help of relevant equations, explain the second order effects in MOSFET. 8M
2. a) With the help of neat circuit and transfer characteristics curve, explain the different regions of operation of CMOS inverter. 7M
- b) Draw the circuit diagram of differential inverter and explain its working. 8M

**Unit – II**

3. a) With the help of neat figure, explain the Czochralski method for manufacturing silicon ingots. 8M
- b) Explain a typical n-well CMOS process technique. 7M
4. a) With neat sketch, explain the steps involved in fabrication of a silicon gate n-MOS transistor. 8M
- b) Write a note on twin tub CMOS process technology. 7M

**Unit – III**

5. a) Derive the equations for Rise time of CMOS inverter with equivalent circuits. 8M
- b) Obtain the circuit diagram and stick diagram for CMOS inverter. 7M
6. a) Derive the equations for Fall-Time of CMOS inverter. 8M
- b) Write short notes on  $2\mu m$  double metal, double poly CMOS rules. 7M

**Unit – IV**

7. a) Draw the truth table, circuit diagram and layout of a CMOS two input NOR and NAND gate. 7M
- b) Design a CMOS logic gate circuit that implements: 8M
  - i.  $F = \overline{a + b.c + d.e.f}$
  - ii.  $F = \overline{a.b + c}$
8. a) Design a dynamic CMOS logic gate circuit that implements  $F = A + \overline{(B.C) + D.E}$ . Explain its operation and advantages of dynamic CMOS logic. 8M
- b) Draw the circuit to implement two input XNOR gate using complementary pass transistor logic. 7M

**Unit – V**

9. a) Explain Stuck-At Faults model in detail. 7M
- b) Explain short-circuit and open-circuit faults models with examples. 8M
10. a) Write short notes on Built in self-test (BIST) technique, draw a neat block diagram. 9M
- b) Write short notes on terms Observability and Controllability in testing. 6M

Hall Ticket No:

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

Question Paper Code : A1430



## VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

(Regulations: VCE-R11)

### EMBEDDED SYSTEMS

(Common to Computer Science and Engineering & Information Technology)

Date: 27 May, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

#### Unit - I

1. a) What is an embedded system? Explain three main characteristics of embedded systems that distinguish such system from other computing systems? 7M
- b) Explain why we use microprocessors? Give two ways to design a digital system. 8M
2. a) Explain what are the problems we need to consider while designing an embedded computing system? 10M
- b) Illustrate the use of UML to model systems, with the help of Model Train Controller. 5M

#### Unit - II

3. a) Explain the various addressing modes of microcontroller and explain each with example. 10M
- b) Explain with diagram the Port-0 pin circuit. 5M
4. a) Explain the following instructions: 10M
- i) DEC 15H ii) INC @ R0 iii) DA A iv) ADDC A, #00H v) SETB 80H
- b) With the help of a block diagram, explain the operation of timer 0 in mode 1. 5M

#### Unit - III

5. a) What is a Semaphore? List the functions related to Semaphore and Illustrate how Semaphore is used to solve the shared data problem with an example? 7M
- b) List the different ways to protect the shared data and What is an Event? Mention the three standard features of an Event? 8M
6. a) Compare and contrast on the pros and cons of the number of Tasks needed in embedded applications. 7M
- b) Discuss the different ways of saving the code memory space while using an RTOS along with their advantages and drawbacks. 8M

#### Unit - IV

7. a) Illustrate the different ways of getting the executable file into the target system. 8M
- b) Explain how the Tool chain uses the different segments in Embedded software with an example. 7M
8. a) Discuss the goals of a typical testing process and Explain the basic method for testing the embedded software on the development host with the help of a neat figure showing the Test system. 8M
- b) What is an Oscilloscope? Explain the working, features and uses of Oscilloscopes with a neat sketch. 7M

Cont...2

::2::

**Unit – V**

- |     |    |  |     |
|-----|----|--|-----|
| 9.  | a) | With neat diagram explain the ARM programming model .  | 8M  |
|     | b) | Compare two advanced processor architectures with various important features.                                  | 7M  |
| 10. | a) | With neat diagrams explain the structure and electrical interface to the I <sup>2</sup> C bus system.          | 10M |
|     | b) | Illustrate how Quick cam operates as a Java applet in an Internet Video camera application with a neat figure. | 5M  |

