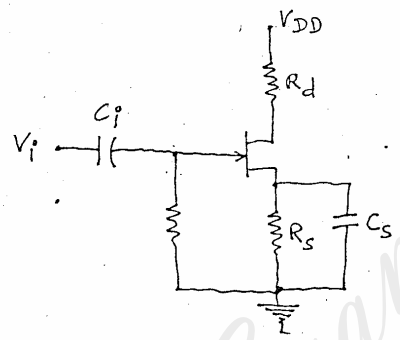
S.E. Sem III I.T. 16/05/06
Electronics Devices and circuits.

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

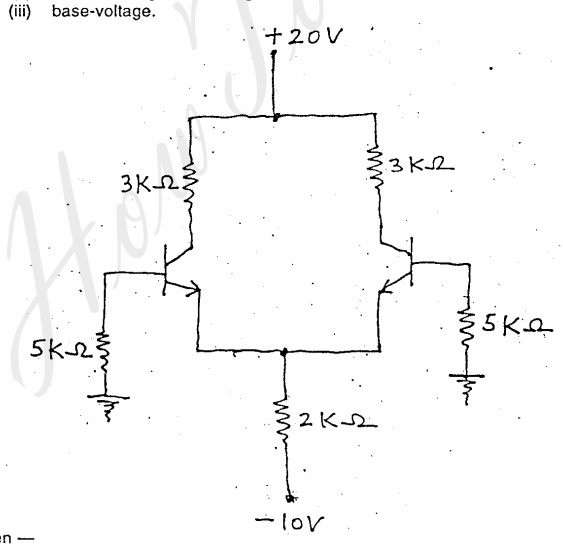
N.B. (1) Question No. **1** is **compulsory**.
(2) Answer any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **required**.

1. (a) The amplifier of **figure** utilizes an n-channel FET for which $V_p = -2{\cdot}0$ V, $g_{mo} = 1{\cdot}60$ mA/V and $I_{DSS} = 1{\cdot}65$ mA. It is desired to bias the circuit at $I_D = 0{\cdot}8$ mA using $V_{DD} = 24$ V. Assume $r_d >> R_d$. 12
Find — (i) V_{GS}, (ii) g_m, (iii) R_S, (iv) R_d, such that voltage gain is atleast 20 dB, with R_S by passed with a very large capacitance.



(b) What method is used to bias an FET against device and temperatue variation ? Explain how this is effective. 8

2. (a) Draw and explain current-mirror circuit. 8
(b) For the circuit shown in **figure**, determine the following :— 12
(i) I_E, I_{E_1}, I_{E_2}
(ii) Collector to ground voltage
(iii) base-voltage.



Given —
$V_{BE} = 0{\cdot}7$ V
$\beta = 100$
both the transistors are matching.

[TURN OVER

3. (a) Explain the difference between the integrator and differentiator and give one application of each. **8**
   (b) What are the advantages of using an instrumentation amplifier versus simple OP-AMP differential amplifier ? **12**
   Explain how to construct basic instrumentation amplifier from general purpose OP-AMP.
   Derive an expression for V_{out}.

4. (a) Draw circuit diagram of second order Butterworth active filter using OP-AMP. Give its frequency response curve. Give practical application of this filter. **15**
   (b) Compare active and passive filters. **5**

5. (a) Draw and explain phase-shift oscillator using OP-AMP. Derive expression for frequency of oscillation and gain factor β of ladder network. **12**
   (b) Give the advantages of Schmitt trigger comparator compared to open-loop comparator using OP-AMP. **8**

6. (a) Explain how current-limit and current foldback protection works in LM723. **8**
   (b) Design a +9 V regulator using the LM 723. Use current limit of 100 mA. **12**

7. (a) Explain monostable operation using IC 555. Draw the waveforms at trigger, V_{out}, and across capacitor. Derive the equation for output pulse width T_{out}. **15**
   (b) Design the circuit using IC 555 to produce a 100 µs output pulse. **5**

F.E Sem I

Applied maths - I

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Answers to **sub-questions** of Individual questions should be answered **one** below the **other**.
(5) Use a **blue/black ink pen** to write answers.

