Roll No. _____ [Total No. of Pages : 3

1E2001

1E2001

B.Tech. I Semester (Main&Back) Examination Dec. - 2016
101 Communicative English

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Unit - I

Attempt any four sections of the following sections :-   (4×4=16)

Section - A

Put the verb in brackets into the correct tense :   (4)

i)   He _____ (Learn) English these days

ii) They_____(Live) in Delhi since 1990

iii) We _____ (play) cards when we _____ (hear) the foot steps

iv) When the guard _____ (go) to sleep a man _____ (try) to open the lock.

Section - B

Change the following sentences into passive voice :   (4)

i)   Ram killed Ravan

ii) Do not beat the child

iii) I know the manager of this bank

iv) People speak English all over the world.

Section - C

Change the following sentences into indirect speech: (4)

i)   Raju said, " I have passed the examination".

ii) The teacher said, " Did you break this table, Aruna? "

iii) The principal said "Let no student stand here".

iv) He said to me, "I know you and your sister".

Section -D

Complete the following sentences:- (4)
i)   She could buy a car, if ------------
ii) If I had got the permission -----------
iii) If I had worked hard --------------
iv) If she practised more ------------

Section - E

Fill in the blanks with correct models:- (4)
i)   Students _____ pay their examination fee by tomorrow. (compulsion)
ii)   One _____ use unfair means in the examination. (prohibition)
iii) She _____ play with dolls in her childhood. (Past Habit)
iv)   The weather is fine. We _____ go for picnic (Possibility)

Unit - II

1. Write a paragraph of about 200 words on any one of the following topics. (8)
   i)   Science and Technology.
   ii)   Man is maker of his own fate.
   iii) Envirpnment Pollution

OR

What is a Dialogue? What is the purpose of the dialogue? Write the merits of dialogue writing. (2×2+4=8)

2. As an editor of your college magazine, write a report on the Annual Function that has just been held in your college premises. (8)

OR

Make a precis of the following passage :- (8)

Your mental attitude is a great determining influence in your daily life. Begin the day with an expectant and energetic mental attitude towards your work and it will elevate and enhance all your activities. The spirit in which you regard the world and your fellowmen will be reflected back to you. When you are in the right mental attitude many things will seem to conspire and Co-operate to advance your work and interests. Primarily it is your mental attitude that makes the day happy and productive or the contrary. You can demonstrate the truth of this today by receiving to look only for the best, to be intelligently optimistic, and to have confidence in the eternal supermacy of God. Make more positive resolutions regarding the thing you ought to do and bring every possible reinforcement to bear upon such resolutions. Assert in vigorous tones the thought you wish to establish as unconscious habits of your life, remembering always that while it is a great thing to conceive a great idea it is still greater to put it into execution.

Unit - III

1. Give an account of satire and irony in somerset maugham's story "The Luncheon"

    (8)

OR

Summarize the story "The Last Leaf". (8)

2. Critically analyze Leo Tolstoy's Story, "How much Land Does a Man Need"? (8)

OR

In the story "The Luncheon", how far do you agree that the writer has taken his revenge of the lady for her misbehavior? Throw some light on the writer's life and Character. (8)

Unit - IV

1. What is meant by the rule of the Road? Why it is essential to observe it? (8)

OR

What do you understand by non-violence? What was the sole desire of Gandhi to choose Non-Violence in his action. (8)

2. What do you mean by Globalization? How has it helped mankind? What is the greatest achievement of the modern civilization? (8)

OR

What made Gandhi feel that all strife could be eliminated from this world? How can you say that all religions speak one common point? (8)

Unit - V

1. Explain the main theme of the poem, "The unknown Citizen" (8)

OR

What makes a happy life? Use examples from the poem "The character of a Happy Life." (8)

2. List the qualities which according to the poet in the poem 'If' transforms a boy into a man. (8)

OR

Analyze the poem "No Men Are Foreign" by James Kirkup. (8)

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1E2003

1E2003

B.Tech. I Semester (Main/Back) Examination, Dec. - 2016
103 Engineering Physics - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any five questions, selecting one question from **each unit**. All questions carry equal marks. of Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

Calculator (Non Programmable)

Unit - I

1. a) How shall you measure the wavelength separation of two closely spaced spectral lines e, g, D_1 and D_2 lines of Na? Derive the formula used.　　**(4,4)**

   b) Newton's rings are formed using sodium light, between plano-convex lines and plane glass plate. What shall be the order of the ring which has twice the diameter of 20th dark ring?　　**(4)**

   c) Two $\lambda/4$ thick layers are deposited on an opthalmic glass $(\mu = 1.52)$ to reduce reflection loss. The first layer has refractive index $\mu = 1.38$. Find the refractive index of the material of second layer.　　**(4)**