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DIGITAL ELECTRONICS AND MICROPROCESSORS**

(Mechanical Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Convert the following numbers to decimal number: 8M
  - i.  $(4021.2)_5$
  - ii.  $(B65F)_{16}$
  - iii.  $(10101.11)_2$
  - iv.  $(75.25)_8$
- b) Perform subtraction using 2's complement method: 7M
  - i.  $11010 - 11011$
  - ii.  $11010 - 10000$
2. a) Convert the following numbers: 7M
  - i.  $(ABCD.EF)_{16} = ( )_2 = ( )_8$
  - ii.  $(1256.75)_{10} = ( )_2 = ( )_8 = ( )_{16}$
- b) With the help of a block diagram explain the working of a digital computer. 8M

**Unit - II**

3. a) Obtain a minimal SOP and POS representations using Karnaugh Maps for 8M  
 $f(w, x, y, z) = \sum_m(0, 7, 8, 10, 12) + d(2, 6, 11)$ .
- b) Write the truth table of a full adder. Implement the full adder with minimum basic gates. 7M
4. a) Find the minimal sum of products for the Boolean expression 8M  
 $F(A, B, C, D) = \sum_m(0, 1, 2, 5, 6, 7, 8, 9, 10, 14)$  Quine - Mc Cluskey method.
- b) Implement a Full adder using 3 to 8 decoder and two OR gates. 7M

**Unit - III**

5. a) With the help of a block diagram explain a sequential circuit. 7M
- b) Explain the working of a Master -Slave JK flip-flop? 8M
6. a) Write the function table and characteristic equations of the following Flip-Flops: 8M
  - i. JK Flip-Flop
  - ii. D Flip-Flop
  - iii. T Flip-Flop
- b) Explain the working of the following shift registers using positive edge triggered D Flip-Flop: 7M
  - i. 4 bit serial in - serial out unidirectional shift registers
  - ii. 4 bit serial in - Parallel out shift registers



::2::

**Unit – IV**

7. a) Explain the following 8085 bus structures: 10M  
i. Address bus  
ii. Data bus  
iii. Control bus  
b) Explain general-purpose registers set of 8085? 5M
8. a) If the contents of the accumulator are 93H and the contents of register C are B7H. ADD both contents. 'ADD C' instruction. 5M  
b) Explain the Arithmetic operations, logical operations and branching operations in detail. 10M

**Unit – V**

9. a) Compare memory mapped I/O with I/O mapped I/O. 5M  
b) Explain in brief the features of 8257 DMA controller? 10M
10. a) Show the internal diagram of 8255 (PPI) and write control word format for I/O operation and BSR operation. 8M  
b) With the help of a neat block diagram, Explain the working of a Direct memory access operation. 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**DATABASE MANAGEMENT SYSTEMS**

(Electrical and Electronics Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) Define a DBMS. What are the characteristics of database that makes difference from traditional file processing? Explain 10M
- b) Define a Scheme. Explain the three schema architecture of DBMS in detail. 5M
2. a) A banking organization wants to automate its existing system. The requirements for automation were identified as follows: 10M  
 Bank is typically identified by unique code, name and address. Bank may have multiple branches. Customers can have different types of accounts with a branch. Customer is identified by SSN, Name, Phone and address. Branch can issue different types of loans. Customer can avail any form of loans. Loan is identified by Loan Id, Loan Name & Interest rate. Draw an E- R diagram for the application. State any other assumptions made by you.
- b) Differentiate between total participation & partial participation with an example. 5M

**Unit – II**

3. a) What are integrity constraints? Define the terms Primary key constraint and referential integrity constraint with an example. 6M
- b) Explain the following relational algebra with an example: 9M
  - i. THETA JOIN
  - ii. DIVISION
4. a) Discuss the different set theoretical operations in relational algebra with an example. 6M
- b) Consider the following relational schema: 9M  
 SAILORS(SID,SNAME, RATING)  
 BOATS( BID, BNAME, COLOR)  
 RESERVES(SID,BID,DAY)  
 Write the SQL queries to implement the following:
  - i. Find the names of sailors who have reserved boat number 103
  - ii. Find the color of boats reserved by ' ARJUN'
  - iii. Count the number of different sailor names
  - iv. Find the names of sailors who are older than oldest sailor with rating 10

**Unit – III**

5. a) List the problems caused by redundancy and explain with example. 6M
- b) Consider Relation (ABCD) with dependencies  $\{AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B\}$  9M
  - i. Identify the candidate key
  - ii. Decompose R into 2NF & 3NF
  - iii. If R is decomposed into  $R_1(AB)$  &  $R_2(CD)$  is it depending preserving and lossless join.
6. a) Define an anomaly. Discuss different types of anomalies. 6M
- b) Define normalization. Explain 1 NF, 2 NF with an example. 9M

::2::

**Unit – IV**

- 7. a) What is a locking protocol? Describe the strict two phase locking protocol. 8M
- b) What is the role of transaction manager & recovery manager? 7M
- 8. a) Briefly explain ARIES algorithm for recovery. 8M
- b) Explain 2 phase locking protocol. 7M

