Code :9ABS302 **R9**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
MATHEMATICS-III
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Define Beta function and prove that $\beta(m,n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$
   (b) Prove that:
      i. $j_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}}\sin x$
      ii. $j_{-\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}}\,\text{cosx}$
2. (a) State Cauchy Reimann equations. Show that $f(z) = z + 2\overline{z}$ is not analytic anywhere in the complex plane.
   (b) Define Harmonic function. Find the regular function. Whose imaginary part is e^xsin y.
3. (a) Find all values of z which satisfy.
      i. $e^z = -2$
      ii. $e^z = 1 + i$
   (b) Find all principal values of $\left(\frac{\sqrt{3}}{2} + \frac{i}{\sqrt{2}}\right)^{(1+i\sqrt{3})}$
4. (a) Integrate $f(z) = x^2 + ixy$ from A(1,1) to B(2,8) along
      i. The straight line AB.
      ii. The curve C:x=t, y=t^3.
   (b) Evaluate using cauchy's theorem
   $\int \frac{z^3 e^{-z}}{(z-1)^3} dz$
5. (a) Expand $f(z) = \sin z$ in Taylor's series about $z = \frac{\pi}{4}$
   (b) State Laurent's theorem, find the Laurent series expansion of the function
   $f(z) = \frac{z^2-6z-1}{(z-1)(z-3)(z+2)}$
6. (a) Find the residue of $\frac{z^2-2z}{(z+1)^2(z^2+1)}$
   (b) Evaluate $\int_0^\infty \frac{dx}{(x^2+a^2)^2}$
7. (a) State Rouche's theorem. Use Rouche's theorem to find the number of zero's of the polynomial $z^{10} - 6z^7 + 3z^3 + 1 if\ |z| < 1$
   (b) Show that the equation $z^4 + 4(1+i)z + 1 = 0$ has one root in each quadrant.
8. (a) Show that the transformation $w = \frac{1}{z}$ maps a circle to a circle or to a straight line if the former goes through the origin.
   (b) Find the bilinear transformation which maps $\infty, i, 0$ in the z-plane in to -1, -i, 1 in the w-plane.

⋆ ⋆ ⋆ ⋆ ⋆

Code :9ABS303 **R9**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
ENVIRONMENTAL SCIENCE
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Write importance of education on environmental issues.
   (b) Explain need for students from all courses to be aware of environmental issues.
2. (a) What do you mean by floods and drought?
   (b) Discuss consequence of drought.
   (c) Define aquifer.
3. (a) Discuss in detail about estuaries, ponds, and oceans.
   (b) Define ecosystem.
4. Discuss in detail about in-situ and ex-situ conservation of biodiversity.
5. Discuss in detail about nuclear hazards and thermal pollution.
6. Write note on air prevention and control of pollution and water prevention and control of pollution.
7. Discuss about role of information technology in environment and human health.
8. Write detailed report on the local polluted industrial site.

⋆ ⋆ ⋆ ⋆ ⋆

Code :RA07A4EC08 **RA**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
OBJECT ORIENTED PROGRAMMING
(Electronics & Communication Engineering)
(For students of R07 regulation readmitted to II B.Tech I Semester R09)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. How many data types are in Java? Explain with ranges.
2. Distinguish the following terms:
   (a) Objects and classes.
   (b) Data abstraction and data encapsulation.
3. (a) Distinguish between the keywords "extends" and "implements".
   (b) What is inheritance? Explain the forms of inheritance with examples.
4. What are the packages provided by Java Apl? Explain.
5. List and explain the various methods by the thread class with examples of each.
6. Describe the action event, the adjustment event, the component event and the container event classes with their methods and classes.
7. (a) Explain the steps in creating a subclass of frame with the help of examples.
   (b) How will you create check boxes and choice boxes? Explain in detail.
8. Write short notes on:
   (a) Network Socket.
   (b) Client / Server.
   (c) Reserved Socket.
   (d) Proxy server.