OR

1. a) While measuring wavelength of light using Newton's rings why

   i) Higher order rings are used?　　**(4)**

   ii) The center of ring system is chosen to be dark?　　**(4)**

   b) Calculate the distance between two successive positions of movable mirror of Michelson's interferometer giving distinct fringes in case of sodium light having wavelengths $5890\ A^0$ and $5896\ A^0$.　　**(4)**

   c) In Newton's ring experiment the diameters of 15th and 5th rings are measured to be respectively, 0.59 cm and 0.336 cm. If radius of curvature of the plano-convex lens be 1.0m, calculate the wavelength of light used.　　**(4)**

Unit - II

2. **a)** Explain construction and working of a quarter wave plate. **(4,4)**

b) 5% solution of cane sugar of length 40 cm causes an optical rotation of 20^0. How much length of 10% solution shall cause 35^0 rotation? **(4)**

c) A plane polarized light is incident on the following phase retardation plates at an angle 30^0 with optic axis what will be the state of polarization of the out going light?

    i) QWP **(2)**

    ii) HWP. **(2)**

OR

2. **a)** Define specific rotation. On what factors does it depend. How shall you measure specific rotation of glucose solution using biquartz polarimeter.

(1,1,6)

b) Evaluate state of polarization of the following wave whose electric field is given by, $\vec{E} = \hat{j}\, a \cos(kx - wt) + \hat{k}b \sin(kx - wt)$ **(4)**

c) How shall you discriminate two sources identical in appearance, one is elliptically polarized and the other is mixture of circularly polarized and plane polarized. **(4)**

Unit - III

3. **a)** The intensity of light on diffraction through single slit is given by (Donot

derive it) $I = I_0\left(\dfrac{\sin\alpha}{\alpha}\right)^2$, $\alpha = \dfrac{\pi}{\lambda} a \sin\theta$ where symbols have their usual meanings.

    i) Find positions of maxima and minima **(6)**

    ii) Show that central maximum has angular width $\dfrac{2\lambda}{a}$ **(2)**

    iii) Find the intensities of successive maxima. **(4)**

b) The wavelengths of sodium D_1, D_2 lines are respectively, 5895.93 A^0 and 5889.99 A^0. What is minimum number of lines plane transmission grating must have, to resolve these lines in first order. **(4)**

OR

3. **a)** Explain, how does grating forms a spectrum of composite light falling normally on it. **(8)**

b) A diffraction grating used at normal incidence, gives green light of wavelength

$\lambda_1 = 5400 A^\circ$ in certain order coincident with violet line of wavelength $\lambda_2 = 4050 A^\circ$ in next higher order. If angle of diffraction be 30°, how many lines are there per centimeter width of the grating. **(8)**

Unit - IV

4. **a)** How shall you determine energy band gap of a semiconductor in the laboratory?
(8)

b) Why diamond is a insulator and graphite is a conductor. **(4)**

c) Mica is an electric conductor but thermal insulator why? **(4)**

OR

4. **a)** Why x-rays are diffracted from crystals? Derive Bragg's law. **(2,6)**

b) State what is Hall effect. What does positive Hall effect indicate? **(2,2)**

c) The number of si atoms per m^3 is 5×10^{28}. This is doped with As, 5×10^{22} m^3. Given $ni = 1.5 \times 10^{16}$ per m^3, find hole concentration if donar is completely ionized. **(4)**

Unit - V

5. **a)** Write postulates of special theory of relativity. **(4)**

b) What is time dilation? Through an experiment, how can it be verified. **(8)**

c) At what velocity the mass of a moving electron will be doubled? **(4)**

OR

5. **a)** A particle is moving with relativistic velocity 'v' find **(4,4)**

   i) Kinetic energy

   ii) Show graphically the increase in mass.

b) A cube of side 'a' is moving with velocity $v = 0.8 C, C$ being velocity of light, find the volume of the cube as observed by the observer at test in laboratory **(4)**

c) The mass of an electron is $9.1 \times 10^{-31} kg$. What is equivalent energy of electron in Mev. **(4)**

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1E2004

1E2004

B.Tech. I Semester (Main/Back) Examination, Dec. - 2016
104 Engineering Chemistry