**Unit – V**

- 9. a) If you were to create an index on a relation, what consideration would guide your choice? Discuss. 10M
  - i. The choice of primary index.
  - ii. Clustered versus unclustered index.
  - iii. Hash versus tree indexes.
  - iv. Use of sorted file rather than tree based index.
  - v. What is composite search key? What considerations are made in choosing composite search key?
- b) Discuss the operations for comparison of File organizations. 5M
- 10. a) Describe the structure of a B-tree. (Insert the following data into a B-tree. 10M  
8,5,1,7,3,12,9,6)
- b) Discuss the first four RAID levels. 5M

Hall Ticket No:

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

Question Paper Code : A1515



## VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

(Regulations: VCE-R11)

### COMPUTER NETWORKS

(Electronics and Communication Engineering)

Date: 27 May, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

#### Unit - I

1. a) Two networks each provide reliable connection-oriented service. One of them offers a reliable byte stream and the other offers a reliable message stream. Are these identical? If so, why is the distinction made? If not, give an example of how they differ. 8M
- b) A cable TV system has 100 commercial channels, all of them alternating programs with advertising. Is this more like TDM or like FDM? 7M
2. a) Television channels are 6 MHz wide. How many bits/sec can be sent if four-level digital signals are used? Assume a noiseless channel. 7M
- b) If the unit exchanged at the data link level is called a frame and the unit exchanged at the network level is called a packet, do frames encapsulate packets or do packets encapsulate frames? Explain your answer. 8M

#### Unit - II

3. a) PPP is based closely on HDLC, which uses bit stuffing to prevent accidental flag bytes within the payload from causing confusion. Give at least one reason why PPP uses byte stuffing instead. 8M
- b) An IP packet to be transmitted by Ethernet is 60 bytes long, including all its headers. If LLC is not in use, is padding needed in the Ethernet frame, and if so, how many bytes? 7M
4. a) When bit stuffing is used, is it possible for the loss, insertion, or modification of a single bit to cause an error not detected by the checksum? If not, why not? If so, how? Does the checksum length play a role here? 7M
- b) Give two reasons why networks might use an error-correcting code instead of error detection and retransmission. 8M

#### Unit - III

5. a) What is the problem with Bellman-Ford routing algorithm? Discuss the ways to overcome from this problem. 5M
- b) Describe the AoDV algorithm used for routing packets in ad hoc networks. 10M
6. a) Discuss the different techniques adapted for achieving good quality of service, also explain token bucket algorithm. In what way token bucket algorithm is efficient than leaky bucket algorithm? 10M
- b) Explain how RSVP protocol used to achieve quality of service in unicast and multicast application. 5M

Cont...2

**Unit – IV**

7. a) Imagine that a two-way handshake rather than a three-way handshake were used to set up connections. In other words, the third message was not required. Are deadlocks now possible? Give an example or show that none exist. 7M
- b) Give a potential disadvantage when Nagle's algorithm is used on a badly-congested network. 8M
8. a) Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets? 7M
- b) Consider a simple application-level protocol built on top of UDP that allows a client to retrieve a file from a remote server residing at a well-known address. The client first sends a request with file name, and the server responds with a sequence of data packets containing different parts of the requested file. To ensure reliability and sequenced delivery, client and server use a stop-and-wait protocol. Ignoring the obvious performance issue, do you see a problem with this protocol? Think carefully about the possibility of processes crashing. 8M

**Unit - V**

9. a) Does voice over IP have the same problems with firewalls that streaming audio does? Discuss your answer. 7M
- b) Does Webmail use POP3, IMAP, or neither? If one of these, why was that one chosen? If neither, which one is it closer to in spirit? 8M
10. a) DNS uses UDP instead of TCP. If a DNS packet is lost, there is no automatic recovery. Does this cause a problem, and if so, how is it solved? 8M
- b) POP3 allows users to fetch and download e-mail from a remote mailbox. Does this mean that the internal format of mailboxes has to be standardized so any POP3 program on the client side can read the mailbox on any mail server? Discuss your answer. 7M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**LANGUAGE PROCESSORS**

(Common to Computer Science and Engineering & Information Technology)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) Explain the different phases of a compiler along with the need for the error handler and symbol table with a neat diagram. 7M
- b) Construct nondeterministic finite automata for the following regular expressions. Show the sequence of moves made by each in processing the input string *ababbab* 8M
  - i.  $((\epsilon|a)b^*)^*$
  - ii.  $(a|b)^*abb(a|b)^*$
2. a) Eliminate left recursion and construct a predictive parsing table for the grammar: 10M
 
$$E \rightarrow E * T \mid T$$

$$T \rightarrow T + F \mid F$$

$$F \rightarrow ( E ) \mid id$$
- b) What is ambiguity in a grammar? Give an example for ambiguous grammar. 5M