⋆ ⋆ ⋆ ⋆ ⋆

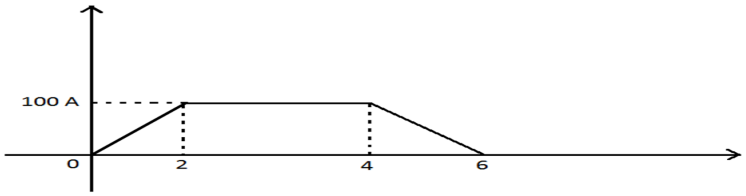
Code :9A02305 **R9**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
ELECTRICAL CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

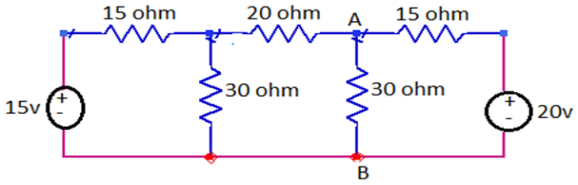
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is the difference between an ideal source and a practical source. Draw the relevant characteristics of the above sources.
   (b) A current wave form flowing through an inductor of 1mH is shown in the figure. Obtain and sketch the waveform of the voltage across the inductor.



2. (a) State and explain Kirchoff's laws using neat diagrams.
   (b) Determine the current in branch A-B by Kirchoff's laws.

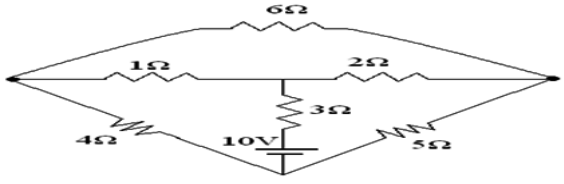


3. (a) Derive the basic equation of an alternating quantity. Hence state its various forms.
   (b) A 50Hz sinusoidal voltage applied to a single phase circuit has its RMS value of 200V. its value at t=0 is 28.3 volt positive. The current drawn by the circuit is 5A RMS and lags behind the voltage by one sixth of a cycle. Write the expressions for instantaneous values of voltage and current.

4. Show that the locus of the current in an R-L circuit with R variable is a semicircle. Find the radius and the center of the circle.

5. (a) State and explain Faradays laws of Electromagnetic Induction.
   (b) Explain dynamically induced emf.
   (c) An iron ring has mean diameter of 20 cm and a cross section of 2 cm^2 . It is uniformly wound with 2000 turns with insulated wire and a current of 2A produces a flux of 0.2mwb .calculate relative permeability of iron.

6. Draw the network graph for the network shown in figure, Find the number of possible trees for that graph and draw all possible trees.



7. Find maximum power transferred to the load resistance RL for the circuit shown fig 1.
8. Find the current through 12Ω resistor using superposition theorem. fig 2.