1. (a) If $x_r = \text{CiS}\left(\frac{\pi}{2^r}\right)$, show that $\lim_{n \to \infty} x_1 \cdot x_2 \cdot x_3 \cdot \ldots \ldots x_n = -1$. **20**

(b) If $y = e^{ax} \cos(bx + c)$, prove that—

$$y_n = \left(a^2 + b^2\right)^{\frac{n}{2}} \cdot e^{ax} \cdot \cos\left(bx + c + n \tan^{-1}\frac{b}{a}\right)$$ and hence find n^{th} derivative of $e^{5x} \cos x \cos 3x$.

(c) A particle moves along a plane curve such that its linear velocity is perpendicular to the radius vector, show that the path of the particle is a circle.

(d) If $u = e^{xyz}$ show that $\frac{\partial^3 u}{\partial x \partial y \partial z} = (1 + 3xyz + x^2y^2z^2 . e^{xyz})$.

2. (a) Prove that— **8**
$\cos^8\theta + \sin^8\theta = \frac{1}{64}[\cos 8\theta + 28 \cos 4\theta + 35]$ By using complex numbers.

(b) Find all the roots of the equation $z^3 = i(z - 1)^3$. **6**

(c) Prove that— $\cosh^5 x = \frac{1}{16}[\cos h\, 5x + 5 \cos h\, 3x + 10 \cos hx]$ **6**

3. (a) If $\sin(\theta + i\phi) = \tan\alpha + i\sec\alpha$, prove that $\cos 2\theta \cos h\, \phi = 3$. **8**

(b) Prove that— $i \log\frac{x - i}{x + i} = \pi - 2\tan^{-1}x$. **6**

(c) Test whether Rolle's theorem hold for the function $e^x(\sin x - \cos x)$. **6**

4. (a) If $y^{\frac{1}{m}} + y^{-\frac{1}{m}} = 2x$, prove that— $(x^2 - 1)\, y_{n+2} (2n + 1)\, xy_{n+1} (n^2 - m^2)\, y_n = 0$. **8**

(b) If $y = \sin^{-1}\left(\frac{2x}{1 + x^2}\right)$, find n^{th} differential coefficients, then convert it into polar form. **6**

(c) If $\lim_{x \to 0} \frac{\sin 2x + a \sin x}{x^3}$ be finite, find the value of a and hence the limit. **6**

5. (a) For the space curve $x = e^t \cos t$, $y = e^t \sin t$, $z = e^t$. Find the radius of curvature and radius of torsion. **8**
(b) Calculate the value of $\sqrt{10}$ correct to four decimal places by using Taylor's theorem. **6**
(c) Using Lagrange's mean value theorem, prove that— **6**

$$\frac{b - a}{1 + b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b - a}{1 + a^2}$$

Hence deduce that—

$$\frac{\pi}{4} + \frac{3}{25} < \tan^{-1}\frac{4}{3} < \frac{\pi}{4} + \frac{1}{6}.$$

6. (a) State and prove that the Euler's theorem on homogeneous function of three variables. Hence if— **8**
$f(x, y, z) = x^2yz - 4y^2z^2 + 2xz^3$

Show that $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} + z\frac{\partial f}{\partial z} = 4f$.

(b) Show that minimum value of— **6**

$u = xy + \frac{a^3}{x} + \frac{a^3}{y}$ is $3a^2$.

(c) Find $[(3{\cdot}82)^2 + 2(2{\cdot}1)^3]^{\frac{1}{5}}$ by using the theory of approximations. **6**

7. (a) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$ show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)^2 u = \frac{-9}{(x + y + z)^2}$. **8**

(b) If $\log_e \theta = r - x$ where $r^2 = x^2 + y^2$, show that $\frac{\partial^2\theta}{\partial y^2} = \frac{\theta \cdot (x^2 + ry^2)}{r^3}$. **6**

(c) Find the equation of the osculating plane to the curve $x = 2abt$, $y = a^2 \log t$, $z = b^2t^2$ at $t = 1$. Also, find the equation of the principle normal at $t = 1$. **6**

———v———

F.E. Sem I Applied sciences - I
09/12/05.

