2019

B.Sc. (Hons)

4th Semester Examination

ELECTRONICS (Honours)

Paper - SEC2T

Full Marks : 40 Time : 2 Hours

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

Internet and JAVA Programming Theory

Group - A

1. Answer any *five* questions : 2×5=10

   (i) What do you mean by constructor overloading?

   (ii) Define an abstract class.

   (iii) What do you understand by console Input/ Output?

   (iv) What is MAC address?

[Turn Over]

(v) Explain the term 'try' and 'catch' with respect to exception handling.

(vi) What is URL?

(vii) What is the role of 'super' keyword?

(viii) What is garbage collection?

Group - B

2. Answer any *four* questions : 4×5=20

(i) Differentiate between TCP and UDP communication protocols.

(ii) Discuss the purpose of doGET() and doPOST() methods.

(iii) What is an exception? How are they handled?

(iv) What are the various looping statements available in Java? Discuss any one with suitable example.

(v) What is thread? Write a short note on the life cycle of a thread.

(vi) How will you create a package in Java? Explain with an example.

Group - C

3. Answer any *one* question : 1×10=10

(i) Explain various access specifiers in Java with suitable examples. What are the advantages of JSP over servlet? What do you mean by JVM? 6+2+2

(ii) Briefly describe each class in IPv4 classful addressing. What is subnet? Define default mask. 6+2+2

Programming with MATLAB

Group - A

1. Answer any *five* questions : 2×5=10

(i) Explain if-end structure in MATLAB.

(ii) Explain the format of 'ode23' built in function in MATLAB.

(iii) Write a MATLAB program to plot $y = e^x$, for $0 \leq x \leq 4$

(iv) What do you mean by Anonymous function? Give its syntax.

(v) What is 'clc' command in MATLAB?

(vi) What do you mean by Laplace transformation of a function?

(vii) Why poly command is used in MATLAB?

(viii) What is Simulink?

Group - B

2. Answer any *four* questions : $4 \times 5 = 20$

(i) What is variable? How it is defined in MATLAB? Give rules regarding variable names. 2+1+2

(ii) Explain 'break' and 'continue' commands in MATLAB. $2\frac{1}{2} + 2\frac{1}{2}$

(iii) Find roots of an algebraic equation $f(x) = x^2 - 2x - 3$ using MATLAB function 'roots'. Also elaborate use of 'poly' command in MATLAB. 3+2

(iv) Explain the format of ode23 built in function in MATLAB. How ode45 differs with it? 3+2

(v) Define Continuous Time (CT) and Discrete Time signals. How DT signals can be plotted by using stem command in MATLAB? 5

(vi) Write a MATLAB program to evaluate the following expression :

$S = 1/1! + 1/2! + 1/3! + \ldots + 1/n!$ 5

Group - C

3. Answer any *one* question : 1×10=10

(i) (a) Explain 'while-end' loop command in MATLAB with proper example. 5

(b) Plot in green colour $y = \sin x$ taking 120 linearly spaced points in the internal $0 \leq x \leq 2\pi$. Lable the axis and put 'sine wave function' name to the graph. 5

(ii) Explain mesh and surface 3D graphical facility provided in MATLAB. 5 + 5

Networking and Mobile Communications

1. Answer any *five* questions : 2×5

   (i) Write down the application of LAN, MAN & WAN.

   (ii) Differentiate between connection less and connection oriented service?

   (iii) What is the function of a data link layer?

   (iv) Define Grade of service.

   (v) What is the difference between soft hand off and hard hand off technology?

   (vi) Mention different types of Blue-tooth network.

   (vii) What is the function of HLR in case of GSM technology?

   (viii) Write two application of CDMA. Networking.

2. Answer any *four* questions : 4×5

   (i) What are the different types of topology used in networking. Briefly discuss about them?

   (ii) Differentiate circuit-switched and packet-switched network.

(iii) What are the different types of transmission media used in data communication? Briefly discuss about them.

(iv) What is the concept of frequency reuse in case of wireless technology?

(v) Write short notes on PSTN network.

(vi) Briefly discuss about IPV4 and IPV6 networking.

3. Answer any *one* question : 1×10

(i) With the proper block diagram, discuss GSM system. 10

(ii) What are the different layers used in TCP/IP networking? Briefly discuss each of the layer. Differentiate between OSI model and TCP/IP model. 2+6+2

Circuit Modelling Using PSPICE

1. Answer any *five* questions : 2×5

(i) Write different types of analysis used in P-SPICE.

(ii) Write different file types for P-SPICE.

(iii) What are the commands that are available to get output from the results of simulations by using P-SPICE?

(iv) Write down the utility of OP command.

(v) What are the model parameters of Pulse sources? Write down by using a proper pulse waveform.

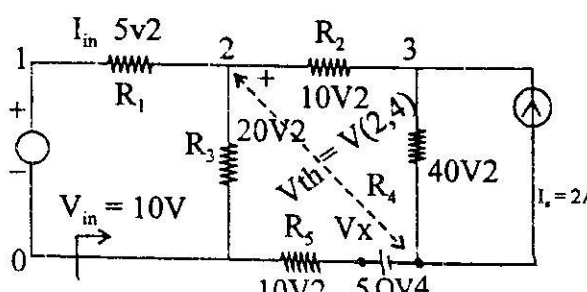
(vi) Write two transient output commands.

(vii) What is the meaning of VM(5)?

(viii) What is the model statement for n-channel MOSFET for P-SPICE?

2. Answer any *four* questions : 4×5=20

(i)



A dc circuit shown above in figure 1. Use P-SPICE to Calculate and print (a) the voltage

gain Av = $\frac{v(2,4)}{v_in}$, (b) the input resistance Rin = V_{in}/I_{in} (c) Thevenin's (output) resistance Rout = Rth between nodes 2 & 4(d) Thevenin's voltage v_{th} between nodes 2 & 4.