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks (Old back) : 24

Min. Passing Marks (M/B): 26

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What is carbonization of coal? Describe OHo-Hoffmann's By - product oven method of coke manufacturing.   (8)

    b) What is oil gas? Explain the manufacturing of oil gas and its uses.   (8)

OR

1. a) What is cracking of fuel? Describe with diagram moving - bed catalytic cracking of petroleum.   (8)

    b) Write short notes on any two of the following:

        i)   Characteristics of good fuel.

        ii) Refining of petroleum

        iii) Pulverized coal and its advantages   (4+4)

Unit - II

2. a) Describe the determination of calorific value of gaseous fuel by Junker's Calorimeter.   (10)

    b) The following data were obtained in a Junker's experiment

        i) Volume of gas used = 0.1 m^3 at STP

        ii) Weight of water heated = 26 kg

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iii) Temperature of inlet water = 26^{0}C

iv) Temperature of outlet water = 36^{0}C

v) Weight of steam condensed = 0.030 kg.

Calculate the higher and lower calorific value at STP. Take latent heat of vaporization of water as 580 K cal/kg. **(6)**

OR

2. a) Write short notes on any two of the following:

i) Orsat's analysis of fuel gases.

ii) Ultimate analysis of coal

iii) Requirement of air in combustion of coal. **(5+5)**

b) Determine the theoretical weight of air required for the complete combustion of fuel having C = 75%, H = 8% and O=3% percentage composition. Assuming that 50% excess air is to be used calculate the weight of air supplied. **(6)**

Unit - III

3. a) Explain the mechanism of conductivity induced in poly aniline. **(8)**

b) Distinguish between addition and condensation polymerization. **(8)**

OR

3. Write notes on any four of the following:

i) Manufacture and uses of nylon.

ii) Classification of polymer.

iii) Manufacture and uses of Nitrile Rubbers

iv) Copolymerization

v) Fullerenes and its applications. **(4×4)**

Unit - IV

4. a) Describe the property of setting and hardening of cement. **(8)**

b) What is glass? Describe the steps involved in manufacture of glass. **(8)**

OR

4. a) What is optical fibre? Discuss the structure and working of optical fibres.**(6)**

b) Explain the significance of basic constituents of cement. **(6)**

c) Write a note on aluminosilicate glasses and its uses. **(4)**

Unit - V

5. a) Discuss the use of Seger's cone test and RUL tests for a good refractory **(10)**

   b) Describe fire clay refractory its properties and uses. **(6)**

OR

5. Explain the following:

   a) Steam emulsification number.

   b) Functions of lubricants.

   c) Viscosity Index.

   d) Thin layer lubrication **(4×4=16)**

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Roll No. _____   [Total No. of Pages : 3]

1E2002

1E2002

B.Tech. I Sem.(Main/Back) Examination, Dec. - 2016
102 Engg. Mathematics-I

Time : 3 Hours

Maximum Marks : 80
Min Passing Marks (Old Back): 24
Min. Passing Marks(Main/Back) : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Find the asymptotes of the curve:

    $x^3 - 5x^2y + 8xy^2 - 4y^3 + 2y^2 + x^2 - 3xy - 1 = 0$ (8)

    b) Trace the curve:

    $x^3 + y^3 = 3axy$ (8)

OR

1. a) For an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, prove that radius of curvature $\rho = \frac{a^2b^2}{p^3}$; where 'p' denotes the length of perpendicular from centre of ellipse on the tangents at any point P.   (8)

    b) Trace the curve: $r = a(1 + \cos\theta)$ (8)

Unit - II

2. a) If $x = t_1 \cos\alpha - t_2 \sin\alpha$, $y = t_1 \sin\alpha + t_2 \cos\alpha$, show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{\partial^2 u}{\partial t_1^2} + \frac{\partial^2 u}{\partial t_2^2}$ (8)

    b) Discuss the maxima and minima of the function:

    $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$ (8)

2. **a)** In a plane triangle the angles and sides receive small variations, prove that

i) $\delta a \cos C + \delta c \cos A = 0$; b, B being constant.

ii) $c \, \delta A + a \cos B \, \delta C = 0$; a, b being constant. **(8)**

b) Find the volume of the greatest rectangular parallelopiped inscribed in the ellipsoid. $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$ **(8)**