(REVISED COURSE)

(3 Hours) [Total Marks : 100

Section I

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining **six** questions.
(3) Assume any **suitable data** if required and **justify** the **same**.

1. (a) An electron is projected horizontally with an initial velocity 'V_0' in to an uniform electric field acting vertically upwards. Show that the trajectory of an electron with in field is a parabola. 5
(b) Describe working of P-N-P transistor in common base configuration. 5

2. (a) Proton and Deuteron are accelerated by the same potential. Compare their De-Broglie wavelengths. 5
[Given data $m_p = \frac{1}{2} m_d$]
(b) Density of CaF_2 is 3180 kg/m^3, A unit cell contains four Ca^{++} and eight F^- ions. Atomic wt. of Ca = 40 and F = 19. Calculate the lattice constant of this crystal. 5

3. (a) An electron of energy 40 e.V. is circulating in a plane at right angles to a uniform magnetic field of strength 10^{-6} wb/m^2. Calculate the radius of orbit and frequency of revolution. 5
(b) Show that packing efficiency in BCC monoatomic structure is 68%. 5

4. (a) Calculate the thickness of quartz plate needed to produce ultrasonic waves of frequencies (i) 3·8 MHz (ii) 300 KHz. (where density of quartz crystal = 2650 kg/m^3 and Youngs modulus = 8 x10^{10} N/m^2) 5
(b) If a stream of electrons with average velocity of 1·6 x 10^7 m/sec. is deflected by 0·3 m in travelling a distance of 0·5 m through an electric field of 3500 volts/m perpendicular to its path then estimate e/m ratio for electron. 5

5. (a) A CRT is designed to have deflection sensitivity of 0·3 mm per volt. The plates are required to be 3 cm long and 6 mm apart. The distance of the screen from the centre of the plate is 20 cm. What should be final anode voltage ? What will be the deflection sensitivity for a charged particle which is 2500 times heavier than electron but having same charge. 5
(b) At what velocity the De-Broglie wave length of an alpha particle is equal to the wavelength of 1·8 KeV x-ray photons ? [$m_p = 1{\cdot}67 \times 10^{-27}$ kg] 5

6. (a) Show that in a crystal of cubic structure the distance between the planes with miller indices (hkl) is equal to— 5

$$d = \frac{a}{\sqrt{h^2 + k^2 + l^2}}$$

where a : lattice parameter.
(b) A crystal lattice plane (326) makes an intercept of 1·5 Å on x-axis in a crystal having lattice constant 1·5 Å, 2 Å, 4 Å, on x, y, z crystallographic axis respectively. Find y and z axes intercept. 5

7. (a) Explain use of CRO to measure phase and frequency of electrical signal. 5
(b) Explain Cavitation effect when ultrasonic wave is passed through a liquid. 5

Section II

N.B. : (1) Question No. **8** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume any **suitable data**.
(4) **Figures** to the **right** indicate **full** marks.
(5) Answer **two** sections on different answer-sheets.

At. Wt. : Ca = 40, H = 1, O = 16, S = 32, N = 14, C = 12, Cl = 35·5, Fe = 55·8, Mg = 24, Si = 28.

8. Answer any **five** of the following :— 10
(a) Fatty oils are no more used as lubricants on the large scale. Why ?
(b) Define Pollution and mention its any two causes.
(c) What is the repeat unit of natural rubber ? (with structure)
(d) Define BOD with its significance.
(e) Name the indicator used in EDTA titration. What is the colour change at the end point of titration ?
(f) Define copolymer and give one example.

9. (a) Which TYPE of film/lubrication required for HIGH SPEED, LOW LOAD Machines ? 4
(b) Calculate amount of Lime (90% pure) and Soda (100% pure) for 1 million lit of water containing the following impurities :— 6
$CaSO_4$ = 136 ppm, H_2SO_4 = 49 ppm, $MgCl_2$ = 95 ppm, $MgSO_4$ = 60 ppm, SiO_2 = 50 ppm.

