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VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

ENGINEERING DRAWING

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

Date : 17 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- | | | |
|---|--|-----|
| 1 | a) Construct a regular hexagon having side 30mm having
i. One side vertical
ii. One side inclined at 40° to HP | 5M |
| | b) Construct a vernier scale of scale of 1:40,000 to showing kilometers, hectometers and decameters and long enough to measure 5 km. Mark distance 3.92 km on the scale. | 10M |
| 2 | a) Draw the circumcircle of a triangle having sides 30 mm, 40 mm and 50 mm. | 5M |
| | b) Draw the involute of a regular hexagon of side 20mm. Draw a tangent and normal to the curve at a distance 100 mm from the centre of the hexagon. | 10M |

Unit – II

- | | | |
|---|--|-----|
| 3 | The top view ab of a straight line is 70mm long and makes an angle of 60 degrees with the XY line. The point A is 10mm in front of VP and 30 mm above HP. The difference between the distances of A and B above the HP is 45mm. Draw the projections and determine its true length and true inclinations. | 15M |
| 4 | A room is 6m x 5m x 4m high. An electric bulb is above the center of the longer wall and 1m above ceiling. The bulb is 50cm away from the longer wall. The switch for the light is 1.25m above the floor on the center of the adjacent wall. Determine graphically, the shortest distance between the bulb and the switch. | 15M |

Unit – III

- | | | |
|---|--|-----|
| 5 | A 30 degree, 60 degree set square with longest side measuring 125mm is placed such that the longest side is on HP making an angle of 30 degrees with VP. The surface of the setsquare is inclined to HP at 45 degrees. Draw its projections. | 15M |
| 6 | A rectangular prism of side 30mm x 50mm and height 70mm is resting with one of its shorter edges on HP such that the axis is inclined at 30 degrees to Hp and 60 degrees to VP. Draw its projections. | 15M |

Unit – IV

- | | | |
|---|--|-----|
| 7 | A cube of 40mm edge is resting on HP on one of its edges with a face parallel to VP. One of the faces containing the resting edge is inclined at 30 degrees to HP. The solid is cut by a section plane parallel to HP and 10mm above the axis. Draw the projections of the remaining solid. | 15M |
| 8 | A hexagonal pyramid of side of base 30mm and axis 60mm long is resting on its base on HP with an edge of the base perpendicular to VP. It is cut by a section plane inclined at 30 degrees to HP and passing through the axis at 20mm from the base. Draw the projections of the solid showing the sectional top view and true shape of section. | 15M |

:: 2 ::

Unit – V

- 9 A hexagonal prism of side of base 30mm and axis 70mm long is resting on its base on HP 15M
such that a rectangular face is parallel to VP. It is cut by a section plane perpendicular to VP
and inclined at 30 degrees to HP. The section plane is passing through the top end of an
extreme lateral edge of the prism. Draw the development of the lateral surface of the cut
prism.
- 10 A cylinder of diameter of base 40mm and axis 55mm long is resting on its base on HP. It is 15M
cut by a section plane perpendicular to VP and inclined at 45 degrees to HP. A section plane
is passing through the top end of an extreme generator of the cylinder. Draw the
development of the lateral surface of the cut cylinder.

**VARDHAMAN COLLEGE OF ENGINEERING**
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

MATHEMATICS - I

(Common for All Branches)

Date : 19 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

1. a) Solve $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$ 7M
- b) Prove that parabola $y^2 = 4a(x+a)$ is self orthogonal, where a is a parameter. 8M
2. a) Solve $\left(y^2 e^{xy^2} + 4x^3\right) dx + \left(2xy e^{xy^2} - 3y^2\right) dy = 0$ 7M
- b) A body originally at $80^\circ C$ cools down to $60^\circ C$ in 20 minutes in the surroundings of temperature $40^\circ C$. Find the temperature of the body after 40 minutes from the original. 8M

Unit – II

3. a) Solve $\frac{d^2 y}{dx^2} + 2 \frac{dy}{dx} + 4y = 2x^2 + 3e^{-x}$ 7M
- b) Solve $y'' - 2y' + y = e^x \log x$ by the method of variation of parameters. 8M
4. a) Solve $(D^2 - 4D + 4)y = 8x^2 e^{2x} \sin 2x$ 7M
- b) Solve the method of variation parameters 8M
- $$\frac{d^2 y}{dx^2} - y = \frac{2}{1+e^x}$$

Unit – III

5. a) If m and n are positive integers, verify Rolle's theorem for the function $f(x) = (x-a)^m (x-b)^n$ in $[a, b]$ 7M
- b) If $x + y + z = u$; $y + z = uv$; $z = uvw$, then evaluate $\frac{\partial(x, y, z)}{\partial(u, v, w)}$ 8M
6. a) Verify Cauchy's Mean value theorem for the function $f(x) = e^x$; $g(x) = e^{-x}$ in $[a, b]$ 7M
- b) Obtain the Radius of curvature of the curve asteroid $x^{2/3} + y^{2/3} = a^{2/3}$ 8M

