VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
ENGINEERING DRAWING
(Common to Mechanical Engineering, Aeronautical Engineering & Civil Engineering)

Date : 1 February, 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) The distance between Bombay and Pune is 180 km. A passenger train covers this distance in 6 hours. Construct a plain scale to measure time upto a single minute. The representation factor of the scale is 1/200000. Find the distance covered by the train in 36 minutes.   9M

   b) Construct angles of 47° and 125° by means of the scale of chords.   6M

2. Trace the paths of the ends of a straight line AP 100 mm long when it rolls, without slipping, on a semi-circle having its diameter AB 75 mm long. Assume the line AP to be tangent to the semi-circle in the starting position.   15M

Unit – II

3. The top view of a 75mm long line AB measures 65mm, while the length of its front view is 50mm. Its one end A is in the H.P and 12mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P and the V.P.   15M

4. The end P of a line PQ 130mm long, is 55mm in front of the V.P. The H.T of the line is 40mm in front of the V.P and the V.T is 50mm above the H.P. The distance between the H.T and V.T is 110mm. Draw the projections of the line PQ and determine its angles with the H.P and the V.P.   15M

Unit – III

5. A regular hexagonal lamina of side 25mm is lying in such a way that one of its corners is on HP while the corner opposite to the corner on which it rests is on VP. If the lamina makes 60⁰ to HP, Draw the projections of the lamina.   15M

6. A pentagonal prism is resting on one of the corners of its base on the HP. The longer edge containing that corner is inclined at 45° to the HP, the vertical plane containing that edge and the axis are inclined at 30° to the VP. Take the side of base 45mm and height 70mm. Draw the projections of the solid.   15M

Unit – IV

7. A pentagonal pyramid, base 30 mm side and axis 65 mm long, has its base horizontal and an edge of the base parallel to the VP. A horizontal section plane cuts it at a distance of 25 mm above the base. Draw its front view and sectional top view.   15M

8. A cylinder of 40 mm diameter, 60 mm height and having its axis vertical, is cut by a section plane, perpendicular to VP, inclined at 45° to HP and intersecting the axis 32mm above the base. Draw its front view, sectional top view, sectional side view and true shape of the section.   15M

Unit – V

9. A pentagonal pyramid, side of base 30mm and height 52mm, stands with its base on HP   15M
   and an edge of the base is parallel to VP. It is cut by a plane perpendicular to VP, inclined
   at 40° to HP and passing through a point on the axis, 32mm above the base. Draw the
   sectional top view and develop the lateral surface of the truncated pyramid.

10. Draw the development of the lateral surfaces of the cone of base diameter 50 mm and axis   15M
    60 mm long when it is resting with its base on HP. It is cut by a section plane which is
    perpendicular to VP and inclined at an angle of 60° to HP and bisects the axis.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
MATHEMATICS - I
(Common for All Branches)

Date : 3 February, 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) Solve $\cos^2 x \dfrac{dy}{dx} + y = \tan x$ 8M

    b) Find the orthogonal trajectories of the family of cardioid $r = a(1 - \cos\theta)$ 7M

2. a) Solve $(e^y + y\cos xy)dx + (xe^y + x\cos xy)dy = 0$ 7M

    b) A bacterial population B is known to have a rate of growth proportional to B itself. If   8M
    between noon and 2 PM the population triples, at what time, no controls being
    exerted, should B become 100 times what it was at noon?

Unit – II

3. a) Solve $\left(D^2 - 1\right) y = \left(1 + e^{-x}\right)^2$ 7M

    b) Solve $y'' + 2y' + 2y = e^{-x}\sec^3 x$ by the method of variation of parameters.   8M

4. Determine q and i in an LCR circuit with L=0.5H, R=6Ω, C=0.02, $e = 24\sin 10t$ and initial   15M
    condition $q = i = 0$.

Unit – III

5. a) Employ Lagrange's mean value theorem, prove that   8M

    $\dfrac{b-a}{\sqrt{1-a^2}} < \sin^{-1} b - \sin^{-1} a < \dfrac{b-a}{\sqrt{1-b^2}}$, where $a < b < 1$ and deduce that

    $\dfrac{\pi}{6} + \dfrac{1}{5\sqrt{3}} < \sin^{-1}\left(\dfrac{3}{5}\right) < \dfrac{\pi}{6} + \dfrac{1}{8}$.

    b) If $x = r\cos\theta$, $y = r\sin\theta$ find $J = \dfrac{\partial(x,y)}{\partial(r,\theta)}$ and $J' = \dfrac{\partial(r,\theta)}{\partial(x,y)}$ and verify that $JJ' = 1$.   7M

6. a) Evaluate $\displaystyle\int_0^3 \int_0^{\sqrt{4-y}} (x+y)\, dx\, dy$ by changing the order of integration.   7M

    b) Find the radius of curvature at any point of the curve   8M
    $x = a(\theta + \sin\theta),\ y = a(1 - \cos\theta)$

Unit – IV

7. a) i.   Find $L\{t^2 \sin at\}$ 3M

    ii. Find $L\left\{\displaystyle\int_0^t e^{2t}\,\frac{\sin at}{t}\,dt\right\}$ 4M

    b) Express $f(t) = \begin{cases} \cos t, & 0 < t \le \pi \\ 1 & , & \pi < t < 2\pi \\ \sin t, & t > 2\pi \end{cases}$ in terms of Heaviside step function and hence find   8M

        its Laplace transform.