**Unit - II**

3. a) Construct the SLR parsing table for the following grammar and find the moves of SLR parser on *id \* id + id* 10M
 
$$E \rightarrow E + E \mid E * E \mid ( E ) \mid E / E \mid id$$
- b) Define handle? What is handle pruning? Explain with an example. 5M
4. a) Consider the following grammar. Show the configurations of shift-reduce parser on input *id+id\*id* 8M
 
$$E \rightarrow E + E$$

$$E \rightarrow E * E$$

$$E \rightarrow ( E )$$

$$E \rightarrow id$$
- b) Consider the ambiguous grammar: 7M
 
$$S \rightarrow AS \mid b$$

$$A \rightarrow SA \mid a$$

Construct the collection of sets of LR(1) items for this grammar. Also construct the parsing table using LALR algorithm.

**Unit – III**

5. a) Consider the productions: 5M  
 $L \rightarrow En$   
 $E \rightarrow E_1 + T$   
 $E \rightarrow T$   
 $T_1 \rightarrow F$   
 $T \rightarrow T_1 * F$   
 $F \rightarrow (E)$   
 $F \rightarrow digit$   
 Construct an annotated parse tree for the i/p:  $3*5$
- b) Design a dependency graph for the following grammar & give rules 10M  
 $S \rightarrow T \text{ List}$   
 $T \rightarrow int / float / char / double$   
 $List \rightarrow List, id / id$   
 Given i/p: int a, b, c
6. a) Construct a DAG for the expression  $a = (-x * y) + (-x * y)$  6M  
 b) Generate three address code and its quadruple representation for the given i/p string: 9M  
 $a = b * -c + b * -c$

**Unit – IV**

7. a) Explain overloading of functions and operators. 7M  
 b) Write a detailed note on types and declarations in intermediate code generation. 8M
8. a) How to access non local names? Explain. Also write the parameter passing mechanism in detail. 8M  
 b) Discuss on activation records in storage organization. 7M

**Unit – V**

9. a) Construct a DAG for the given input  $a = (a * b) + (c - d) * (a * b) + b$  5M  
 b) Generate 3 address code for the following program fragment and only identify the basic block 10M  
 Prod=0  
 i=1  
 Do  
 Prod=prod+a[i]\*b[i]  
 i=i+1  
 White  $i \leq 20$
10. a) Find the local characteristics of peephole optimizations and explain the same with an example each. 10M  
 b) List the rules that the code generation algorithm need to follow to update the address and register descriptors. 5M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**OBJECT ORIENTED DESIGN AND PATTERNS**

(Common to Computer Science and Engineering, Information Technology)

Date: 3 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit – I**

- |    |    |  |    |
|----|----|--|----|
| 1. | a) | State and explain principles of modeling.  | 7M |
|    | b) | What are the building blocks of the UML? Explain.                                | 8M |
| 2. | a) | Explain the following terms with suitable examples and UML notations.            | 8M |
|    |    | i. Generalization  |    |
|    |    | ii. Aggregation  |    |
|    |    | iii. Multiplicity  |    |
|    | b) | Explain modeling of concrete and prototypical instances with a suitable example. | 7M |

**Unit – II**

- |    |    |   |     |
|----|----|---|-----|
| 3. |    | The Web Customer uses some web site to make purchases online. Typically the website may have top level menus such as View Items, Make Purchase and Register. View Items could be used by customer only when they want to find and see some products. Register menu allows customer to register on the web site, for example to get some coupons or be invited to private sales. Customer may search for items, browse catalog, view items recommended for him/her, add items to shopping cart or wish list. Note, that the customers checkout after making purchase. Customer Authentication is included in View Recommended Items and Add to shopping cart. Design a use case diagram for online shopping system.  | 15M |
| 4. | a) | Facebook uses OAuth 2.0 protocol framework which enables web application (called "client"), which is usually not the FB resource owner but is acting on the FB user's behalf, to request access to resources controlled by the FB user and hosted by the FB server. Instead of using the FB user credentials to access protected resources, the web application obtains an access token.<br>Web application should be registered by Facebook to have an application ID (client_id) and secret (client_secret). When request to some protected Facebook resources is received, web browser ("user agent") is redirected to Facebook's authorization server with application ID and the URL the user should be redirected back to after the authorization process. User receives back Request for Permission form. If the user authorizes the application to get his/her data, Facebook authorization server redirects back to the URI that was specified before together with authorization code ("verification string"). The authorization code can be exchanged by web application for an OAuth access token. If web application obtains the access token for a FB user, it can perform authorized requests on behalf of that FB user by including the access token in the Facebook Graph API requests. If the user did not authorize web application, Facebook issues redirect request to the URI specified before and adds the error_reason parameter to notify the web application that authorization request was denied. Design a sequence diagram for the above scenario. | 10M |
|    | b) | Engine is part-of Car or Car has Engine as main part hence the relationship between them is Composition. Organization has Person as employees, relationship between them is Aggregation. Write Java Class Skelton to demonstrate these concepts.  | 5M  |