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Unit – IV

7. a) Find the Laplace transform of $te^{-2t} \cosh 3t$ 8M
b) Find $L^{-1} \log\left(\frac{s+1}{s-1}\right)$ 7M
8. Solve by the method of Laplace transforms, the equation $y''' + 2y'' - y' - 2y = 0$ given $y(0) = y'(0) = 0$ and $y''(0) = 6$ 15M

Unit – V

9. a) Find the constants a and b so that the surfaces $x^2 + ayz = 3x$ and $bx^2y + z^3 = (b-8)y$ are orthogonal at the point $P(1,1,-2)$ 8M
b) Find the constants a, b, c so that the vector field $\vec{f} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$ is irrotational 7M
10. Verify Green's theorem for $\int_C [(xy + y^2)dx + x^2dy]$ where C is bounded by $y = x$ and $y = x^2$ 15M

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VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

TECHNICAL ENGLISH

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

Date : 21 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- 1 a) Outline C V Raman's major contributions to the field of science. 10M
 b) Do as directed: 5M
 i. Write the antonym for the word : Interest
 ii. Write the synonym for the word : Genuine
 iii. Add a prefix to the word 'fit' to form a new word
 iv. Choose the appropriate word : The University _____ on him an honorary doctorate. (Conferred / confirmed)
 v. Correct the error : Let's have the lunch together tomorrow
- 2 a) Service to Man is service to God. Elaborate how this statement is suitably applicable for Mother Teresa. 10M
 b) Do as directed: 5M
 i. Write the antonym for the word : Grace
 ii. Write the synonym for the word : tribute
 iii. Write the word substitute : belief that there is only one god
 iv. Use this phrasal verb in your sentence : Give in
 v. Correct the sentence : He resembles to his mother

Unit – II

- 3 a) Who is a connoisseur? Do you think Miss Krishna is a connoisseur? Justify your answer 10M
 b) Do as directed: 5M
 i. Write the antonym for the word : reveal
 ii. write the synonym for the word : Perverse
 iii. Construct a sentence with a demonstrative adjective
 iv. Correct the sentence : I have few money to spend
 v. Give the adjective form for the word : Frequency
- 4 a) What was Pitroda's contribution to the Indian Telecom industry? Elaborate. 10M
 b) Do as directed: 5M
 i. Write the meaning for the word : exorbitant
 ii. frame a sentence using : let down
 iii. Write one-word substitute : Doubting the goodness of people
 iv. The Tsunami is 2004 _____ large areas of southern India. Use the right word (effect / affect)
 v. Write the antonym : Continue

Unit – III

- 5 a) Summarize in your own words the story 'Bubbling well road'. 10M
b) Do as directed: 5M
- i. Use the right option : Karan is an _____ director.
Imminent / eminent
 - ii. Write the meaning for the word : Hamlet
 - iii. Write one word substitute : Study of birds
 - iv. Frame a sentence using the idiom : have second thoughts
 - v. Use an adverb in your sentence : we go to the park
- 6 a) Summarize Martin Luther King's dream. 10M
b) Do as directed: 5M
- i. Write the synonym for the word : momentous
 - ii. Write one word substitute : one who is present everywhere
 - iii. Use this idiom phrase : Figure out
 - iv. Use question tag : you are tired, _____?
 - v. Correct the sentence : They doesn't seem honest

Unit – IV

- 7 a) Write a letter of complaint to the Vice-Chancellor of your university (you are a student of that university) on some irregularity in the examinations conducted recently. 8M
b) Write a memo to your superior requesting permission to upgrade the machinery in your department as the present ones are hazardous to health. 7M
- 8 a) Write an E-mail to your friend asking him to participate in a workshop that your department has arranged. 8M
b) Apply for the post of software engineer to any company of your choice. 7M

Unit – V

- 9 What is a report? State the main points to be considered in drafting a report. Write a sample report on any topic. 15M
- 10 Imagine you were the convener of a workshop arranged in your department. Submit a report to the academic registrar. 15M

Hall Ticket No

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Question Paper Code : A1002



VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

ENGINEERING PHYSICS

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

Date : 21 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

1. a) Explain with suitable examples the ionic, covalent, metallic and Vander – Waal's bonding in solids. 8M
- b) Discuss structure of NaCl and calculate the spacing between Na^+ and Cl^- ions in it. Molecular weight of NaCl is 58.45 and its density is 2180 kgm^{-3} . 7M
2. a) With lattice parameters draw the seven crystal systems. 7M
- b) Write a short notes on bonding in crystals. 5M
- c) Calculate atomic radii for the three types of cubic crystals in terms of the lattice constant. 3M