8. Using Laplace transforms solve, $y'' + 2y' - 3y = \sin t$, given $y(0) = 0,\ y'(0) = 0$.   15M

Unit – V

9. a) Find $div\vec{F}$ and $curl\vec{F}$ if $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$, where ∇ is gradient.   7M

    b) Show that $\vec{F} = (y^2 \cos x + z^3)\vec{i} + (2\,y\sin x - 4)\vec{j} + (3xz^2 + 2)\vec{k}$ is irrotational. Find φ 8M

        such that $\vec{F} = \nabla\varphi$

10. Verify Green's theorem for $\displaystyle\int_C \left[(y - \sin x)\,dx + \cos x\,dy\right]$ where C is the plane triangle   15M

    enclosed by the lines $y = 0,\ x = \dfrac{\pi}{2},\ y = \dfrac{2x}{\pi}$.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
TECHNICAL ENGLISH

(Common to Computer Science and Engineering, Information Technology,
Aeronautical Engineering & Civil Engineering)

| Date : 5 February, 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) C.V.Raman's determination, spirit and contributions will indeed remain special within the context of the practice of science in India. Justify this statement in your own words.   10M

    b) Do as directed: 5M
    i.   Frame a sentence with the phrase   : Carry on
    ii. Fill in the blank with Article: _____ Judge should always be objective and fair
    iii. Use prefix to complete the sentence: the pain has become_____ (tolerable)
    iv. Use possessive pronoun   : You can use _____ umbrella
    v.   Correct the error   : Have you been to north-eastern states?

2. a) Mother Teresa's services for the poor and the down trodden are remarkable. Elaborate the statement.   10M

    b) Do as directed: 5M
    i.   Give the synonym   : abandon
    ii. Form a new word by adding a prefix   : reach
    iii. Give the meaning for the idiom   : one's cup of tea
    iv. Frame a sentence with the phrasal verb   : get over
    v.   A doctor's _____ should not be ignored. Use the right word : advise / advice

Unit – II

3. a) Comment on the tile of the lesson 'The Connoisseur'.   10M
    b) Use suffixes to the given words to form new words: 5M
    i.   Bride
    ii. Wise
    iii. Love
    iv. King
    v.   Human

4. a) Give a brief account of Sam Pitroda's Contribution to IT industry.   10M
    b) Fill in the blanks: 5M
    i.   Kabaddi, _____ typical Indian game, is _____ sporting version of pranayama. (use suitable articles)
    ii. The train was scheduled to leave _____ 8 pm and we were there _____ 7:30 pm (use suitable prepositions)
    iii. I maintain a daily _____ (diary /dairy)

Unit – III

5. a) The writer keeps a secret promise to himself before he leaves the village. Bring out the hidden mystery in the story 'Bubbling well Road'. **10M**

b) Correct the error in the given sentences: **5M**
   i. He told me that where my friend was
   ii. His trouser were torn
   iii. She stays besides the market
   iv. I should focus on my carrier
   v. Your information are wrong

6. a) Elaborate the key statements in the historic speech given by Martin Luther King. **10M**

b) Do as directed: **5M**
   i. Give one word substitute   : Study of speech sounds
   ii. Fill in the blanks   : You're tired, _____?
   iii. Use the right word : The office works on all days _____Sundays.
                                            (accept/except)
   iv. Give the meaning of the idiom   : to spill the beans
   v. Correct the error   : They doesn't know about it

Unit – IV

7. a) Assume that you are the manager of an organization. Draft a memo to an employee stating about his negligence in completing the tasks within the stipulated time. **8M**

b) Write a letter to the administrative office of an organization stating your acceptance for the job offered to you. Assume details. **7M**

8. a) Write an e-mail of complaint to the General Manager of the BSNL for delay in providing Broadband Internet connection to your house. **8M**

b) Draft a job Application letter for the post of software Developer in IGEF Pvt. Limited, Bangalore. Assume necessary information. **7M**

Unit – V

9. As a student representative of the class, submit a report to the principal on the ongoing classes for your batch. The report should cover subjects taught, curriculum, outcome, students' response and suggestion for better implementation. **15M**

10. Write a report on the recent college Annual Athletic meet in your college. Give all the details. **15M**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
ENGINEERING PHYSICS
**(Common to Electronics and Communication Engineering,
Electrical and Electronics Engineering & Mechanical Engineering)**