10. (a) Which type of moulding is used for coating the wires used for insulation ? 4
(b) Explain Reactions of Lime and Soda used for softening. 6

11. (a) Define flash point of lubricant. How is it determined by Pensky-Marten's Apparatus ? 5
(b) Differentiate :— (i) Thermoplastic and Thermosetting resins (any 3 points) 3
(ii) LDPE and HDPE (any 2 points) 2

12. (a) Explain any three moulding constituents of plastics (With 2 ex. of each) 6
(b) Write a note on Photochemical smog. 4

13. (a) A zeolite softener was completely exhausted and was regenerated by passing 150 lit. of NaCl soln., containing 50 g/lit. of NaCl. How many litres of water of hardness 450 ppm can be softened by this container ? 6
(b) Give an account of Phosphate conditioning in case of boilers as internal treatment method. 4

14. (a) Give the sources and effects of the air pollutants Ozone and SOx. 6
(b) 16 gm of blended oil was heated with 50 ml KOH. This mixture then required 31·5 ml of 0·5 N HCl·50 ml KOH required 45 ml 0·5 N HCl. Find % cottonseed oil, if saponification value = 192 mg. 4

———v———

F.E. Sem I Engineering Mechanics 12/12/05

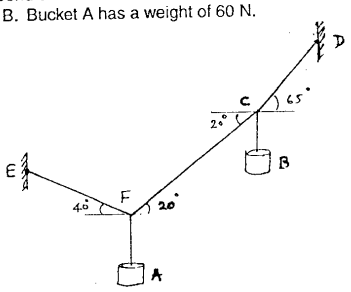
(REVISED COURSE)

(3 Hours) [Total Marks : 100

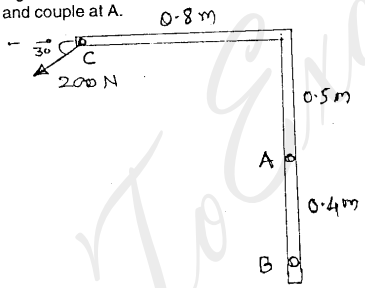
N.B. (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions out of **remaining six** questions.
(3) Assume **suitable** data if **necessary**.
(4) **Figures** to the **right** indicate marks.
(5) Take value of g = 9·81 m/s².

1. Solve any **four** of the following :— 20

(a) If the cords suspend the two buckets in the equilibrium position shown in **figure**. Determine the weight of bucket B. Bucket A has a weight of 60 N.



(b) A force of 200 N acting on a bracket as shown in **figure**. Determine. An equivalent force and couple at A.



(c) A stone dropped into a well is heard to strike the water in 4 seconds. Find the depth of the well, assuming the velocity of sound to be 335 m/sec.

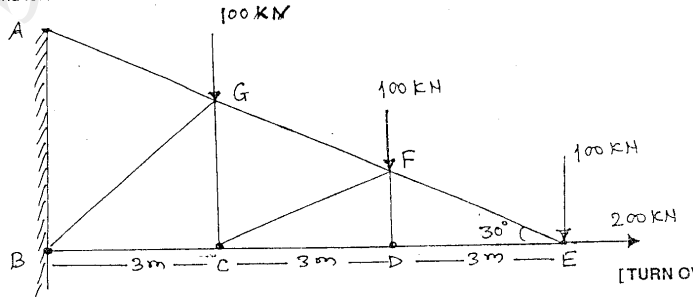
(d) The path of projectile is a parabola. Justify this statement with the help of mathematical derivation.

(e) A particle moves in a x-y plane with an acceleration, $\bar{a} = -3i - 16tj$ m/s². If it starts at the origin with a starting velocity 50 m/s directed at 30° C to the x-axis, compute at t = 2 sec., (i) Radius of curvature of path, (ii) Tangential acceleration,, (iii) Normal acceleration.

$$\left(\text{Hint : } \frac{1}{R} = \frac{V_x a_y - a_x V_y}{\left(V_x^2 - V_y^2 \right)^{3/2}} \right)$$

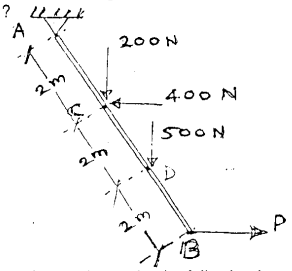
2. (a) The Truss is loaded and supported as shown in **figure**. Determine the following :— 12

(i) Identify the zero force member.
(ii) Find forces in members EF, ED and FC by method of joints.
(iii) Find forces in members GF, GC and BC by method of section.