::2::

**Unit – III**

5. a) How can we design a day class? Explain implementing a day class with a suitable code segment. 8M  
b) Write a Java code to design a frame with two buttons and a text box. 7M
6. a) Bring out the significance of pre-condition and post-condition as mechanism to achieve programming by contract. 8M  
b) What is polymorphism? Describe the benefits of polymorphism. 7M

**Unit – IV**

7. a) What is pattern? Explain suitable pattern that is useful to access the elements of an aggregate object. 7M  
b) Define composite pattern. With an example, address situations where this pattern can be applied. 8M
8. a) Explain with a suitable code segment, concepts of invoking super class methods and super class constructors with respect to inheritance. 7M  
b) Write explanatory note on Protected Interfaces and Abstract Classes. 8M

**Unit – V**

9. a) What is a framework? What is an application framework? List two characteristics of application framework. 10M  
b) What is a factory method pattern? 5M
10. a) Design a class that creates two threads. The first thread should print "hello world" and subsequently the second thread should print goodbye world. 9M  
b) How to supply a method that can be overridden to create objects of varying types? Explain with a suitable pattern. 6M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**C#AND.NET FRAMEWORK**

(Common to Computer Science Engineering & Information Technology)

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

**Unit - I**

1. a) Describe the three building blocks of .Net platform. 7M
- b) What is Common Type System? Explain different types defined by the CTS in their language of choice. 8M
2. a) CLS rules apply only to those parts of a type that are exposed outside the defining assembly – Give inference with a suitable example. 8M
- b) List the productivity enhancements provided by SharpDevelop. 7M

**Unit – II**

3. a) Describe Boxing and Unboxing with suitable examples. 7M
- b) Write a C# program to find the minimum and maximum element of an array. The array should have both positive and negative elements. Irrespective of the elements, your program should find maximum number when all numbers are made positive and minimum number when all numbers are made negative. 8M
4. a) Write a C# program that determines a student's grade. The program will read three types of scores (quiz score, mid-term score, and final score) and determine the grade based on the following rules: 8M
  - i. If the average score  $\geq 90\%$   $\Rightarrow$  grade=A
  - ii. If the average score  $\geq 70\%$  and  $< 90\%$   $\Rightarrow$  grade=B
  - iii. If the average score  $\geq 50\%$  and  $< 70\%$   $\Rightarrow$  grade=C
  - iv. If the average score  $< 50\%$   $\Rightarrow$  grade=F
- b) Explain the method parameters keywords in C# namely "ref" and "out" with suitable examples. 7M

**Unit – III**

5. a) Illustrate the concept of containment/delegation model with an example. 7M
- b) Explain different Exception class members that can be useful in further qualifying the nature of the problem with an example for each? 8M
6. a) What is a shadowing member in C# programming? Illustrate the shadowing member by taking an example. 8M
- b) Illustrate how multiple exceptions are handled in C# programming with an example. 7M

**Unit – IV**

- |    |    |  |    |
|----|----|--|----|
| 7. | a) | What is a delegate? Illustrate how to define a delegate type in C#.                      | 8M |
|    | b) | Illustrate the process of strongly naming an assembly.                                   | 7M |
| 8. | a) | Write simple Console Application program in C# programming illustrating a delegate type. | 7M |
|    | b) | Briefly discuss CIL Code, Type Metadata and the Assembly Manifest in .NET assembly.      | 8M |

**Unit – V**

- |     |    |  |     |
|-----|----|--|-----|
| 9.  | a) | Demonstrate the process of building a reusable data access library.  | 10M |
|     | b) | Compare and contrast dataset and data table.                         | 5M  |
| 10. | a) | Give definitions for IDbDataParameter and IDataParameter Interfaces. | 8M  |
|     | b) | List the seven methods of dataset along with its usage.              | 7M  |

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



## VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

(Regulations: VCE-R11)

### WIRELESS AND MOBILE COMPUTING

(Information Technology)