Date : 5 February, 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) Identify the type of bonding in CsCl, Ge and Ag. Explain their properties based on the type of bonding.   9M

   b) Calculate the bond energy of NaCl molecule. Given equilibrium spacing between Na^+ and Cl^- ions is 0.24 nm, Ionization energy is 5.1eV and Electron affinity is 3.6eV.   6M

2. a) Define Packing factor and coordination number. Draw neat diagrams of b.c.c. and h.c.p. structures, obtain the packing factor and coordination number for b.c.c.   8M

   b) Explain with a neat diagram the structure of NaCl.   7M

Unit – II

3. a) Derive the expression for inter planar spacing in terms of Miller indices. In a tetragonal lattice a=b=0.25nm and c= 0.18nm. Calculate the spacing between (1 1 1) planes.   8M

   b) Explain pulsed laser vapor deposition method with a neat sketch. What are its advantages?   7M

4. a) A crystal plate is mounted on an X-ray spectrometer. The glancing angles of incidence for three reflections are 5°58', 12°01' and 18°12'. Show that these are successive orders of reflection from the same crystal plane. Also, find the interplanar spacing, given the wavelength of incident X-rays is 0.586 nm.   7M

   b) Distinguish between top down and bottom up methods. Describe combustion method for preparation of nano powders.   8M

Unit – III

5. a) The results of Davison – Germer experiment confirms deBroglie hypothesis. Justify your answer.   8M

   b) Discuss the concept of wave particle duality.   7M

6. a) Using the energy band model, describe the classification of metals, semiconductors and insulators.   8M

   b) What are Bloch functions? How it is different from the free electron wave function?   7M

Unit – IV

7. a) Explain the origin of electronic polarization? Does this polarization occur in all materials? Explain the Hysteresis behavior of ferroelectric materials.   8M

   b) Sulphur is elemental solid dielectric whose dielectric constant is 3.4. Calculate the electronic polarization if its density is 2.07×10^3 kg m^{-3} and atomic weight is 32.07.   7M

8. a) With the help of suitable diagram explain Meissner's effect. Explain hysteresis of magnetic materials.   8M

   b) Find the relative permeability of a ferromagnetic material if field of strength 220 amp/meter produces a magnetization of 3300 amp/meter in it.   7M

Unit – V

9. a) Obtain an expression for energy density in terms of Einstein's coefficients. Prove that the probability of the process of stimulated emission is same as the probability of the process of absorption.   7M

    b) Discuss the functioning of a semiconductor laser with a help of band diagram.   8M

10. a) Draw refractive indices profiles for multimode step index and graded index fibers.   6M

    b) The refractive index of the cladding of an optical fiber is 1.49 and the fractional index change is 0.002. Calculate the refractive index of the core and the acceptance angle in water (refractive index of water is 1.33).   9M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
ENGINEERING CHEMISTRY
(Common to Electronics and Communication Engineering,
Electrical and Electronics Engineering & Mechanical Engineering)

Date : 7 February, 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 secondary cells? Explain the construction and working of a Nickel - Cadmium cell.   7M

    b) Define equivalent conductance. The solubility product of SrF_2 in water is 8×10^{-12}. Calculate the solubility in 0.1 M SrF_2 solution.   8M

2. a) State Kohlrausch's law of independent migration of ions. Discuss how it can be used in the determination of the equivalent conductivity of a weak electrolyte.   8M

    b) Define a battery. Describe in brief a lead- acid battery.   7M

Unit – II

3. a) What is hard water? What are the disadvantages of hard water in domestic requirements?   7M

    b) Explain Ion exchange method of softening of hard water. What are its merits and demerits?   8M

4. a) What is reverse osmosis? Describe reverse osmosis method of desalination of brackish water.   8M

    b) 1 gm of $CaCO_3$ is dissolved in 1 litre of water to prepare the standard hard water. 50 ml of this water requires 18 ml of EDTA solution and 9 ml EDTA after boiling and filtration. Calculate temporary, permanent and total hardness of water.   7M

Unit – III

5. a) What are nanomaterials? Describe Solvo thermal method for preparation of ZnO nano material.   6M

    b) Give preparation method and uses of following polymers: 9M
        i.   PVC
        ii. Nylon (6, 6)
        iii. Thiokol rubber

6. a) Explain the following properties of colloids: 9M
        i.   Electrophoresis
        ii. Tyndal effect
        iii. Brownian movement

    b) What are plastics? Distinguish between thermoplastics and thermosetting plastics.   6M

Unit – IV

7. a) Discuss the relative merits and demerits of solid, liquid and gaseous fuels. 7M
    b) Write the significance of proximate and ultimate analysis of coal. 8M
8. a) What is petroleum? Discuss the refining of petroleum. 12M
    b) Explain the calorific value of a fuel. 3M

Unit – V

9. a) With the help of Gibb's phase rule, calculate the degree of freedom of the following 7M
        systems:
        i.   Ice and water in equilibrium
        ii. Silver and lead at eutectic point
    b) Define the reduced phase rule. With the help of a neat labeled diagram, describe the 8M
        phase diagram of lead-silver system.
10. a) What are refractories? Classify refractories based on their chemical properties. Write a 8M
        short note on the thermal conductivity of a refractory.
    b) Write a note on setting and hardening of cement. 7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)