Unit - III

3. **a)** The part of the parabola $y^2 = 4ax$ cut off by the latus rectum revolves about the tangent at vertex. Find the volume of the reel thus generated. **(5)**

b) Find the area of the region lying in Ist quadrant enclosed by the circle $x^2 + y^2 = a^2$ and the line $x + y = a$ by double integration. **(5)**

c) Evaluate $\int_0^{\pi/6} \cos^4 3\theta \sin^2 6\theta \, d\theta$ **(6)**

OR

3. **a)** Find the surface area generated by revolving the cardioid $r = a(1 + \cos\theta)$ about the initial line. **(5)**

b) Transform the integral $\int_0^a \int_0^{\sqrt{a^2 - x^2}} y^2 \sqrt{x^2 + y^2} \, dy \, dx$ by changing to polar coordinates and hence evaluate it. **(5)**

c) Change the order of integration $\int_0^1 \int_{e^x}^{e} \dfrac{1}{\log y} \, dx \, dy$ and hence solve. **(6)**

Unit - IV

4. **a)** Solve: $x \log x \dfrac{dy}{dx} + y = 2 \log x$ **(4)**

b) Solve: $\left(3x^2 + \dfrac{y}{x}\right) dx + \left(x^3 + \log x\right) dy = 0$ **(4)**

c) Solve: $\dfrac{d^2 y}{dx^2} + a^2 y = \sec ax$ **(8)**

OR

4. **a)** Solve: $x \dfrac{dy}{dx} + y = y^2 \log x$. **(5)**

b) Solve : $\left(xy^3 + y\right)dx + 2\left(x^2y^2 + x + y^4\right)dy = 0$. **(5)**

c) Solve: $\left(D^2 + 2D + 1\right)y = x\cos x$ **(6)**

Unit - V

5. a) Solve: $(3x+2)^2 \dfrac{d^2y}{dx^2} + 3(3x+2)\dfrac{dy}{dx} - 36y = 3x^2 + 4x + 1$ **(8)**

b) Solve the following differential equation by changing the independent variable

$$\cos x \dfrac{d^2y}{dx^2} + \sin x \dfrac{dy}{dx} - 2y\cos^3 x = 2\cos^5 x$$ **(8)**

OR

5. a) Solve: $\left(2x^2+3x\right)\dfrac{d^2y}{dx^2} + (6x+3)\dfrac{dy}{dx} + 2y = (x+1)e^x$ **(8)**

b) Solve by the method of variation of parameters $\dfrac{d^2y}{dx^2} - y = \dfrac{2}{1+e^x}$ **(8)**

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1E2002 (3)

13

1E2005

1E2005

B.Tech. I Semester (Main&Back) Examination, Dec. - 2016
105 Basic Electrical and Electronics Engg.

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any five **questions**, selecting **one question from each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Using the mesh analysis, find the current I_1, I_2 and I_3. Evaluate the power in 10V voltage source (In fig 1) **(8)**
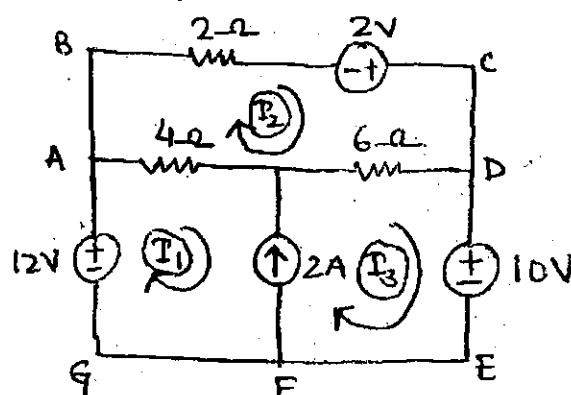
Fig : 1

   b) State & explain superposition theorem. Find current I in fig. 2 by applying superposition theorem. **(8)**
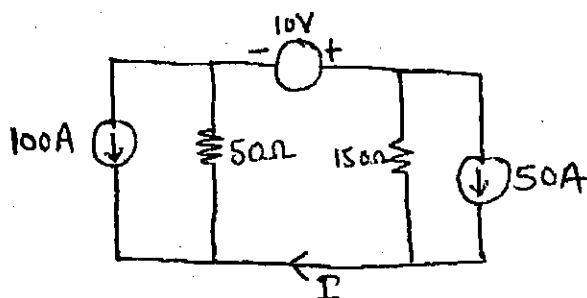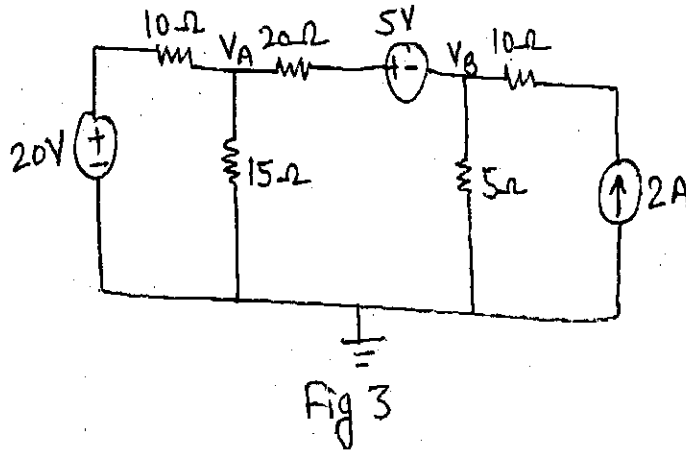