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

#### Unit - I

1. a) Discuss the concept of handover in connection with the satellite communication? 8M
- b) Satellites may be able to communicate directly with each other via inter-satellite links. Show the way how MUL and GWL play a major role in communication? 7M
2. a) Explain the IEEE 802.11 protocol architecture with a neat diagram? 7M
- b) With a neat diagram, explain the format of IEEE 802.11 PHY frame using Direct Sequence Spread Spectrum (DSSS). 8M

#### Unit - II

3. a) Illustrate the problem of near and far terminals in medium access control? 7M
- b) N bits of data are to be transmitted as a packet-switched data. The packets have a maximum of n bits each. The data transmission rate is n/T and the data to be transmitted is formatted into four packets A, B, C & D. If three different route are available for transmission. Calculate the time taken to complete the synchronous packet transmission. What is the time taken if N=4n? How much time will it take to transmit the same data through one single path? 8M
4. a) With the help of a diagram, explain system architecture of GSM? Also show the interfacing between different subsystems along with components of each subsystem? 8M
- b) Describe the process of call handover when a mobile station moves? 7M

#### Unit - III

5. a) Explain the process of encapsulation by additional IP header of an IP packet? 7M
- b) Illustrate the TCP connection timeout freezing of transmission protocol? 8M
6. a) How does dynamic source routing handle routing? What is the motivation behind dynamic source routing compared to other routing algorithms from fixed networks? 8M
- b) Illustrate how mobile IP employees route optimization after mobility binding between COA<sub>j</sub> and CN<sub>k</sub>? 7M

#### Unit - IV

7. a) Explain Query-processing architecture for processing a query using distributed data bases? 7M
- b) Describe context aware computing. What are different context-types used in context-aware computing? 8M
8. a) Explain ACID transaction rules that should be maintained by database transactional models to achieve data integrity? 8M
- b) Why does a mobile device take quality of service issues into account while computing? List the objects which specify and model the QoS? 7M

::2::

**Unit – V**

- |     |      |  |    |
|-----|------|--|----|
| 9.  | a)   | Explain the following with a neat diagram:   | 7M |
|     | i.   | The WAP 2.0 client   |    |
|     | ii.  | Gateway  |    |
|     | iii. | Web HTTP server architecture   |    |
|     | b)   | Explain the following protocols of WAP 1.1:  | 8M |
|     | i.   | Wireless Transaction Protocol (WTP)  |    |
|     | ii.  | Wireless Transport Layer Security (WTLS)   |    |
| 10. | a)   | Explain the source profiles, packages for the configurations of CLDC and CDC and the required virtual machine in J2ME? | 7M |
|     | b)   | What is profile? How is MIDP defined from J2ME? Describe features of MIDP 3.0?   | 8M |

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**NETWORK SECURITY AND CRYPTOGRAPHY**

(Computer Science and Engineering)

Date: 8 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit – I**

1. a) With a neat diagram explain a model for Network security. 7M
- b) Differentiate between Transposition Cipher and Substitution Cipher. Apply two stage transposition cipher on the text "treat diagrams as single units" using the keyword "sequence". 8M
2. a) What is Steganography? Briefly explain any three techniques used. 7M
- b) Encrypt the word "Semester Result" with the keyword "Examination" using Playfair Cipher. List the rules used. 8M

**Unit – II**

3. a) With a neat diagram, describe Classical Feistel Cipher structure. 7M
- b) Explain the different Cipher block modes of operation. 8M
4. a) Explain the following: 7M
  - i. Differential Cryptanalysis
  - ii. Linear Cryptanalysis
- b) Explain the RC4 algorithm. 8M

**Unit – III**

5. a) Discuss the Diffie-Hellman Key Exchange mechanism. 7M
- b) With a neat diagram discuss the ingredients of a Public Key Cryptosystem. 8M
6. a) With a neat diagram discuss the essential elements of a Digital Signature Process 7M
- b) Write the RSA algorithm for Encryption and Decryption. Given  $p=3$ ,  $q=11$ ,  $e=7$  &  $m=5$ , perform RSA encryption and decryption. 8M

**Unit – IV**

7. a) Describe the structure of Private and Public key rings used in PGP. 7M
- b) Discuss Transport mode and Tunnel modes of using IPsec Encapsulating security payload services. 8M
8. a) Describe the following with respect to Kerberos Version. 4: 8M
  - i. Authentication Server
  - ii. Ticket Granting Server
- b) Briefly discuss the benefits of IPsec. Also list any four IPsec services. 7M

**Unit – V**

9. a) What are the components of a Virus? Discuss the four phases in the life time of a virus? 7M
- b) What is a Firewall? Discuss any three types of Firewall? 8M
10. a) What are the objectives of SET? What do you understand by a dual signature that is used in SET? 7M
- b) Discuss the following with respect to SSL Architecture: 8M
  - i. SSL session
  - ii. SSL Connection