ENVIRONMENTAL SCIENCE

**(Common to Computer Science and Engineering, Information Technology,
Aeronautical Engineering & Civil Engineering)**

Date : 7 February, 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 Environment. Bring out how Environmental Science is considered Multidisciplinary as well as an interdisciplinary subject. | 8M
   b) Differentiate between renewable and non-renewable resources. Give examples for both renewable and non-renewable resources. | 7M
2. a) Write about Forests as resources and explain the major causes, consequences of deforestation. | 8M
   b) What is a mineral? What are the uses of Mineral Resources in our daily life? | 7M

Unit – II

3. a) What is meant by ecological succession? Mention how initiation of succession happens and explain the types of succession. | 7M
   b) Explain the concepts on: | 8M
      i. food web
      ii. food chain
4. a) Define biodiversity and explain the threats to biodiversity. | 8M
   b) Explain the structure and function of an ecosystem. | 7M

Unit – III

5. a) Define water pollution and describe the ill effects of pollutants on water bodies. | 8M
   b) Explain the various sources of noise pollution and list out its control methods. | 7M
6. a) Explain the management of solid waste in an urban area. | 7M
   b) What is Global Warming? List out the effects of Global Warming on environment. | 8M

Unit – IV

7. a) Discuss the role of information technology in environment and human health with an example. | 8M
   b) What is meant by 'Polluter Pay Principle'? | 7M
8. a) What are the approaches to green computing? | 8M
   b) What is meant by green building concept? | 7M

Unit – V

9. a) Write about Indian Forest Act and briefly mention about its salient features. | 8M
   b) Write about Environmental Ethics. | 7M
10. a) How NGOs are creating environmental awareness in India. | 8M
    b) What is meant by Environmental Impact Assessment and write about its importance? | 7M

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
PROBABILITY, STATISTICS AND COMPUTATIONAL TECHNIQUES
(Common to Computer Science and Engineering & Aeronautical Engineering)

Date : 10 February, 2014　　　　Time : 3 Hours　　　　Max. Marks : 75

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

Unit – I

1. a) A coin is biased so that a head is twice as likely to appear as a tail. If a coin is tossed 6　　7M
   times, find the probabilities of getting:
   i.　Exactly 2 heads
   ii.　Atleast 3 heads
   iii.　Atmost 4 heads

   b) In an intelligence test administrated on 1000 students, the average score was 20.　　8M
   Assuming that the marks obtained by the students follow a normal distribution, find the
   number of students who have scored:
   i.　Over 90 marks
   ii.　Below 40 marks
   iii.　Between 50 and 80 marks

2. a) The probability distribution of a random variable x is given below　　　　　　7M

$X = x_i$	-2	-1	0	1	2	3
$P(X = x_i)$	0.1	K	0.2	2K	0.3	K

   i.　What will be the value of K so that $P(X \leq 0) \geq \dfrac{1}{3}$?

   ii.　Find the value of K for which the given data represent a valid probability
   distribution,　for　this　value　of　K,　find　mean,
   variance, $P(-1 \leq X \leq 2)$ and $P(X > -1)$.

   b) The probability that an individual suffers a bad reaction from a certain injection is　　8M
   0.002. Determine the probability that out of 1000 individuals:
   i.　Exactly 3 will suffer a bad reaction
   ii.　More than two will suffer a bad reaction

Unit – II

3. a) In a sample of 500 men drawn from a population it was found that 60% of them had　　7M
   over weight. What can we infer about the proportion of men having over weight in
   the population at 99% level of confidence?

   b) A die was thrown 9000 times and a throw of 5 or 6 was obtained 3240 times. On the　　8M
   assumption of random throwing, does the data indicate an unbiased die at 0.01 level
   of significance.

4. a) The nine items of a sample have the following values: 45, 47, 50, 52, 48, 47, 49, 53, 51.　　7M
   Does the mean of these items differ significantly from the assumed mean of 47.5?

   b) Enumerate the properties of t and f distribution and also state the applications of both　　8M
   the distributions.

Unit – III

5. a) Find a real root of the equation $\tan x = x$ by Regula Falsi method correct to 3 decimals. 8M
   b) Using Lagrange's interpolation formula, find a polynomial which passes through (0, -12), (1, 0), (3, 6), (4, 12). 7M

6. a) Using Newton-Raphson method, find a real root of the equation, $x \sin x + \cos x = 0$ near $x = \pi$, carryout iterations upto four decimal places where x is in radians. 7M

   b) Find $\dfrac{dy}{dx}, \dfrac{d^2 y}{dx^2}$ at $x = 1.1$ for the table below: 8M

x	1	1.2	1.4	1.6	1.8	2
y	0	0.128	0.544	1.296	2.432	4

Unit – IV

7. Evaluate $\displaystyle\int_0^6 \dfrac{dx}{(1 + x^2)}$ by 15M
   i. Trapezoidal rule
   ii. Simpson's 1/3 rule
   iii. Simpsons 3/8 rule with h=1