Fig : 2

OR

1. a) State and explain Thevenin's Theorem. Illustrate the application of this theorem with reference to an appropriate electric circuit. **(8)**

   b) Using nodal analysis, determine the node voltage. V_A and V_B in the circuit shown in Fig. 3. **(8)**

Fig 3

Unit - II

2. a) For a single phase sinusoidal waveform find the RMS value in terms of maximum value, Determine the form factor of sine wave. **(8)**

   b) Find the angle by which i_2 lags i_1 if

   $i_1 = 120\, Cos(100\pi t - 30^0)$ and

   i) $i_2 = -8\, Cos(100\pi t + 20^0)$

   ii) $i_2 = 5\, Sin(100\pi t + 50^0)$

   iii) $i_2 = -6\, Sin(100\pi t - 30^0)$ **(8)**

OR

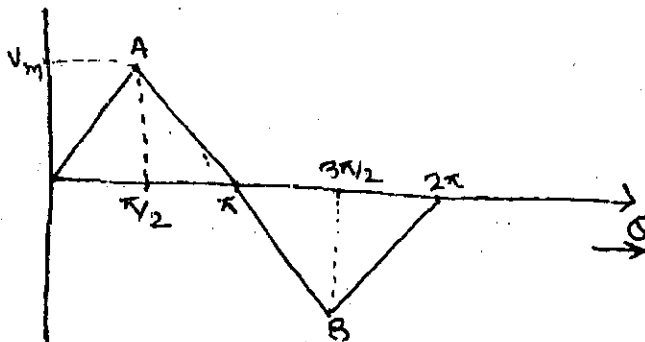2. a) Find the r.m.s and average value of wave form in fig. 4   **(8)**

Fig. 4

b) For a 3φ system, determine the relation between line and phase quantities in delta connection. Also draw the phasor diagram and find the relation for power. **(8)**

Unit - III

3. a) Describe the principle of operation of 3-phase synchronous generator. **(8)**

b) Explain the principle of D.C. machines and construction of D.C. machine. **(8)**

OR

3. a) Explain the principal and working of 3-phase induction motor and explain type of 3- phase induction motor. **(8)**

b) A 8 pole DC machine has a wave winding containing 600 conductors. Calculate the generated emf. When the flux per pole is 0.08 wb and speed is 215 rpm. If the flux per pole is made 0.05 wb. At what speed should the armature be driven to generate 500 V. **(8)**

Unit - IV

4. a) Sketch and explain the input and output characteristic curve for common emitter configuration. **(8)**

b) Show how the zener diode can act like a voltage regulator. Also differentiate Avalance breakdown and zener breakdown. **(8)**

OR

4. a) i) Define α and β of a transistor. Derive the relationship between them. **(4)**

ii) What do you mean by
   a) Active region
   b) Cut off region.
   c) Saturation region **(4)**

b) Realize the Ex-OR and Ex-NOR gates by using only NAND gates and only NOR gates. **(8)**

Unit - V

5. a) What is Communication system. Explain with block diagram in detail. **(8)**

b) What is the need of modulation? Compare the different types of modulation techniques. **(8)**

OR

5. a) Explain strain gauge transducer and drive its gauge factor **(8)**

b) Write short note on
   i) Thermocouple **(4)**
   ii) RTD **(4)**

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Roll No. _____   [Total No. of Pages : 4]

3E1651

B.Tech. III Semester (Main/Back) Examination Dec. - 2016
Information Technology
3IT1A Electronic Devices & Circuits
CS, IT

3E1651

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Find the probability to find an electron at energy level $\varepsilon = 1.8ev$ in silicon at room temperature. Assume the fermi level, $\varepsilon_F = 0.51ev$. Also find the probability of hole at same level. **(6)**

   b) Discuss the factors on which depends the carrier generation and recombination in semiconductor. **(4)**

   c) Design a clamping circuit using diode for clamp a input waveform $v_i = v_0 \sin \omega t$ at -2volt. **(6)**