Unit – II

3. a) Derive Bragg's law of X-ray diffraction. Discuss powder method of crystal structure determination with figures. 10M
- b) Explain Sol-gel method of synthesis of nano materials. 5M
4. a) Discuss the synthesis of nano materials by pulsed laser vapour deposition technique. Mention its advantages over other methods. 8M
- b) Define Miller indices and write the steps to find Miller indices. Draw the planes $(\bar{1}32)$ and (111) inside a unit cell. 7M

Unit – III

5. a) Set up one dimensional, time independence Schrodinger wave equation. Discuss the probability curves for ground and first excited states of a one dimensional potential well of infinite height and of width L m. 10M
- b) Explain the properties of matter waves. Calculate the wavelength of radiation required to excite and electron from ground state to third excited state of an one dimensional potential well of infinite height and of width 4 nm. 5M
6. a) Discuss the origin of energy band formation based on Kronig-Penny model. 6M
- b) Explain wave particle dualism. Discuss with neat diagrams, the G P Thompson experiment to establish de Broglie hypothesis. 10M

Unit – IV

7. a) Define intensity of polarization and discuss any three types of polarization mechanisms with pictorial representations. 7M
- b) Discuss hard and soft magnetic materials based on hysteresis curve and write any one application of each of them. 8M

Cont...2

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8. a) Briefly explain the origin of magnetism and discuss the classification of magnetic materials based on their susceptibilities. 7M
- b) Explain Meissner effect. 4M
- c) The number of atoms in unit volume of hydrogen gas is 9.8×10^{26} . Radius of hydrogen atom is 0.53 \AA . Calculate the polarizability and relative permittivity. 4M

Unit – V

9. a) Explain induced absorption, spontaneous emission and stimulated emission with figures. 7M
- b) Arrive at the conditions for laser action. 4M
- c) Calculate numerical aperture and acceptance angle for an optical fiber of core RI = 1.53 and clad RI = 1.46. The fiber is kept in water of RI = 1.33. 4M
10. a) Define attenuation and write the equation for attenuation in an optical fiber. Discuss any three reasons for attenuation in an optical fiber. 8M
- b) Calculate the temperature at which the ratio of populations of two energy levels separated by an energy 5 eV is 10^{-38} . 3M
- c) Explain graded index and step index fibers with refractive index profiles. 4M

Hall Ticket No

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Question Paper Code : A1003



VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

(Regulations: VCE-R11)

ENGINEERING CHEMISTRY

(Common to Electrical and Electronics Engineering, Mechanical Engineering, Aeronautical Engineering, Civil Engineering)

Date : 24 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- 1 a) What is a fuel cell? Mention its advantages. How it differs from a conventional battery? 8M
- b) Derive Nernst equation for single electrode potential of an electrode. 7M
- 2 a) Explain the construction and the working of Lead-acid battery. Write the electrode reactions during charge and discharge of battery. 8M
- b) The emf of a cell $Mg|Mg^{2+}(0.01)||Cu^{2+}(0.01)|Cu$ is measured to be 2.78V at 298K. Calculate the electrode potential of copper electrode if standard electrode potential of Magnesium electrode is -2.371V. 7M

Unit – II

- 3 a) How do you estimate temporary hardness of water by EDTA method? 7M
- b) What is potable water? Describe the desalination of water by reverse osmosis. 8M
- 4 a) Compare zeolite method with ion exchange method in softening of water. 10M
- b) The hardness of 10,000 liters of water sample was completely removed by zeolite softener. The zeolite softener required 60 ml of NaCl containing 1.5kg/liter of NaCl for regeneration. Calculate the hardness of the water sample. 5M

Unit – III

- 5 Give the preparation method and applications of following polymer 15M
 - i). PVC
 - ii). Nylon (6, 6)
 - iii). Buna - S Rubber
 - iv). Thiokol Rubber
 - v). Teflon
- 6 a) Differentiate Lyophilic and Lyophobic colloids. 7M
- b) How vulcanization is done? What are the merits of vulcanized rubber? 8M

Unit – IV

- 7 What are the various fractions obtained during refining of petroleum? Mention their composition, boiling point range and applications. 15M
- 8 a) Discuss ultimate analysis of coal. 10M
b) A fuel contains Carbon = 90%, Hydrogen = 6 %, Sulphur = 2.5%, Oxygen = 1.0%, and Ash = 0.5%. Calculate the amount of air required for complete combustion of 1kg of fuel. 5M

Cont...2

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Unit – V

- 9 What are the different types of refractories? Discuss the importance of the following characteristics of a refractory: 15M
- i). Strength
 - ii). Refractoriness
 - iii). Chemical inertness
- 10 Draw phase diagram for Silver-Lead system and answer the following. 15M
- i). Define eutectic point and indicate it on the phase diagram
 - ii). Explain how degree of freedom is zero at eutectic point
 - iii). What is the eutectic composition of a Silver-Lead system
 - iv). Explain the changes taking place when a mixture with 80% lead is cooled from $900^{\circ}C$ to $200^{\circ}C$ at constant pressure.