[TURN OVER

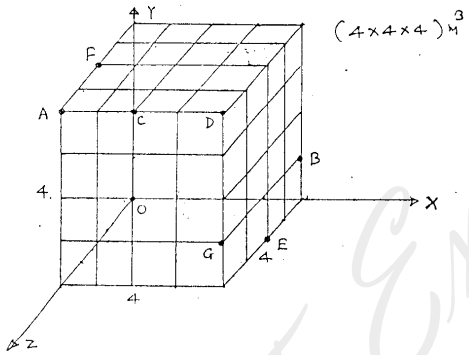
(b) Bar AB is acted upon by forces as shown in the **figure**. Find F to be applied at P for the system in equilibrium. Use Virtual Work Method ? (8)



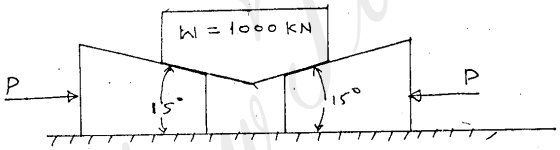
3. (a) The Rectangular block as shown in **figure** is acted upon by the following forces :— 12

P = 500 kN acting from B to C
Q = 480 kN acting from C to E
T = 270 kN acting from F to G.

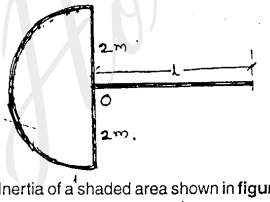
Replace the specified set of forces by single resultant force acting at 0 and a couple.



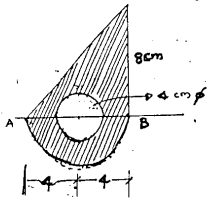
(b) What force P must be applied to the weightless wedges shown in **figure** to start them under the 1000 kN block ? The angle of friction at all contact surfaces is 10°. 8



4. (a) Find the length L of a portion of bent up wire shown in **figure**. The C.G. of a whole **figure** is at point O. 8



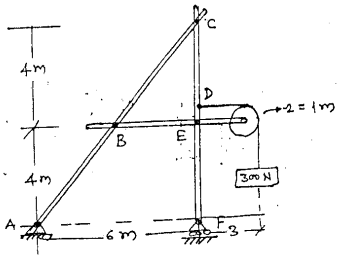
(b) Find the Moment of Inertia of a shaded area shown in **figure** with respect to the centroidal axis parallel to AB. 8



(c) State : (i) Lamis Theorem, (ii) Principle of super position. 4

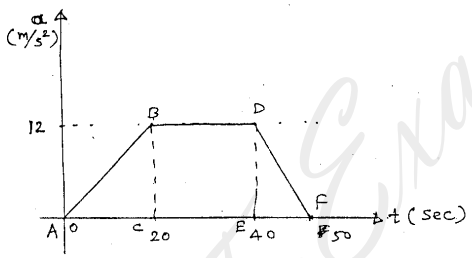
F.E. Sem I Engineering Mechanics 12/12/05

5. (a) Determine the components of forces acting at points B, C and E. Assume that the pulley is smooth. 10

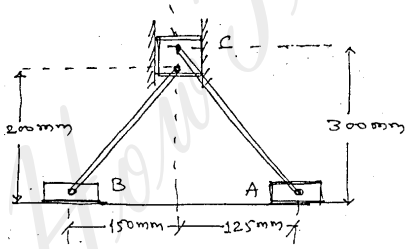


(b) A boy throws a ball with an initial velocity 24 m/s knowing that the boy throws the ball from a distance of 30 m from the building. Determine — (i) the maximum height 'h' that can be reached by the ball and (ii) the corresponding angle α. 10