8. a) Derive an equation for Newton cotes quadrature formula. 7M
   b) The velocity v (kms) of a moped which starts from rest, is given at fixed intervals of time t (min) as follows. Estimate the approximate distance covered in 20 min. 8M

t	2	4	6	8	10	12	14	16	18	20
v	10	18	25	29	32	20	11	5	2	0

Unit – V

9. a) Employing Taylor's series method, find an approximate solution given $y' = 2y + 3e^x$, $y(0) = 0$ at $x = 0.1$ and $x = 0.2$. 7M
   b) By using Milne's predictor-corrector method, find an approximate solution of $y' = \dfrac{2y}{x}$, $x \neq 0$ at $x = 2$ given y(1)=2, y(1.25)=3.13, y(1.5)=4.5 and y(1.75)=6.13. 8M

10. Solve $y' = x + y^2$, $y(0) = 1$ to find y(0.4) by Adam's predictor corrector method. Starting solutions required are y(0.1), y(0.2), y(0.3) to be obtained by Taylor series method. 15M
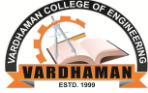
VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
BASIC ELECTRICAL ENGINEERING
(Common to Information Technology, Electronics and Communication Engineering &
Electrical and Electronics Engineering)

Date : 10 February, 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 electrical circuit? Differentiate between   8M
       i.   Active and passive elements
       ii. Independent and dependent sources
    b) Use Kirchhoff's laws, determine the currents flowing in each branch of the network   7M
        shown in fig.1.
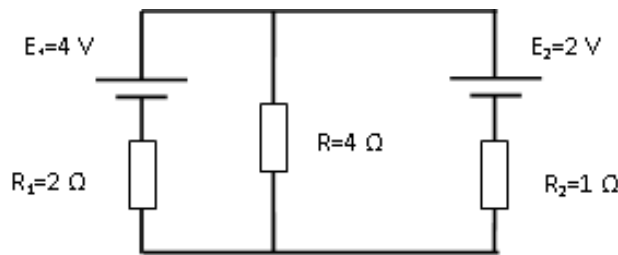
fig.1

2. a) Assume 'n' number of resistors is connected in series and entire combination is supplied   7M
        by a single DC voltage source of 'V' volts. Prove that, the voltage drop across 'n^{th}'
        resistor is directly proportional to the supply voltage 'V' volts.
    b) For the network shown in fig.2, determine the total power consumed in 0.8 Ω resistor   8M
        by source transformation method.
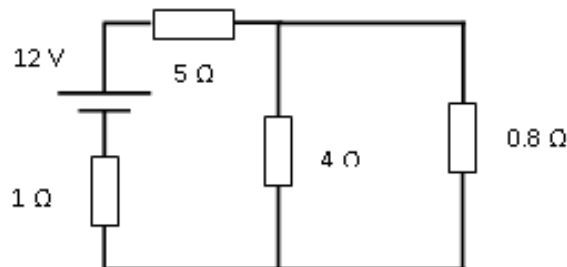
fig.2

Unit – II

3. a) A star network in which N is star point made up as follows. AN=70Ω, BN=100Ω,   7M
        CN=90Ω. Find an equivalent delta network.

    b) In the network shown in fig.3, find the current in the 10Ω resistor using nodal   8M
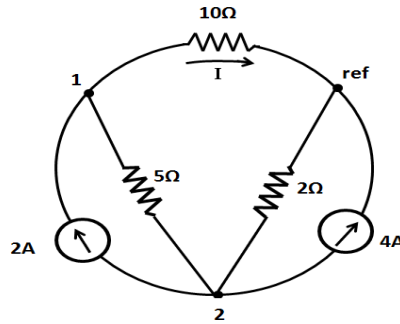   equations by inspection.

fig.3

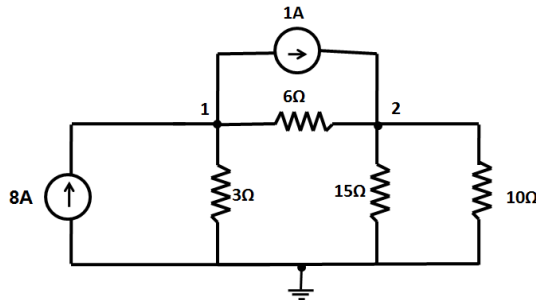4. a) Using nodal analysis, find the node voltages V_1 and V_2 in fig.4.   6M

fig.4

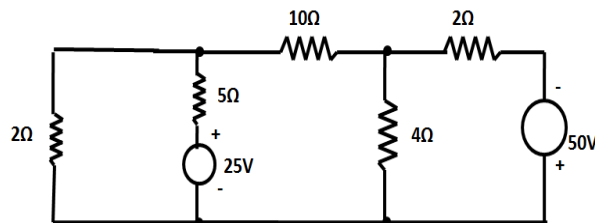   b) Write the mesh current matrix equation for the network shown in fig.5 and solve for   9M
        the currents.

fig.5

Unit – III

5. a) Find the average and effective values of   8M
        i.   Cosine wave $v(t)=V_m \cos (\omega t+\theta)$
        ii. Half-rectified sine wave

    b) The voltages across two series connected circuit elements are $v_1=100 \sin\omega t$ V and   7M
        $v_2=50 \sin (\omega t-30^0)$ V. If the circuit current is (4+j2) A, find the complex power of the
        circuit.