Hall Ticket No

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Question Paper Code : A1004



VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations December - 2013

(Regulations: VCE-R11)

ENVIRONMENTAL SCIENCE

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

Date : 24 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- | | | |
|---|---|----|
| 1 | a) Discuss the concept of sustainable development and its relevance. | 8M |
| | b) Discuss tidal energy as a potential source of energy. | 7M |
| 2 | a) Define desertification. Enumerate the main reasons of desertification, its effects and control measures. | 8M |
| | b) Elaborate on Ecological perspectives of biofuels. | 7M |

Unit – II

- | | | |
|---|---|----|
| 3 | a) Discuss flow of energy in an ecosystem. | 8M |
| | b) India is a mega biodiversity nation. Identify the factors that substantiate the statement. | 7M |
| 4 | a) Nations rich in biodiversity are the most sought after tourist places. Explain the values of biodiversity. | 8M |
| | b) Explain the process of ecological succession. | 7M |

Unit – III

- | | | |
|---|--|----|
| 5 | a) Air is a vital and essential natural resource for all living organisms that is getting polluted. Analyze the causes, effects and controlling measures of air pollution. | 7M |
| | b) What is Rain Water Harvesting? Give the objectives and give the methods of Rain Water Harvesting with an case study. | 8M |
| 6 | a) Describe the sources, effects and methods for controlling thermal pollution. | 7M |
| | b) State the ill effects due to Green house Gases, acid rain, climatic changes in the atmosphere. | 8M |

Unit – IV

- | | | |
|---|--|-----|
| 7 | Write short notes on:
i). Clean development mechanism
ii). Carbon Foot print
iii). Polluter pays principle
iv). Nanotechnology | 15M |
| 8 | a) What is the role of Information Technology in protecting the environment and human health? | 8M |
| | b) Explain the concept of Green Building. | 7M |

Unit – V

- | | | |
|----|--|----|
| 9 | a) Write a brief account on Environmental Ethics. | 7M |
| | b) Discuss the highlights of Indian Forest Conservation Act. | 8M |
| 10 | a) Define Environmental Impact Assessment and explain its importance in environmental studies. | 8M |
| | b) Discuss the salient features of Environment Protection Act, 1986. | 7M |

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VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations December - 2013
(Regulations: VCE-R11)

COMPUTER PROGRAMMING

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

Date : 27 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- | | | |
|----|---|-----|
| 1. | a) What do you mean by algorithm? Design a flowchart to find the largest of three numbers. | 8M |
| | b) What is an identifier? Highlight the different rules to be followed to write valid identifiers in C programming language. | 7M |
| 2. | a) With the aid of a block diagram discuss the basic hardware units of a computer system. | 12M |
| | b) Let $a = 15.0, b = 6.0, c = 4.0, x = 3.0, y = 4.0$, What is the result of the expression $(a - 5.5 \geq 9.5) \parallel (b < c) \&\& (x \geq y)$? | 3M |

Unit – II

- | | | |
|----|---|----|
| 3. | a) Define recursion, write a recursive function to count number of vowels in the user given string. | 6M |
| | b) A class is having N number of students. Each student is writing two Mid exams and two assignment test for five subjects. Max marks for each test / exam is 30 marks. Write a C program to find topper of the class based on total max obtained in all exam/test. Total marks can be calculated by taking 50% off both the Mid exam and 30% off both assessment test. | 9M |
| 4. | a) Explain the following control statement with an example. | 6M |
| | i) else if | |
| | ii) switch case | |
| | b) Write a C program to read string from user to display the data in right angle triangle form, for example the given string is RADHA then the output should be | 9M |
| | R | |
| | A A | |
| | D D D | |
| | H H H H | |
| | A A A A A | |

Unit – III

- | | | |
|----|---|----|
| 5. | a) Explain the strcat() and strncat() library functions with the syntax and the example. | 8M |
| | b) Write a C program to read a set of characters using a pointer and to print it in the reverse order. | 7M |
| 6. | a) Character strings in C are automatically terminated by NULL character. Explain how this feature helps in string manipulations. | 7M |
| | b) Define pointer. What would be printed from the following code? | 8M |
| | <pre>void main() { int a[]={0,1,2,3,4}, *p[]={a,a+1,a+2,a+3,a+4}, **ptr=p; **ptr++; *++*ptr; printf("%d\t", **ptr); ++**ptr; }</pre> | |

```
    printf("%d",**ptr);  
}
```

Cont..2

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Unit – IV

- | | | | |
|----|----|--|----|
| 7. | a) | Define structure. With an example explain structure within structure. | 7M |
| | b) | Write a C program to illustrate the comparison of structure variables. | 8M |
| 8. | a) | Write a simple C program to illustrate the method of sending an entire structure as a parameter to a function. | 7M |
| | b) | Write a C program that prints the distinct words in its input sorted into decreasing order of frequency of occurrence. | 8M |