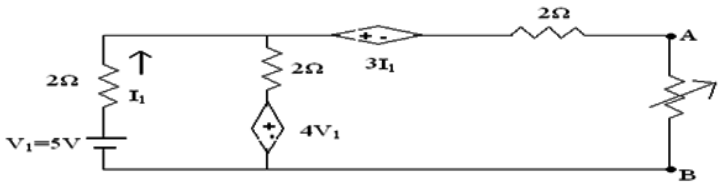


Figure 1: Figure for Question No.7

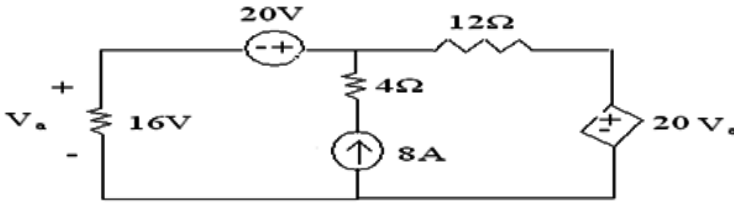


Figure 2: Figure for Question No.8

⋆⋆⋆⋆⋆

Code :9A04301 **R9**

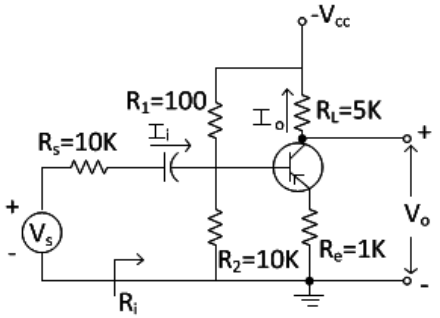
II B.Tech I Semester(R09) Supplementary Examinations, May 2011
ELECTRONIC DEVICES & CIRCUITS
(Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Information Technology, Computer Science & Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Discuss PN diode VI characteristics with neat sketch.
   (b) Calculate the factor by which the current will increase in a silicon diode operating at a forward voltage of 0.4Volts, when the temperature is raised from 25 C to 150 C.
2. (a) With circuit and necessary waveforms explain the operation of Bridge Rectifier.
   (b) Design a filter for FWR circuit with LC filter to provide an output voltage of 10 Volts with a load current of 200mA and the ripple is limited to 2%.
3. (a) With neat sketch explain the different current components of transistor.
   (b) In an NPN transistor emitter is grounded, base is connected with 4 Volts supply in series with 100 K ohms resistor and collector base is connected with 4 Volts supply in series with 2K ohms. Assume $V_{CC} = 12$Volts, $V_{BE} = 0.7$ Volts, $\beta = 100$. Find I_B,I_C and I_E
4. (a) Explain diode compensation circuit for variations in I_C for self bias circuit.
   (b) How self bias circuit will eliminate drawbacks in fixed bias circuit.
5. (a) With neat structure explain the principle of operation of depletion MOSFET.
   (b) Explain drain characteristics of JFET.
6. (a) Derive an expression for voltage gain, Input Impedance and output impedance of CG amplifier at low frequencies.
   (b) In an N - channel JFET based voltage divider common drain configuration, determine the value of resistor Rs so as to have the operating point as IDQ = 5mA, VDSQ = 10V. Given that VDD = 28 V, R1 1 M ohms, R2 = 0.5 M ohms, saturation drain current of the FFET is 10 mA and gate source pinch off voltage is '-5V'.
7. For the transistor amplifier shown below, Compute $A_I = I_0/I_i, A_v$, A_{vs} and R_i. Assume h_{ie} = 1100 ohms, $h_{fe} = 50$, $h_{re} = 2.5 * 10^{-4}$ $h_{oe} = 24$uA/V



8. Discuss the principle of operation of
   (a) Varactor Diode
   (b) LED
   (c) LDR

⋆ ⋆ ⋆ ⋆ ⋆

Code :9A04303 **R9**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
PROBABILITY THEORY & STOCHASTIC PROCESSES
(Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) State and prove Baye's theorem
   (b) A shipment of components consists of three identical boxes. One box contains 2000 components of which 25% are defective, the 2^{nd} box has 5000 components in which20% are defective, and the 3^{rd} box contains 2000 components of which 600 are defective. A box is selected at random from the box. What is the probability by that it came from the second box?
2. (a) Discuss about uniform distribution and exponential distribution
   (b) A random variable x has the distribution function $F_x(x) = \sum_{n=1}^{12} \frac{n^2}{650}\, u(x-n)$ find the probabilities (a) p($-\infty \prec x \leq 6.5$) (b) p(x$\succ$4) and (c) p(6$\prec x \leq 9$)
3. (a) What is the limitation of a characteristic function and how it is rectified in moment generating function? Explain.
   (b) Find the moment generating function of the random variable whose moments are M_r= (r+1)! 2^r
4. (a) Explain the statistical independence of two random variables.
   (b) A joint sample space for two random variables X and Y has four elements (1,1),(2,2),(3,3),and(4,4). Probabilities of these events are 0.1,0.35,0.05 and 0.5 respectively
      i. Find the probability of the event {x $\leq$ 2.5, Y $\leq$6}
      ii. Find the probability of the event { x $\leq$ 3}
5. (a) Write short notes on joint moments about the origin.
   (b) If X and Y be independent random variables each having density function.