6. a) A capacitor C is connected in series with a 40 Ω resistor across a supply of frequency 60   7M
        Hz. A current of 3 A flows and the circuit impedance is 50 Ω. Calculate
        i.   The value of Capacitance C,
        ii. The supply voltage,
        iii. The phase angle between the supply voltage and current
        iv. The PD across the resistor and capacitor. Draw the phasor diagram.

b) A 10 Ω is in series with a 2 Ω capacitive reactance and the combination is connected across a 5 Ω resistor. If the input current to this combination is $10\lfloor 0^0$ A. Find the power factor of the circuit. **8M**

Unit – IV

7. a) Obtain an expression for coefficient of coupling. **7M**
   b) A solenoid has 1200 turns and carries a current of 2A.The iron core has a length of 0.4m and cross section of 80cm^2,the relative permeability 1000. Calculate self - induced emf in the solenoid, if the current is switched off in 0.01 second. **8M**

8. a) A cast steel electromagnet has an air gap length of 3mm and iron path of length 40cm. Find the number of ampere-turns necessary to produce a flux density of 0.7wb/m2 in the gap. Neglect leakage and fringing. Assume ampere turns required for air gap to be 70% of the total ampere turns. **10M**
   b) State Faraday's laws of electromagnetic induction. **5M**

Unit – V

9. a) For the resistive network shown in fig.6, draw the graph and tree of the network. Also develop the fundamental tie-set matrix **7M**
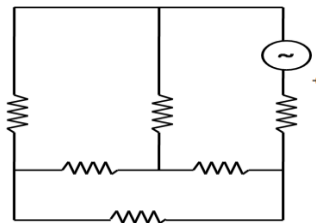

fig.6

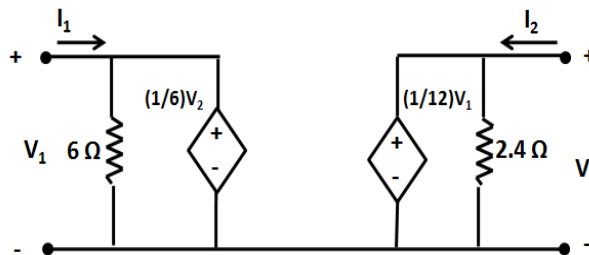b) Find the Y-parameters of the two-port network for the circuit shown in fig.7. **8M**

fig.7

10. a) For the network shown in fig.8, draw the directed graph, tree and show the loops **7M**
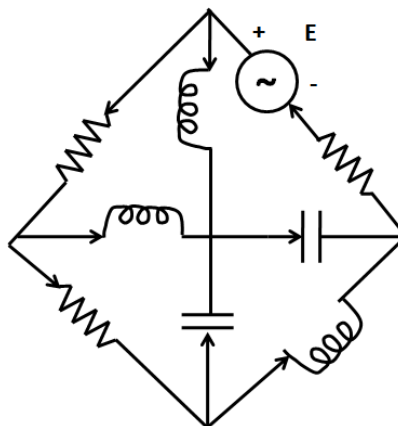

fig.8

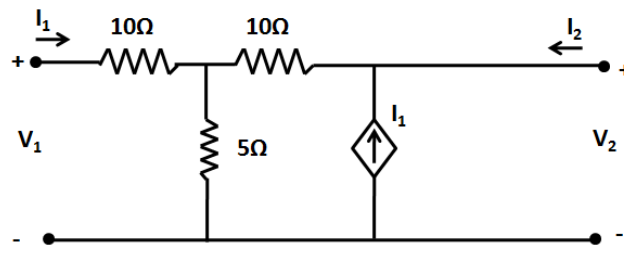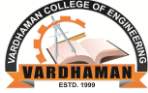**Cont...4**

b) Determine the Z-parameters of the network shown in fig.9.   8M

fig.9

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Mechanical Engineering & Civil Engineering)