Unit – V

- | | | | |
|-----|----|--|-----|
| 9. | | Write a file based program to store N employees data like emp id, name, basic, da %, hra % and tax. Print the emp id, name and total salary of each employee. The total can be calculated by using the formula (total salary = basic + da + hra – tax). Then print who is the highest paid employee. | 15M |
| 10. | a) | Define types of streams. Explain about the gets() and fgets() with an example. | 9M |
| | b) | Discuss any three file attributes. | 6M |



VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations December - 2013
(Regulations: VCE-R11)

ENGINEERING MECHANICS

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

Date : 27 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

UNIT-I

1. a) State and Explain 'Triangle law of forces' with neat sketches. 8M
- b) An electric light fixture weighing 50N hangs from point C by two strings AC and BC as shown in fig.1 using Lami's theorem or otherwise determine the forces in the strings AC and BC. 7M

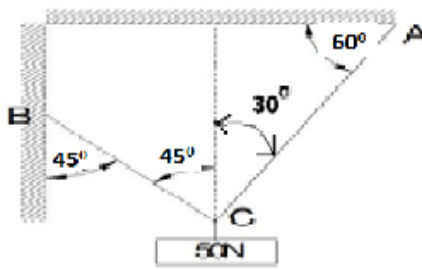


Fig.1

2. A string ABCDE whose end A is fixed, has weights W_1 and W_2 attached to it at B and C and passes round a smooth peg at D carrying a weight of 800N at the free end E fig.2. If in a state of equilibrium, BC is horizontal and AB and CD make angles 150° and 120° respectively with BC, find 15M
 - i). The tensions in portions AB, BC, CD and DE of the string.
 - ii). The value of weights W_1 and W_2 .
 - iii). The pressure on the peg D.

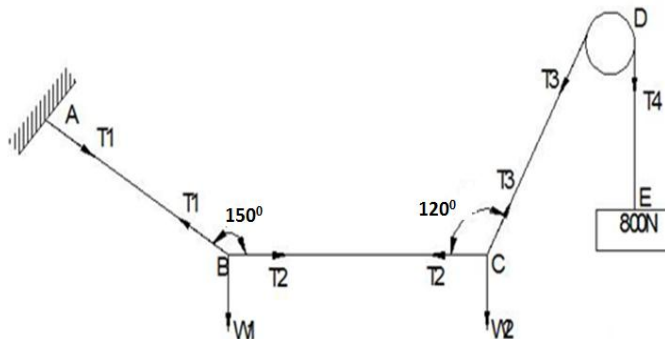


Fig.2

UNIT-II

3. A block A weighing W Newton's is placed on a rough inclined plane having $\mu=0.2$ and is held in position by means of a horizontal rod hinged to the block B which presses against a rough vertical wall having $\mu=0.4$ as shown in fig.3. If the block weighs 500N, find the minimum value of W consistent with equilibrium. 15M

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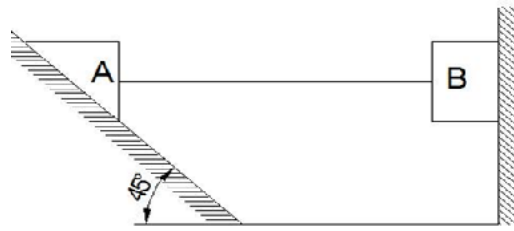


Fig.3

4. A block weighing 2500N, overlying a 10-degree wedge on a horizontal floor and leaving against a vertical wall is to be raised by applying a horizontal force to the wedge. Assume coefficient of friction between all the surfaces in contact to be 0.3, determine the minimum force (horizontal) to be applied to raise the block. 15M

UNIT-III

5. a) Differentiate between centre of gravity and centroid. Under what conditions these will coincide? 8M
b) A right circular cone of 20cm height weighs 1000N. A cone of 8cm height and 64N weight is removed from the top. Determine the distance of CG of the frustrum from the base. 7M
6. A body consists of a right circular solid cone of height 120mm and radius 100mm placed on a solid hemisphere of radius 100mm of the same material. Find the position of the CG of the body. 15M

UNIT-IV

7. Find the area moment of inertia of a T-section shown in fig.4 about XX axis passing through the CG of the section. 15M

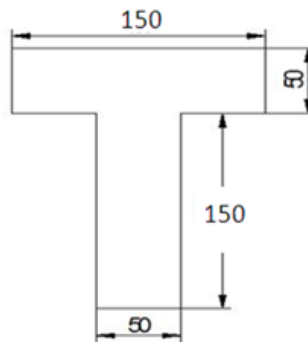


Fig.4

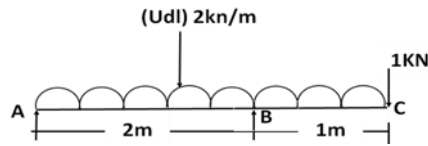
All dimensions are in mm

8. a) Determine the mass moment of inertia of a steel rectangular plate 80 x 160 mm and thickness 10mm about the centroidal axis parallel to the 80mm side. Take mass density of steel as 8000kg/m³. 7M
b) Determine the mass moment of inertia of a triangular plate of base 500mm and height 1000mm and density of the plate of the material is 7500kg/m³. 8M