Hall Ticket No:

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

Question Paper Code : A1718



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**AEROSPACE PROPULSION-II**

(Aeronautical Engineering)

Date: 31 May, 2014

Time: 3 hours

Max Marks: 75

---

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

---

**Unit - I**

1. a) With a neat sketch explain single stage velocity triangle and derive expression for work output. 8M
- b) Discuss the limitations in the design of gas turbine. 7M
2. a) Explain vortex theory. 7M
- b) Explain film cooling and transpiration cooling as applied to blade cooling in gas turbine. 8M

**Unit - II**

3. a) Discuss the principle of scram jet engine and list out any four advantages of scram jet engine. 7M
- b) With neat sketch explain the working principle of turbo fan engine. 8M
4. a) An ideal ramjet is flying at Mach 2 where the ambient temperature is 293 K. The fuel has a heating value of 45,000 KJ/Kg and the temperature inside the combustion chamber is 2500 K. Find the jet exit velocity and fuel ratio. If the air mass flow through the engine is 200 Kg/s, what is the thrust produced and the thrust specific fuel consumption? For air,  $\gamma = 1.4$  and  $C_p = 1.0035$  KJ/Kg K, which are assumed to remain constant. 8M
- b) Explain thrust augmentation technique. 7M

**Unit - III**

5. Starting with the basic derivation solve the following : 15M  
The effective jet exit velocity from a jet engine is 2700 m/s .The forward flight velocity is 1350 m/s and the airflow rate is 78.6 kg/s. Calculate:
  - i. Thrust
  - ii. Thrust power and
  - iii. Propulsive efficiency
6. A rocket flies at 10,080 kmph with an effective exhaust jet velocity of 1400 m/s and propellant flow rate is 5.0 kg/s. If the heat of reaction of the propellant is 6500 KJ/kg of the propellant mixture determine: 15M
  - i. Propulsion efficiency and propulsion power
  - ii. Engine output and thermal efficiency
  - iii. Overall efficiency

::2::

**Unit – IV**

- |    |    |  |    |
|----|----|--|----|
| 7. | a) | With neat sketch explain plasma rocket propulsion.                                       | 8M |
|    | b) | Write short notes on internal ballistics.  | 7M |
| 8. | a) | List out the various types of electrical rocket propulsion system? Explain any one.      | 8M |
|    | b) | List out the methods used for cooling of rocket engines thrust chamber? Explain any one. | 7M |

**Unit – V**

- |     |    |   |    |
|-----|----|---|----|
| 9.  | a) | With neat sketch explain the working of ion rocket propulsion.              | 8M |
|     | b) | Write short notes on staging of rockets.                                    | 7M |
| 10. | a) | With neat sketch explain the working of solar rocket engine.                | 8M |
|     | b) | What are the factors important in comparison of different types of rockets? | 7M |



Hall Ticket No:

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

Question Paper Code : A1719



**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

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

**(Regulations: VCE-R11)**

**FLIGHT VEHICLE DESIGN**

**(Aeronautical Engineering)**

**Date: 3 June, 2014**

**Time: 3 hours**

**Max Marks: 75**

---

**Answer ONE question from each Unit**

**All Questions Carry Equal Marks**

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

---

**Unit - I**

1. a) Briefly discuss the phases of aircraft design. 8M
- b) What are the performance data of the existing aircraft that can be used as guidelines for the conceptual design of aircraft? Explain considering four design parameters? Also explain how you would use the data. 7M
2. a) Explain the take-off weight build up and the empty weight estimation for a new aircraft design 8M
- b) Discuss the performance requirement of air craft. 7M

**Unit - II**

3. What are the implications of wing loading (W/S) value on aircraft design, mainly stall speed, climb, range, endurance, ceiling altitude, take off and landing distance. 15M
4. a) What are the volume consideration while sizing fuselage. 10M
- b) Discuss flat wrap lofting. 5M

**Unit - III**

5. a) Describe installed engine thrust correction. 5M
- b) Discuss the effect of altitude and velocity variation on engine performance. 10M
6. What are the types of loads acts on an aircraft and derive expression for total load factor for sharp edge gust. 15M

**Unit - IV**

7. a) Explain the stability and control derivative of aircraft. 7M
- b) Discuss the advantages and disadvantages of canard wing of airplane. 8M
8. Discuss the following: 15M
  - i. RDT&E and production cost
  - ii. Operation and maintenance costs
  - iii. Crew salaries
  - iv. Matrix plot
  - v. Carpet plot