Date : 10 February, 2014	Time : 3 Hours	Max. Marks : 75

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

Unit – I

1. a) Compare conductor, semiconductor and insulator.   6M
    b) A dc circuit comprises of two resistors; resistor A of value 25 ohm and resistor B of   9M
        unknown value, connected in parallel, together with a third resistor C of value 5 ohm,
        connected in series with the parallel branch. Find the voltage to be applied across the
        whole circuit and the value of the resistor B if the potential difference across C is 90V,
        and the total power consumed is 4320W.
2. a) If a coil of 150 turns is linked with a flux of 0.01Wb when carrying current of 10A,   6M
        calculate the inductance of the coil. If this current is uniformly reversed in 0.01S,
        calculate the induced emf.
    b) State Kirchhoff's current law. In the circuit shown in fig.1, determine the values of E,   9M
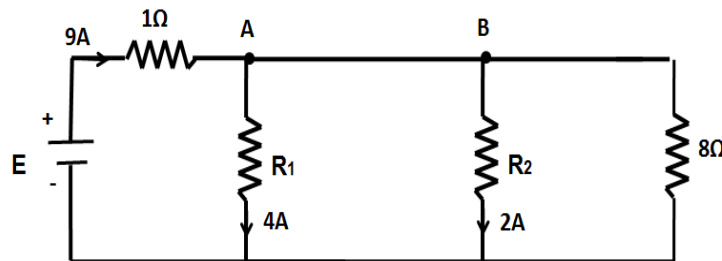 R_1 and R_2 by applying KCL at junction A.

fig.1

Unit – II

3. a) An alternating voltage e=200sin(314t) is applied to a device which offers an ohmic   8M
        resistance of 20 ohm to the flow of current in one direction, while preventing the flow
        of current in the opposite direction. Calculate RMS, average values and form factor for
        the current over one cycle.
    b) A 4 ohm resistor is connected in series to a 10 milli henry inductor across a 100V, 50Hz   7M
        voltage source. Find input current, voltage drop across resistor, power factor of the
        circuit and the real power consumed in the circuit.
4. a) Obtain the form factor of a sinusoidal ac wave.   7M
    b) A supply of 400V, 50Hz is applied to a series RC circuit. Find the value of C if the power   8M
        absorbed by the resistor is 500W at 150V.

Unit – III

5. a) Using the Thevenin's theorem, find the current i through 2 Ω in fig.2.   8M
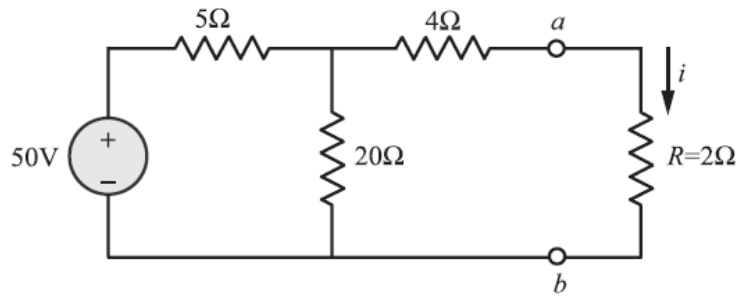

fig.2

b)   Find R$_L$ for maximum power transfer and the maximum power that can be transferred   7M
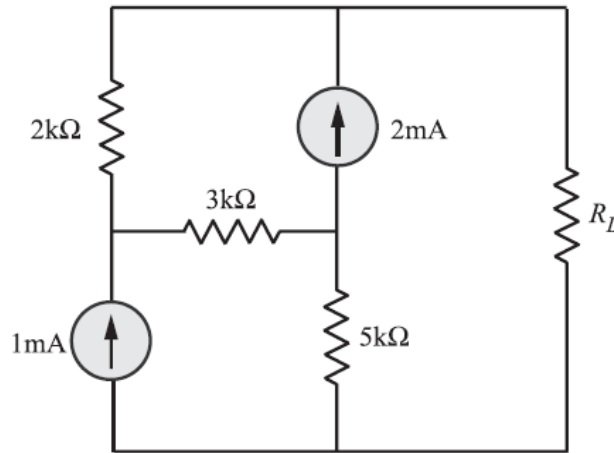in the network shown in fig.3.

fig.3

6. a) Calculate the amplitude of the pulse signal in the below fig.4 (scope setting 100   5M
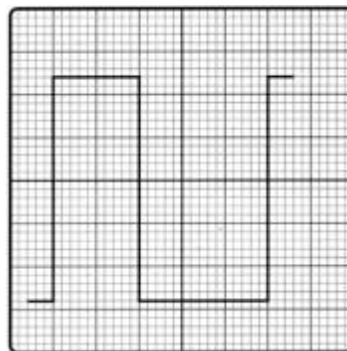mV/cm).

fig.4

b) Explain the operation of cathode ray oscilloscope with the help of neat block diagram   10M
and also mention the salient features of permanent magnet moving coil instrument.