Cont...3

UNIT-V

9. a) Explain the concept of virtual work 5M
b) An overhanging beam ABC of span 3m is loaded as shown in the fig.5 using the principle of virtual work, find the reactions at A and B 10M



10. a) Explain the application of the principle of virtual work on ladders. 5M
b) A uniform ladder, 5 mts long and weighting 200N, rests on a smooth floor at 'A' and against a smooth wall at 'B' as shown in fig.6. A horizontal rope PQ prevents the ladder from slipping using the principle of virtual work, determine the tension in the rope. 10M

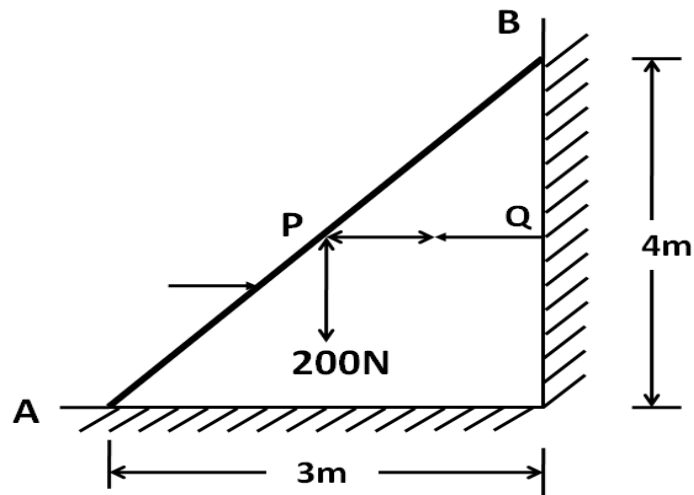


Fig.6

**VARDHAMAN COLLEGE OF ENGINEERING**
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

PROBABILITY, STATISTICS AND COMPUTATIONAL TECHNIQUES(Common to Computer Science and Engineering, Information Technology,
Aeronautical Engineering & Civil Engineering)

Date : 30 December, 2013

Time : 3 Hours

Max. Marks : 75

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

1. a) A box contains 100 cell phones, 20 of which are defective. 10 cell phones are selected for inspection. Find the probability that 8M
- i. Atleast one is defective
 - ii. Atleast three are defective
 - iii. All the ten are defective
 - iv. None of them are defective
- b) From a bag containing 4 white and 5 black balls, a man draws 3 balls at random. What are the odds in favour of they being all black? 7M
2. a) Out of 800 families with 5 children each, how many would you expect to have 7M
- i. 3 boys
 - ii. 5 girls
 - iii. Either 2 or 3 boys
 - iv. At least one boy
- b) Suppose 2% of the items of a factory are defective. Find the probability that 8M
- i. Defective items are 2
 - ii. At least 3 defective items

Unit – II

3. a) A random sample of size 81 was taken whose variance is 20.25 and mean is 32, construct 98% confidence interval. 7M
- b) A die is thrown 264 times with the following results. Show that the die is biased 8M

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

4. a) A die was thrown 9000 times and of these 3220 yielded at 3 or 4. Test whether the die was unbiased? 7M
- b) In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance 8M

Unit – III

5. a) Find the real root of the equation $x e^x - \cos x = 0$, using Newton Raphson method. 7M
- b) Find the root of the equation $x \log_{10} x = 1.2$, using False position method. 8M
6. a) Using Newton's-Forward interpolation formula, find the number of students who obtained marks between 40 and 45 from the following table: 8M

Marks:	30-40	40-50	50-60	60-70	70-80
No. of students:	31	42	51	35	31

b) Given the data

7M

$x:$	5	7	11	13	17
$f(x):$	150	392	1452	2366	5202

Find $f(9)$ using Newton's divided difference formula.

Unit – IV

7. a) Using least squares principles fit a second degree parabola to the following Data

7M

x	0	1	2	3	4
y	2.4	2.1	3.2	5.6	9.3

b) Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Trapezoidal and Simpson's 1/3 rule

8M

8. a) Fit a curve $y = ae^{bx}$ to the following data

7M

x	0	1	2	3
y	1.05	2.10	3.85	8.30

b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's 3/8 rule by dividing the range in to 6 equal parts.

8M

Unit – V

9. Use Runge-Kutta method to find an approximate value of $y(0.2)$ taken that 15M

$$y' = \frac{y-x}{y+x}, y(0) = 1.$$

10. Find $y(0.1), y(0.2), y(0.3)$ from $y' = x^2 - y, y(0) = 1$ by Taylor's series method and hence 15M
obtain $y(0.4)$ using Adam-Bashforth method.