(ii) A pulse input as shown in figure 2(b) is applied to the RLC circuit of figure 2(a). Use P-SPICE to calculate and Plot the transient response from 0 to 400 μs with a time increment of 1 μs. The capacitor voltage v(3) and the current through R_1I (R_1) are to be Plotted

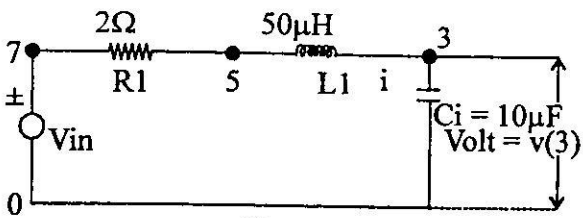
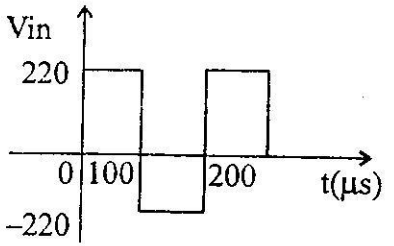


Figure 2(a)
Circuit

[Turn Over]



Ideal pulse input

(iii) A diode circuit is shown in figure 3. Plot the V-i characteristic of the diode for forword voltage 0 to 2V and for temperatures of 50°, 100° and 150°. The diode is of type DIN914, and the model parameters are 2S = 3·93E–9, Rs = 1, BV = 100V, IBv = 5E – 6, CJo= 1·7PF and TT = 2NS.

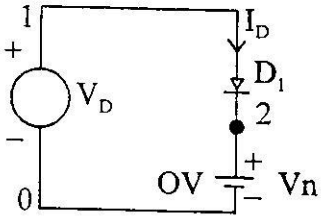


Fig. 3

(iv) For the NPN BST of Figure 4, Plot the output characteristics (IC versus V_{CE}) if V_{CE} is varied from 0 to 10V in steps of ·02V and I_B is varied from 0 to 1 mA in steps of 200 μA.

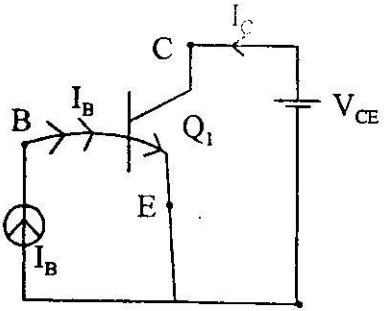
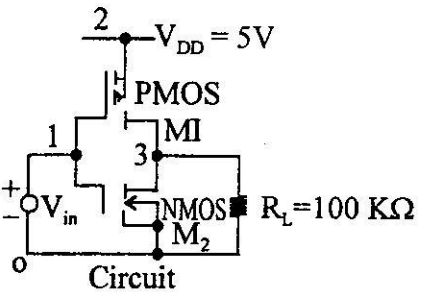


Figure 4

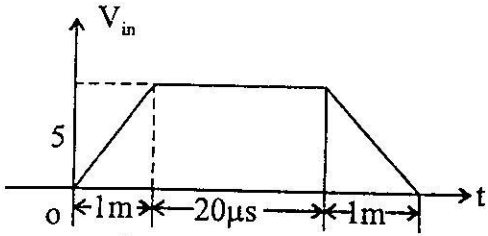
(v) A CMOS inverter circuit is shown in Figure (5a). The output is taken from node 3. The input voltage is shown in figure 5(b). Plot the transient response of the output voltage from 0 to 80μs in stpes of 2μs. If the input voltage is 5V, calculate the voltage gain, the input rersistance and the O/P rersistance.



Circuit

Figure5 (a)

[Turn Over]



input voltage
Figure 5(b)

(vi)

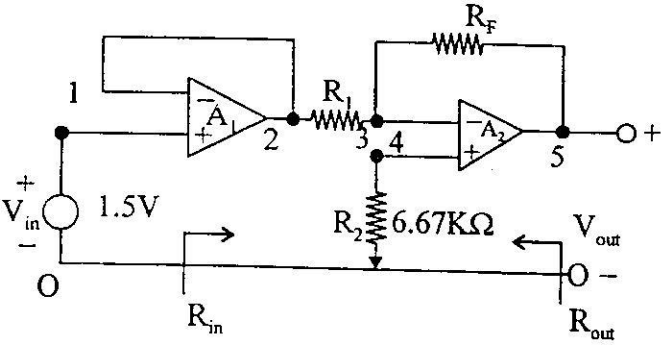


Figure-6

An inverting amplifier is shown in figure 6. The output is taken from node 5. Calculate and print the voltage gain, the input resistance and the output resistance.

3. Answer any *one* question : 1×10

(i)

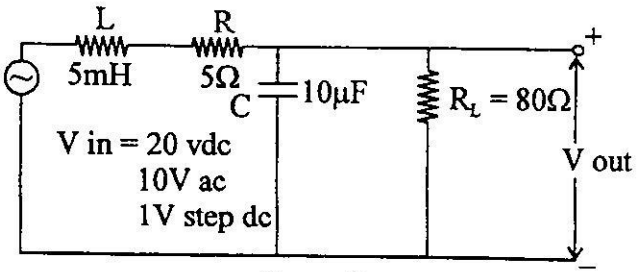


Figure 7

Find the frequency response and dc analysis of a series-parallel circuit. 10

(ii) Write a P-SPICE program for transfer function analysis and small signal analysis for a BJT amplifier. 5 + 5