Unit – IV

7. a) Determine the output waveform for the network of fig.5 shown and calculate the V_{dc} 8M
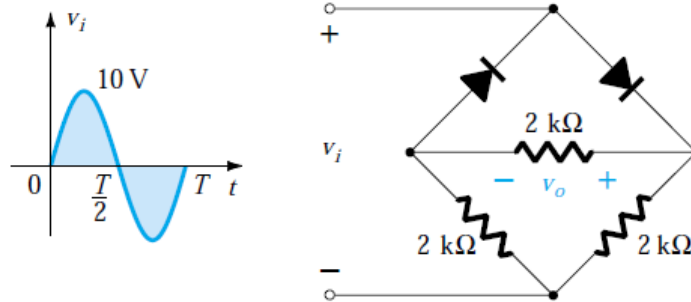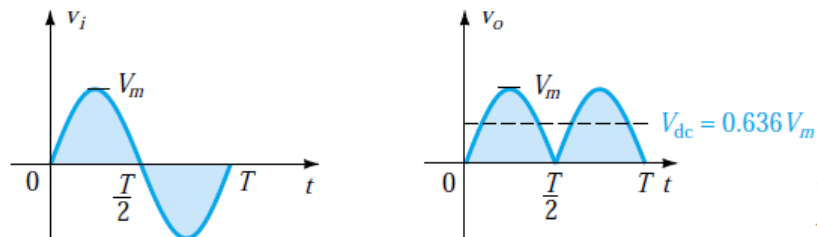   and the required PIV of each diode.

fig.5

    b) With the help of circuit diagram and waveforms explain the operation of half wave 7M
        rectifier.

8. a) Design a circuit using four diodes to get the desired V_0 for the applied input V_i shown in 8M
        the fig.6. Explain the operation of circuit.

fig.6

    b) Explain the following with respect to diode: 7M
        i.   Formation of depletion layer
        ii. Effect of temperature on barrier voltage

Unit – V

9. a) Explain the operation of N-P-N transistor. 8M
    b) Explain the input–output characteristics of a common emitter configuration. 7M
10. a) Explain the following with respect to Transistor: 8M
        i.   Current gain
        ii. Voltage gain
    b) Explain the output characteristics of a common base configuration. 7M

**Hall Ticket
No**

Question Paper Code : A1501

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech I Semester Regular Examinations, February - 2014
(Regulations: VCE-R11A)
COMPUTER PROGRAMMING
(Common for All Branches)

Date : 12 February, 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) "In the early days of computers, there was only one environment, the mainframe computer hidden in a central computing department. With the advent of minicomputers and personal computers, the environment changed with computers on virtually every desktop". Explain briefly any two computing environments. **8M**

   b) Write a function Add() that returns sum of two integers. The function should not use any of the arithmetic operators. **7M**

2. a) Outline the basic structure of a C program. Explain the significance of preprocessor directives with an example. **7M**

   b) Write a program that inputs one five-digit number, separates the number into its individual digits and prints the digits separated from one another by three spaces each. **8M**

   [*Hint*: Use combinations of integer division and the remainder operation.] For example,
   if the user types in 42139, the program should print : 4   2   1   3   9

Unit – II

3. a) Define user-defined function. Give the general format of declaring a function. Compare local and global variables. **7M**

   b) The grade of an examination is decided based on the following rules: **8M**

Marks	Grade
0-39	F
40-59	D
60-69	C
70-79	B
80-89	A
90-100	S

   Write a C program to read the name and marks of a student and display the grade using switch statement.

4. a) What are arrays? How one and two dimensional arrays are declared and initialized? Give example for each. **7M**

   b) Read in 20 numbers, each of which is between 10 and 100, inclusive. As each number is read, print it only if it is not a duplicate of a number already read. Provide for the "worst case" in which all 20 numbers are different. Use the smallest possible array to solve this problem. **8M**

Cont…2

Unit – III

5. a) Write a C Program to compute sum of the array elements using pointers. **7M**
    b) Write a C program that asks the user to enter a string and a character and checks how many times that character is repeated in the string entered by the user. **8M**

6. a) What is the difference between single quoted and double quoted declaration of char array? Illustrate with a suitable example. **6M**
    b) Write a C program to find the length of a given string and reverse the string without using string library function. **9M**

Unit – IV

7. a) What is a structure? How is it different from union? Give example for each of them. **8M**
    b) Define a structure with the following fields: title of book, author name, number of pages, and publisher's name. Write a C program to read 10 books data and print the details. **7M**

8. a) Illustrate the following with an example: **9M**
    i. Structure within a structure
    ii. Array of structures
    iii. Bit fields

    b) Trace the output for the following programs : **6M**

```
i)
#include<stdio.h>
int main()
{
        union var
        {
                int a, b;
        };
        union var v;
        v.a=10;
        v.b=20;
        printf("%d\n", v.a);
        return 0;
}
```

```
ii)
#include<stdio.h>
int main()
{
        struct value
        {
                int bit1:1;
                int bit3:4;
                int bit4:4;
        } bit={1, 2, 13};
printf("%d, %d, %d\n", bit.bit1, bit.bit3,
bit.bit4);
return 0;
}
```

Unit – V

9. a) Explain briefly about fopen() and fclose() with an example. **8M**
    b) Write a file copy program which copies the contents of the file "prog.c" to "prog.old". **7M**

10. a) What are the various file access modes and explain each of them with an example. **8M**
    b) Write a program to count the number of lines and characters in a file. **7M**
    Note: Each line of input from a file or keyboard will be terminated by the newline character '\n'. Thus by counting newlines we know how many lines there are in our input.