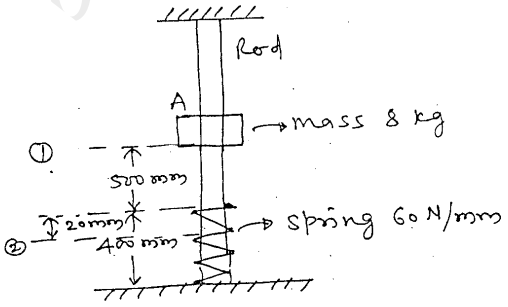
6. (a) **Figure** shows below a plot of a-t curve for a particle moving along straight line. Draw v-t and s-t curve and determine the speed and distance covered by the particle after 50 sec. Find also the maximum speed and time at which the speed is attained by the particle. 10



(b) In the mechanism shown in **figure**. Piston 'C' is constrained to move in a vertical slot. A and B moves on horizontal surface. Rods CA and CB are connected with smooth hinges. If V_A = 0·45 m/sec. to the right. Find velocity of C and B. Also find angular velocity of two rods. 10

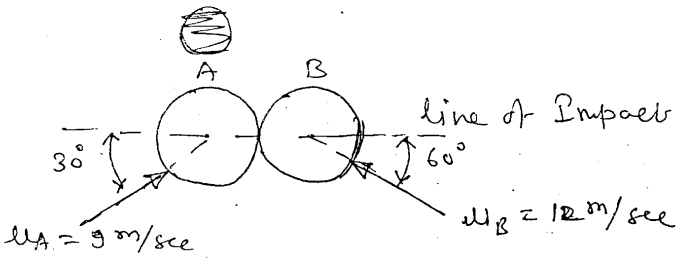


7. (a) A mass of 8 kg can slide freely on a smooth vertical rod as shown in **figure**. The mass is released from rest at a distance of 500 mm from the top of the spring. The spring constant is 60 N/mm. Determine the velocity of 'A' when the spring has compressed through 20 mm. The free length of the spring is 400 mm. 6

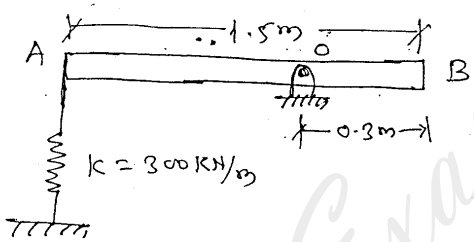


[TURN OVER

(b) The magnitude and direction of two identical smooth balls before central oblique impact are as shown in figure. Assuming e = 0·90. Determine the magnitude and direction of velocity of each ball after impact.



(c) A 15 kg siender rod AB is 1·5 m long and pivoted about point 'O' which is 0·3 m from end B. The other end is pressed against a spring of constant. K = 300 kN/m. Until the spring is compressed 25 mm. The rod is then in a horizontal position. If the rod is released from this position. Determine the angular velocity when the rod has rotated through 60° and 90°.



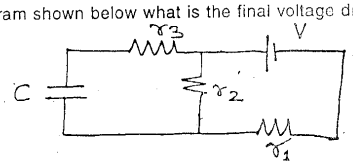
F.E. Sem I Basic Electrical and Electronics Engg.
14/12/05

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

B. (1) Question No. **1** is **compulsory** .
(2) Attempt any **four** questions out of **remaining** six questions.
(3) Assume any **suitable** data wherever **required**.

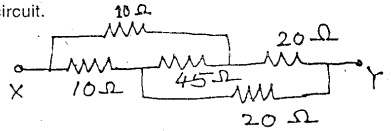
(a) In the circuit-diagram shown below what is the final voltage drop across capacitor. 25



(b) A wire has a resistance of 12 Ω. It is bent in the form of circle. Calculate the resistance between any two points on its diameter.

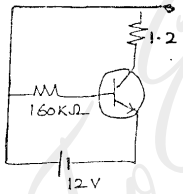
(c) The resistance of a wire of uniform diameter 'd' and length 'l' is 'R' Ω. Calculate the resistance of another wire of same material but diameter '2d' and length '4l'.

(d) Find R_{XY} in the following circuit.



(e) Calculate the power dissipated in the circuit when supply voltage $v = 5 \cos(wt)$ and $i = \sin(wt)$.