**Unit - V**

9. a) With neat sketch explain the development of DC-1 aircraft. 8M
- b) With neat sketch explain double delta wing of aircraft. 7M
10. a) Draw the three views of the layout of a 60 seater high subsonic aircraft. 9M
- b) Make a conceptual sketch of stealth bomber. 6M

Hall Ticket No:

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

Question Paper Code : A1720



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**FINITE ELEMENT MODELING AND ANALYSIS**

(Aeronautical Engineering)

Date: 5 June, 2014

Time: 3 hours

Max Marks: 75

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

1. a) Discuss in brief the general steps involved in the finite element method. 12M
- b) Define degree of freedom. Explain the degrees of freedom for any two dimensional element. 3M
2. a) What is local coordinate and global coordinate system? Explain with an example? 5M
- b) Derive relation between natural and Cartesian coordinate for a two dimensional triangular element in triangular coordinate system. 10M

**Unit - II**

3. a) What is interpolation function? Explain its importance in finite element method with an example. 5M
- b) Derive interpolation functions for two dimensional, 4 node rectangular element using Lagrange interpolation and sketch the interpolation plots. 10M
4. a) Define plane stress and plane strain condition for isotropic material. Derive [D] matrix for plane stress condition. 10M
- b) Sketch local and global degrees of freedom of a truss element and list all its degrees of freedom. 5M

**Unit - III**

5. a) Derive elemental stiffness matrix for 2 node one dimensional bar element using direct approach and list the properties of stiffness matrix. 10M
- b) Explain the assembly process of global stiffness matrix with an example. 5M
6. a) Explain isoparametric, super parametric and sub parametric representation. 9M
- b) Derive Jacobean matrix for a 3 node 2 D simplex element. 6M

**Unit - IV**

7. a) Explain two point formula in numerical integration. 10M
- b) Integrate  $I = \int_{-1}^1 (3\xi^3 + 2\xi^2 + \xi + 2) d\xi$  by using two (2) point method. 5M
8. a) Using 2 point Gaussian quadrature, evaluate  $\int_{-1}^1 \int_{-1}^1 (r^2 + 2rs + s^2) dr ds$ . 8M
- b) Explain numbering system of nodes to reduce band width? 7M

**Unit - V**

9. a) Explain structured and unstructured mesh generation. 7M
- b) Write a note on commercially available FEA packages. 8M
10. a) List any 4 axial symmetric cases and sketch and explain any one case. 5M
- b) Explain with a flow chart, pre-processor, solver and post processor. 10M

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



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

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

(Regulations: VCE-R11)

**FATIGUE AND FRACTURE MECHANICS**

(Mechanical Engineering)

Date: 7 June, 2014

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

**Unit - I**

1. a) Write a note on: 6M
  - i. Stress Concentration
  - ii. Notch Sensitivity
  - iii. Endurance Limit
- b) Explain with sketch "GOODMAN" method for combination of stresses and how it is useful in design? 9M
2. a) What information do you get from "SODERBERG" diagram? Explain? 9M
- b) A Machine component is subjected to a flexural stress which fluctuates between  $+300\text{MN/m}^2$  and  $-150\text{MN/m}^2$ . Determine the value of minimum ultimate strength according to: 6M
  - i. Goodman Relation
  - ii. Soderberg Relation

Take yield strength=0.55 times Ultimate Strength,  
Endurance strength = 0.5 times Ultimate Strength and factor of safety=2

**Unit - II**

3. a) State examples and explain low cycle fatigue and explain from the application point of view. 8M
- b) Explain Coffin Manson's relation of fatigue behavior? 7M
4. a) Differentiate between: 8M
  - i. Stress Intensity Factor
  - ii. Plane stress fracture toughness
- b) Explain how effect of notches on fatigue failure can be experimentally studied. 7M

**Unit - III**

5. a) With the help of a neat sketch explain the process of crack initiation and explain the stages of crack initiation. 8M
- b) Explain the phenomenon of crack propagation? 7M
6. a) Explain Griffith's theory and also compare this theory to Irwin- Orwin extension? 10M
- b) Write short notes on strength of cracked bodies. 5M

**Unit - IV**

7. Explain in detail the effect of thickness on fracture toughness and also give examples as to how this value would be useful in industry scenario? 15M
8. Explain in detail citing examples as to how finite element approach is useful for crack propagation studies? 15M

::2::

**Unit – V**

- |     |   |     |
|-----|---|-----|
| 9.  | Explain in detail the applications in composite material sector?                          | 15M |
| 10. | a) Explain the different conditions that can cause the failure of a structural component? | 8M  |
|     | b) Explain experimental determination of Interlaminar toughness of a composite laminate?  | 7M  |