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VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Supplementary Examinations, December - 2013

(Regulations: VCE-R11)

COMPUTATIONAL TECHNIQUES

(Mechanical Engineering)

Date : 30 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

Unit – I

- Using Bisection method find an approximate root of the equation $x^3 - 7x + 5 = 0$ that lies between 0.5 and 1. Carry out computations up to the 6th stage. 7M
 - Apply Gauss – Seidel iteration method to solve the equations, carry out 3 iterations. 8M
 $10x_1 + x_2 + x_3 = 12, 2x_1 + 10x_2 + x_3 = 13, 2x_1 + 2x_2 + 10x_3 = 14.$
- Show that a real root of the equation $\tan x + \tanh x = 0$ lies between 2 and 3. Then apply Regula-falsi method to find third approximation. 7M
 - Solve by Jacobi's method. Perform 3 iterations. 8M
 $4x + y + 3z = 17, x + 5y + z = 14, 2x - y + 8z = 12.$

Unit – II

- Form the difference table of $f(x) = x^3 - 3x^2 + 5x + 7$ for the values of 0, 2, 4, 6, 8. 10M
Find $f(10)$ using Newton's iterative formula.
 - Prove that $\Delta \log f(x) = \log \left[1 + \frac{\Delta f(x)}{f(x)} \right]$ 5M
- If $y(1) = 3, y(3) = 9, y(4) = 30, y(6) = 132$ find Lagrange's interpolation polynomial that takes on these values. 15M

Unit – III

- Evaluate $\int_0^2 e^{-x^2} dx$ using Simpson's 1/3 rule taking $h = 0.25$ 7M
 - Find by the method of least squares the straight line that best fits the following data 8M

x	0	5	10	15	20
y	7	-11	16	20	26

- Fit a Curve from $y = ae^{bx}$ to the following data 8M

x	0	2	4
y	5.1	10	31.1

- From the following table of values of x and y, obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for $x = 1.2$ 7M

x	1.0	1.2	1.4	1.6	1.8	2	2.2
y	2.7183	3.3201	4.0552	4.953	6.0496	7.3891	9.025

Unit – IV

7. a) Use Taylor's series method to find y at the points $x_1 = 0.1$ and $x_2 = 0.2$ given that $\frac{dy}{dx} = x^2 + y^2, y(0) = 1$. 8M
- b) Using the fourth – Runge – Kutta method, solve the equation $y' = x + y^2, y(0) = 1$ at the points $x = 0.1$ and $x = 0.2$ in steps of 0.1. 7M
8. a) Using Euler's method, solve for y at $x = 2$ from $\frac{dy}{dx} = 3x^2 + 1, y(1) = 2$ taking step size $h = 0.25$ 7M
- b) Using the Adams – Bashforth method, solve the equation $\frac{dy}{dx} = \frac{1}{2}xy$ at the point $x = 0.4$ given that $y(0) = 1, y(0.1) = 1.0025, y(0.2) = 1.0101, y(0.3) = 1.0228$ 8M

Unit – V

9. Find the numerical solution of the parabolic equation $\frac{\partial^2 u}{\partial x^2} = 2 \frac{\partial u}{\partial t}$ when $u(0,t) = 0 = u(4,t)$ and $u(x,0) = x(4-x)$ by taking $h = 1$. Find the values upto $t = 4$. 15M
10. Solve the Laplace's equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ for $0 < x < 1, 0 < y < 1$, given that $u(x,0) = u(0,y) = 0, u(x,1) = 6x, 0 < x \leq 1$ and $u(1,y) = 3y, 0 < y \leq 1$. Divide the region into 9 square meshes. 15M



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B. Tech I Semester Supplementary Examinations, December - 2013
(Regulations: VCE-R11)

BASIC ELECTRICAL ENGINEERING

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

Date : 30 December, 2013

Time : 3 Hours

Max. Marks : 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

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

UNIT-I

1. a) Find current in all branches for the network shown in fig.1

6M

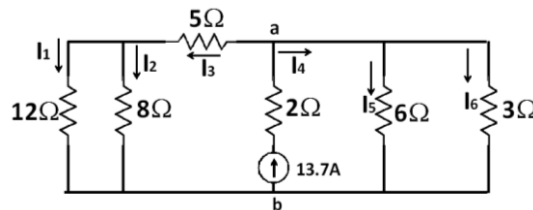


fig.1

- b) Using source transformation, replace the circuit shown in fig.2. by a practical voltage source between A & B

9M

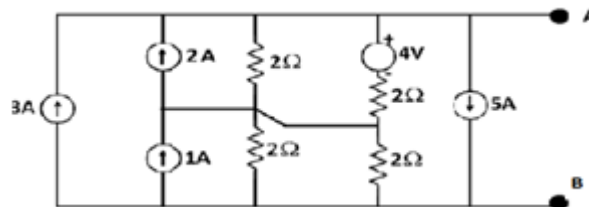


fig.2

2. a) Write the concept of source transformation technique with suitable examples.
b) Determine the current in resistor 10Ω in the circuit given in fig.3 and find Vs.