OR

1. a) Find the contact potential between point 1 and 2 in a semiconductor sample shown in fig. - 1(a) **(6)**

1	Intrinsic	2
n-type si	si	n- type si

$N_D = 10^{18}/cm^3$ $N_D = 10^{13}/cm^3$

Fig. 1(a)

   b) Design a clippling circuit using PN junction to achieve a output waveform as shown in fig. - 1(b)
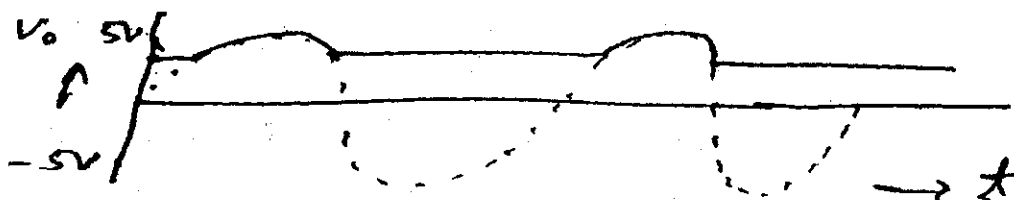
Fig- 1.(b)

Assume the input wavefrom is $v_i = 5\sin \omega t$ (6)

c) What is difference between Full wave and Half wave voltage multiplier? (4)

Unit - II

2. a) Find all junction voltage and terminal current in Fig. 2 (a). Assume $\alpha = 0.8$ and $I_{CBO} = 200$ nano Amp. (8)
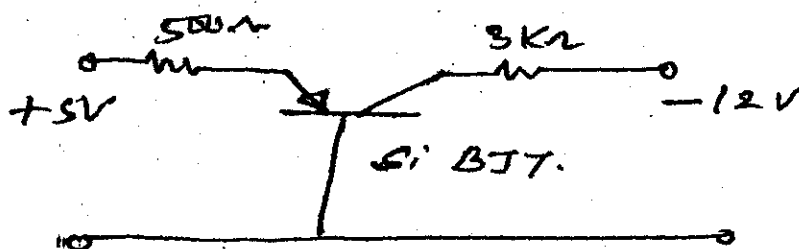

Fig- 2 (a).

b) What is difference between

i) Biasing and stabilization

ii) DC and AC analysis (4+4=8)

OR

2. a) How reverse saturation current I_{CBO} of collector junction depends on

i) Collector supply

ii) Junction temperature and

iii) Collector region doping.

Explain with Analytical discussion. (2+3+3=8)

b) Design a voltage divider bias circuit to establish a current $I_E = 1mA$ using a power supply $v_{cc} = +12$Volt. Assume the nominal value of $\beta = 100$ (6)

c) What is condition for thermal stability? (2)

Unit - III

3. a) Find the expression for overall voltage and current gain for a CB-CC configuration. (8)

b) Determine the lower and higher Cutoff frequency f_L and f_H for a RC amplifier show in fig. - 3(b). Assume $C_K = 1000 PF$ and $C_H = 10 PF$. (8)
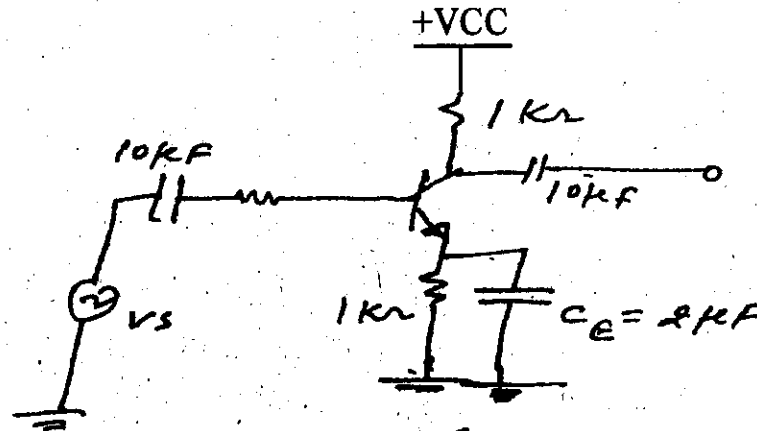

fig - 3(b).