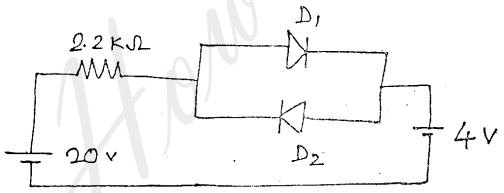
(f) Find I_C in the following circuit if B = 200.



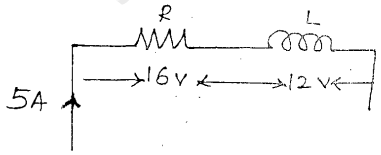
(g) An Impedence Z is connected to the secondary of an ideal transformer, having primary and secondary turns as N_1 and N_2. Show that Z seen from primary is equal to $\left(\frac{N_1}{N_2}\right)^2 Z$.

(h) State Fleming's right hand and left hand rules.

(i) Calculate the current flowing thro' 2·2 kΩ Resistor in the following circuit. Both diodes are ideal.



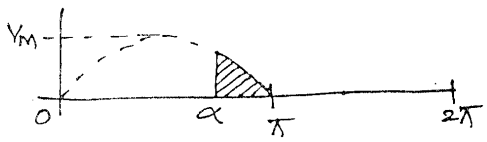
(j) Calculate the impedence of the circuit given below :



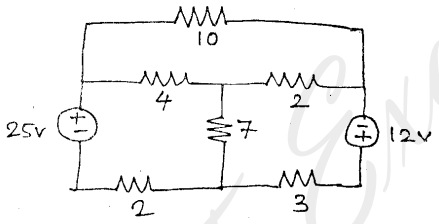
[TURN OVER

2. (a) Derive the expressions for the following parameters of Full Wave Rectifier :—
(i) I_{dc} (ii) I_{rms} (iii) P_{dc} (iv) P_{ac} (v) Efficiency η.
(b) What is ripple factor and derive for the ripple factor of full wave rectifier.
(c) With neat circuit dia and waveform explain capacitor input filter.

3. (a) Compare BJT configurations (CE, CB, CC) w.r.t.—
(i) Input resistance
(ii) Output resistance
(iii) Voltage gain
(iv) Current gain
(v) Applications.
(b) Discuss the operation of JFET.
(c) Calculate the RMS and Average values of the waveform shown below :



4. (a) Calculate the current thro' 10 Ω resistor by—
(i) Superposition theorem (ii) Thevenin's theorem.



(b) An RLC series circuit with resistance of 10 Ω, inductance of 0·2H and capacitance of 40 μF is supplied with a 100 V supply at variable frequency. 8
Find—(i) Resonating frequency
(ii) Current at resonance
(iii) Power
(iv) Power factor
(v) Voltage across R,L,C
(vi) Quality factor
(vii) B.W.
(c) Define— (i) Conductance (ii) Susceptance. 2

5. (a) A 230 V DC shunt motor takes no load current of 3A and runs at 1100 rpm. If the full load current is 41 Amps. Find the speed on full load if R_a = 0·25 Ω. and R_{sh} = 230 Ω. 4
(b) Why 1-ph Induction motors are not self starting ? and Hence explain the construction and working principle of shaded pole Induction motor. 6
(c) Discuss the effect of p.f. on regulation of transformer. 4
(d) Draw and explain the vector diagram of transformer with leading p.f. load. 6

6. (a) Discuss the measurement of 3-ph power by two wattmeters method. Draw phasor and circuit-diagram 8
(b) Discuss the graphical representation of series resonance. 8
(c) Define the following terms : 4
(i) Latching current
(ii) Holding current
(iii) dv/dt
(iv) di/dt.

7. Write short notes on : 20
(a) Gravity and Spring Control Instruments
(b) Temperature Sensors
(c) Star-Delta transformations
(d) Double-field revolving theory.

F.E. Sem I Computer Programming - I 16/12/05.

[REVISED COURSE]

(3 Hours) [Total Marks : 100

N.B. : (1) Question No.1 is compulsory.
(2) Attempt any four out of remaining six questions.
(3) All programs in C programming language.
(4) Answers to a main question shall be grouped and written together.