8M

7M

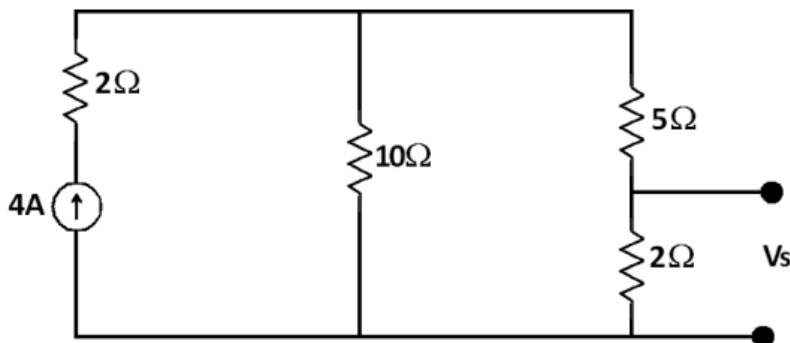


fig.3

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UNIT-II

3. a) Explain super mesh and super node analysis. 7M
b) Using Nodal Analysis, find voltages V_1 and V_2 in the network in Fig 4(b) 8M

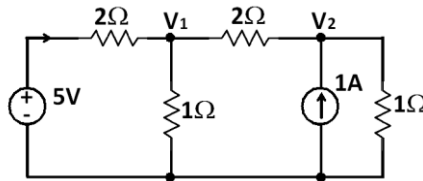


Fig 4(b)

4. a) Deduce the expressions used in conversion of Y to Δ and Δ to Y transformations. 5M
b) Determine the equivalent resistance between the terminals A & B for the network shown in fig.5 10M

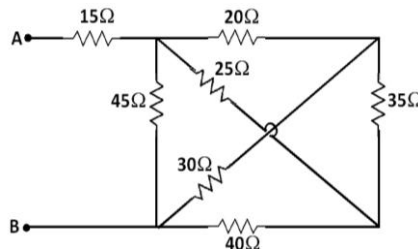


fig.5

UNIT-III

5. a) Define power factor, frequency, phase and phase difference of AC quantities with neat sketches. 8M
b) An alternating voltage of $V = 100 \sin 376.8t$ is applied to a circuit consisting of a coil having a resistance of 6 ohm and an inductance of 21.22mH 7M
i. Find the expression for instantaneous current
ii. Calculate the RMS voltage, real power and frequency
6. a) Derive the expression for the resonant frequency of a parallel AC circuit. Draw the relevant circuit diagram. 7M
b) A coil having 6 Ohm resistor and inductance of 25.5mH is energized from 440V, 50Hz supply calculate the current to make the overall p.f. to unity what value of capacitor is to be connected is parallel with the coil. Draw the vector diagram. 8M

UNIT-IV

7. a) Explain and derive the expression for self inductance and mutual inductance. 5M
b) A circuit has 800 turns enclosing a magnetic circuit 15cm^2 in section. With 5A flowing in the circuit, the flux density is 0.8 wb/m^2 and with 10A the flux density increases to 1.2 wb/m^2 . Find 10M
i. The mean value of the inductance between these current limits.
ii. The induced emf when the current falls uniformly from 10A to 5A in 0.04 sec.
8. a) Compare electric and Magnetic circuits. 5M
b) A cast steel electromagnetic has an air gap length of 3mm and an iron path of length 40 cm. Find the number of ampere – turns necessary to produce a flux density of 0.7 wb/m^2 in the gap. Neglect leakage and fringing. (consider $H = 660 \text{ At/m}$ for $B = 0.7 \text{ wb/m}^2$) 10M

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UNIT-V

9. a) Explain graph , tree, tie set and cut set with example. 8M
b) What are Z parameters of a 2 port network. Find the Z parameters of the 2 port circuit shown in fig.6 7M

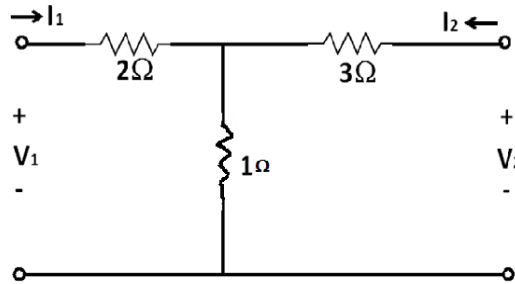


fig.6

10. a) Write short notes on: 7M
i. H parameters
ii. ABCD parameters
b) Obtain the dual of the network shown in fig.7 8M

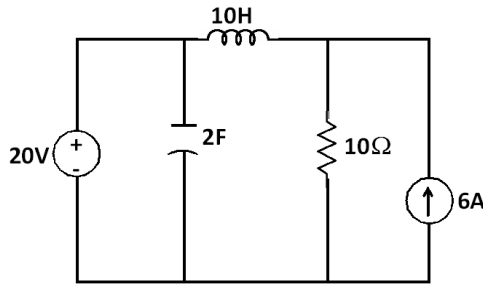


fig.7