OR

3. a) Find the overall voltage gain expression for a CS-CD double stage FET amplifier. (8)

   b) Design a double stage CE-CE amplifier for achieve overall voltage gain 40dB. Assume the β of each transistor is 100. Neglect the source resistance. (8)

Unit - IV

4. a) Define the unit of

   i) Feedback factor in voltage series Feedback.

   ii) Feedback factor in current shunt Feedback. (2×2=4)

   b) Find the value of feedback factor and its topology in fig. 4(b) (6)
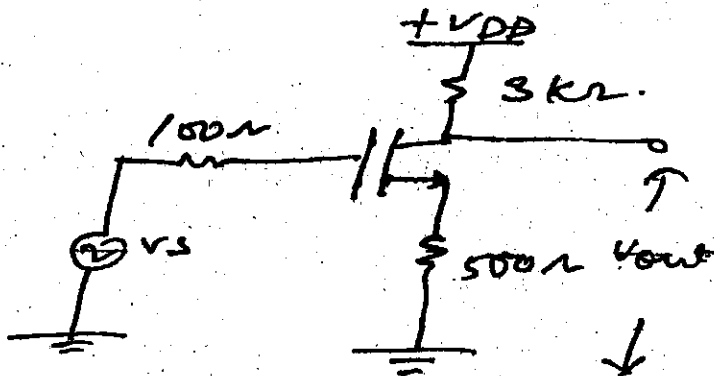
   c) Find the most appropriate Feedback in following condition.

Source	Load
i) Current source	low
ii) Voltage source	High	(2×3=6)

OR

4. a) If the open circuit voltage gain of an amplifier is 1000 find the value of input and output resistance with feedback in following cases. Assume 10% output voltage is feedback.

   i) $R_i = 100\Omega$, $R_0 = 10k\Omega$ feedback is voltage series.

   ii) $R_i = 500\Omega$, $R_0 = 100k\Omega$ feedback is voltage shunt. **(4+4=8)**

   b) Why feedback is used in amplifiers and oscillators? What difference between these two cases? **(4)**

   c) If the fractional change in open circuit voltage gain is 50% with temperature then what would be the fractional change in voltage gain with feedback if 5% feedback is used. Assume the open circuit voltage gain $A_r = 500$. **(4)**

Unit - V

5. a) Design a wein bridge oscillator using

   i) BJT as active element.

      Let $\beta = 100$.

   ii) Op-Amp as active element **(4+4=8)**

   b) Explain the frequency division by bistable multivibrator **(4)**

   c) Draw the Hystris curve of a schmitt trigger and define its LTP and VTP point. **(4)**

OR

5. a) Design a schmitt trigger such that its LTP and UTP are equal and equal to

   $\pm \dfrac{V_{DD}}{2}$ **(8)**

   b) Design a colpitt oscillator for obtain oscillation frequency 10 MHz. Assume mutual inductance is Negligible. **(8)**

3E1652/1612

B.Tech. IIISem.(Main/Back) Examination Dec. - 2016
Computer Science & Engineering.
3CS2A Data Structures and Algorithms
CS,IT,EX,EC, EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any five questions, selecting **one question** from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What are the differences between Big oh (O), omega (Ω) & theta (θ) notation?
(8)

b) Calculate the address of element A[3][2] in a two dimensional array. A[3][3] stored in row major and column major order in the main memory. Assume the base address to be 100 and that each element requires 2 words of storage.(8)

OR

1. a) Why time and space complexity must be considered while writing a code?(8)

b) Explain the characteristics of an algorithm. (8)

Unit - II

2. a) What is STACK? Write algorithms to insert an element in STACK and delete an element from STACK with example. (8)

b) Convert following infix expression into portfix notation :

$A + B - (C + D) / E * F - (G + h) / I$ (8)

OR

2. a) Explain the implementation of queue with example. (8)

b) Write an algorithm to delete an element from a circular queue. (8)

Unit - III

3. What is doubly linked list? Explain the algorithms for inserting a node and deleting a node from a doubly linked list. **(16)**

OR

3. a) Explain polynomial representation using linked list with an example. **(8)**

b) What is dequeue? Write down the algorithms for the insertion and deletion operations performed on dequeue. **(8)**

Unit - IV

4. a) Define Binary search tree. Write algorithm to implement insertion operation on Binary Search tree. **(8)**

b) What is an AVL tree? Explain the rotations of AVL tree. **(8)**

OR

4. a) Explain an algorithm for postorder traversal of a binary tree. **(8)**

b) What are the basic operations that can be performed on a binary tree? Explain each of them in detail with suitable example. **(8)**