Q	No	Detailed and framed questions	Max. Marks
Q1.	a	Suppose you place a given sum of money, A, into a savings account at the beginning of each year for n years. If the account earns interest at the rate of i percent annually, then the amount of money that have accumulated after n years, F is given by $F=A[(1+i/100) + (1+i/100)^2 + (1+i/100)^3 + \ldots\ldots\ldots + (1+i/100)^n]$ Write an interactive C program to determine the following i) Money gets accumulated at the end of n years ii) how much money needs to be deposited at the beginning of the first year to get an amount ' Famt'	10
	b	There's a recursive function called Ackerman's function, which is popular with lecturers' of computer science course and can be defined like this if m and n are integers. Ack(m,n) = n+1 if m=0 Ack(m,n)=Ack((m-1,1) if (n=0) and m>0 Ack(m.n)=Ack(m-1,ack(m,n-1)) otherwise Where m>=0 and n>=0 Write a recursive function for the aforesaid Ackerman's function	10
Q2.	a	Write a program which finds four digit perfect squares , where the number represented by the first two digits and last two digits are also perfect squares e.g. $1681= 41^2$, $16= 4^2$, $81=9^2$	10
	b	A famous conjecture holds that all positive integers converges to 1 (one) when treated in the following fashion. Step 1. If the number is odd, it is multiplied by three and one is added 2. If the number is even , it is divided by two 3. Continuously apply above operations to the intermediate results until the number converges to one Write a program to read an integer number from key board and implement the above mentioned algorithm and display all the intermediate values until the number converges to 1. Also count and display the number pf iterations require for the convergence	10
Q3.	a	Write a program to read the name and total marks of a class of 50 students. Arrange this data (names and marks) in the descending order of total marks and print the outputs with proper headings.	10
	b	Write a program for computing mean, variance and standard deviation of a set of numbers using the following formula $\text{Mean} = 1/n \sum_{i=1}^{n} Xi$ $\text{Variance} = 1/n \sum_{i=1}^{n} (Xi-Xmean)^2$ Standared Deviation = $\sqrt{\text{Variance}}$	10

[TURN OVER

Q4.	a	Write a program that builds tables of the tip speed of a propeller having diameter d (an input value) for various shank speeds, measured in revolutions per minute. Let s=1000, 2000, 3000 ...80,000. Store the tip speeds and shank speeds in tables then print the tables. The formula for computing the angular velocity in radians per second $\omega = 2\pi s/60$ and tip speed = $(\omega \times d)/2$	10
	b	A minimax or saddle point in a two dimensional array is an element that is the minimum of its row and the maximum of its column, or vice verse. For example , in the following array A[I][J] 11 22 33 24 99 55 66 77 77 44 88 22 The element A[1][3]= 33 is a minimax The element A[2][2]= 55 is a minimax Write a program to identify and display all such saddle points and its location with in the two dimensional array, which is read from the keyboard	10
Q5.	a	A point on the two dimensional plane can be represented by two numbers; an X coordinate and a Y coordinate. For example (2, 3) represents point 2 units to the right of the origin along the X axis and 3 units up the y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the two points and whose Y coordinate is the sum of the coordinates of the Y coordinates of the two points. Write a program that uses a structure called Point to model a point. Define three points, and have the user input values to two of them. Then set the third point equal to the sum of the other two, and display the input values of the new point.	10
	b	Write a program to create an array of structure to store the details of utmost 100 employees. Employee details are as follows i) Employee Name ii) Employee Designation iii) Employee ID No. iv) Employee Date of Birth v) Employee salary Also write functions for deletion of an employee record and insertion of a employee record in a sorted array (Ascending order of Employee ID No.) and also incorporate function for display of array of structures.	10
Q6.	a	Discuss UNIX as an operating system and explain its file structure, and vi editor	10
	b	List at least 10 UNIX commands and explain	10
Q7.		Write notes on the following with suitable program/ program segments a. Storage classes b. Array notation and pointers c. Parameter passing by reference and value d. Preprocessor directives e. Structures and union.	20

****