$$f_x(x) = 3e^{-3x} \quad for\ x \geq 0$$
$$= 0 \quad elsewhere$$
$$f_y(y) = 3e^{-3y} \quad for\ y \geq 0$$
$$= 0 \quad elsewhere$$

   find $(a)\ E(x^2+y^2)$ $(b)\ E(xy)$
6. (a) What are the differences between determinate and non determinate random processes? Explain each with an example.
   (b) Sample function in a discrete random process are constants; that is x(t) = c = constant where c is a discrete random variable having possible values $c_1 = 1$, $c_2 = 2$ and $c_3 = 3$, with probabilities 0.6, 0.3 and 0.1 respectively
      i. Is x(t) is deterministic.
      ii. Find the first order density function of x(t) at any time t.
7. (a) State and prove the properties of cross correction function
   (b) A random process is defined as x(t) = A cos ωt, where 'ω' is a constant and 'A' is a uniform random variable over (0,1). Find the auto correction and auto covariance of x(t).
8. (a) Derive the expression for the power spectral density of input and output of a linear system.
   (b) Prove that $|R_{xy}(\tau)| \leq \sqrt{R_{xx}(0).R_{yy}(0)}$.

⋆ ⋆ ⋆ ⋆ ⋆

Code :9A04304 **R9**

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
SIGNALS & SYSTEMS
(Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Verify the following signals $\sin n\omega_0 t$ and $\sin m\omega_0 t$ are orthogonal or not over the interval $(t_0, t_0 + 2/\omega 0)$
   (b) Approximate the function described below by a wave form sin t over the interval $(0, 2\pi)$. The function is
   f(t) = 1 $0 < t < \pi$
   =-1 $\pi < t < 2\pi$
   Also sketch the original function and approximated function.
2. (a) Expand following function f(t) by trigonometric Fourier series over the interval (0,1). In this interval f(t) is expressed as f(t) = At
   (b) Prove that discrete magnitude spectrum is symmetrical about vertical axis whereas phase spectrum anti-symmetrical about vertical axis.
3. (a) Find the Fourier transform of symmetrical gate pulse and sketch the Spectrum
   (b) State and prove following properties of Fourier transform
      i. Time shifting
      ii. Differentiation time domain
4. (a) Derive the relationship between rise time and bandwidth
   (b) Sketch the frequency response of ideal LPF,HPF and BPF.
5. (a) State and frequency Convolution property of Fourier transform
   (b) Find the correlation of symmetrical gate pulse with amplitude and time duration '1' with itself.
   (c) Evaluate u(t) * u(t)
6. (a) Sketch the spectrum of naturally sampled signal for following cases
      i. $\omega_0 = 2\omega_m$
      ii. $\omega_0 > 2\omega_m$
      iii. $\omega_0 < 2\omega_m$
      Where 'ω_0' is frequency corresponding to sampling interval and 'ω_m'is maximum frequency in the spectrum of base band signal. Explain the each sketch.
   (b) Explain the reconstruction of signal from its samples.
7. (a) Find Laplace transforms and sketches their ROC of
      i. x(t) = u(t-5)
      ii. $x(t) = e_0^{jwt}\, u(t)$
   (b) Find the inverse Laplace transform of
   X(s) = (-5s-7)/(s+1)(s-1)(s+2)
8. (a) Determine z - transform, pole - zero locations and sketch of ROC of following signal
   X(n) = -u(-n-1)+$(1/2)^n$u(n)
   (b) Find the inverse z - transform of
   X(z) = (2+z^{-1})/(1-0.5z^{-1}) with ROC $|z| > 1/2$
   Using power series expansion

⋆ ⋆ ⋆ ⋆ ⋆