Unit - V

5. a) Write an algorithm for merge sort and comment on its complexity. **(8)**

b) Sort the following data in ascending order using Quick sort :

9, 4, 12, 6, 5, 10, 7. **(8)**

OR

5. a) Using Prim's and Kruskal's algorithm, find minimum spanning tree for the following graph : **(10)**
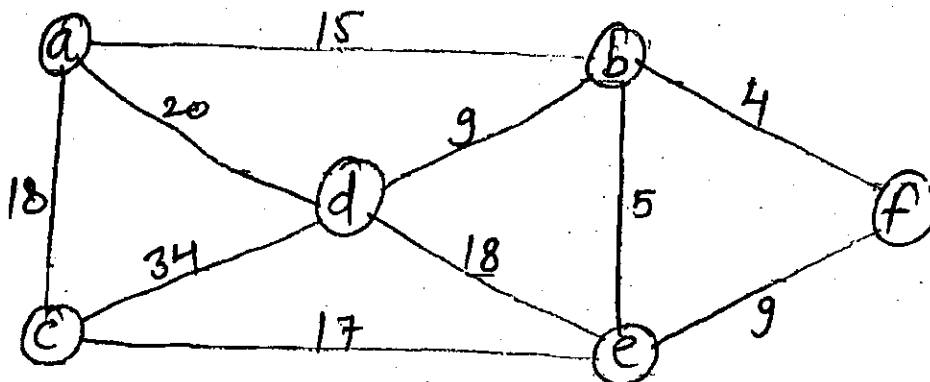
b) Write an algorithm for DFS traversal. **(6)**

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B.Tech. III Semester (Main/Back) Examination Dec. - 2016
Applied Elect. & Inst. Engg
3Al4 Digital Electronics
EE, EX, EC, EI, CS, IT, AI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) For the integer with decimal representation 34567, give the corresponding bit vectors for BCD code and for excess - 3 code.   **(8)**

    b) Design a network using only XOR gates which performs the following function.

$$Z = \begin{cases} x_i & if\ C = 0 \\ x_i & if\ C = 1 \end{cases}$$ **(8)**

OR

1. a) What do you mean by sequential code, self complementing code, cyclic code and excess - 3 code? Give one example of each code.   **(8)**

    b) Using the postulates of Boolean algebra and the theorems, prove the following:

    i. $a'b' + ab + a'b = a' + b$

    ii. $ab' + b'c' + a'c' = ab' + a'c'$ **(8)**

Unit - II

2. a) Discuss CMOS NAND and NOR gates.   **(8)**

    b) Explain the working of CMOS inverter.   **(8)**

OR

2. a) Draw a neat circuit of TTL (Transistor Transistor Logic) NAND gate with totem pole output and explain.   **(8)**

b) Draw a 3 input ECL (Emitter - Coupled Logic) OR/NOR gate and explain it's working? **(8)**

Unit - III

3. a) Simplify the following using the tabulation method :

$$F = \sum(1,2,3,7,8,9,10,11,14,15)$$ **(8)** •

b) A stair case light is controlled by two switches one at the top of the stairs and another at the bottom of stairs. Realize the circuit when the lamp (L) glows. **(8)**

OR

3. a) Compare k-map technique and quine - Mc cluskey minimization technique. **(8)**

b) Simplify the expression $F(A,B,C,D) = ACD + \overline{A}B + \overline{D}$ **(8)**

Unit - IV

4. a) Implement the following function using 4×1 multiplexer.

$$f(A,B,C) = \sum m(0,1,4,7) \text{ use A and C as select lines.}$$ **(8)**

b) What are the use of multiplexers and demultiplexers. Explain the construction and working of a multiplexer circuit. **(8)**

OR

4. a) Draw gate level schematic of a 1-to-4 decoder as component realize a 1-to-16 decoder. **(8)**

b) Signals A,B,C,D and A are available. Using only one 8 to 1 MUX and no other gate, implement the expression.

$$F(A,B,C,D) = BC + AB\overline{D} + \overline{A}\overline{C}D$$ **(8)**

Unit - V

5. a) Draw a logic diagram of clocked S-R flip - flop and obtain its characteristic equation. Also show its excitation table. **(8)**

b) Write short note on the following :
a. Asynchronous and synchronous counter.
b. Sequential and non sequential counter. **(4×2)**

OR

5. a) Construct 4-bit serial adder using shift registers and logic gates. Explain its operation. **(8)**

b) Determine the next state for each of six unused states in the BCD ripple counter. Is the counter self - starting? **(8)**