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Code No. : 14164 (D) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. IV-Semester Main & Backlog Examinations, July-2023

P Spice Modeling for Electrical Circuits

Time: 3 hours

Max. Marks: 60

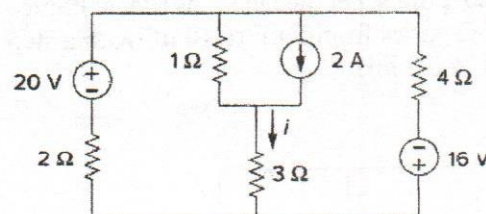
Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

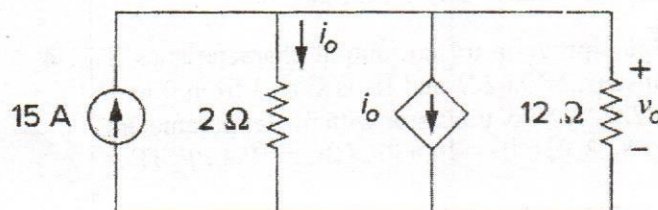
Q. No.	Stem of the question	M	L	CO	PO
1.	Give an example of Textual Scientific Notation which is used in PSPICE software.	2	1	1	1,2
2.	Write syntax of voltage dependent voltage source in PSPICE A/D software	2	1	1	1,2
3.	Write the part name for a voltage-controlled current source in PSPICE A/D software	2	1	2	1,2
4.	Write any two applications of PSPICE A/D software	2	1	2	1,2
5.	Explain the significance of .TRAN statement to analyze AC electrical circuits	2	1	3	1,2
6.	Write the syntax of sinusoidal AC voltage source	2	1	3	1,2
7.	Describe .PLOT command	2	1	4	1,2
8.	What is the use of .PRINT statement in a circuit file in PSPICE A/D software	2	1	4	1,2
9.	Write the syntax for DC parametric sweep statement in electrical circuits	2	1	5	1,2
10.	Describe the use of .MODEL statement in PSPICE A/D software	2	1	5	1,2

Part-B (5 × 8 = 40 Marks)

11. a) Explain the format of output file in PSPICE A/D software. 4 2 1 1,2
 b) Write a PSpice program to print i in the circuit shown below. 4 3 1 1,2

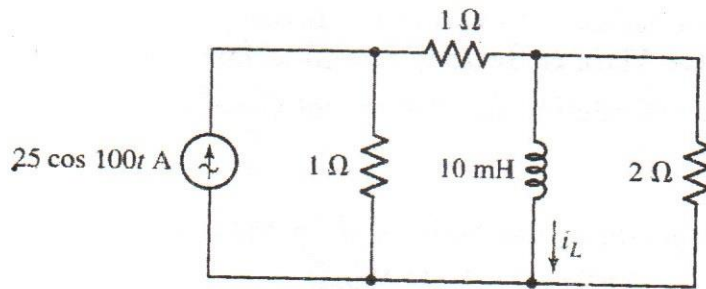


12. a) Describe the format of a circuit file in PSPICE A/D software with a suitable example. 4 2 2 1,2
 b) Write a PSpice program to print v_0 and i_0 in the circuit shown below. 4 3 2 1,2



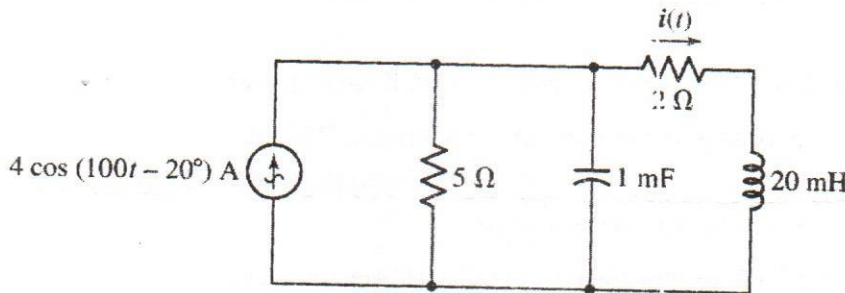
Contd... 2

13. a) Write a PSpice program to print i_L in the output file for the circuit shown below



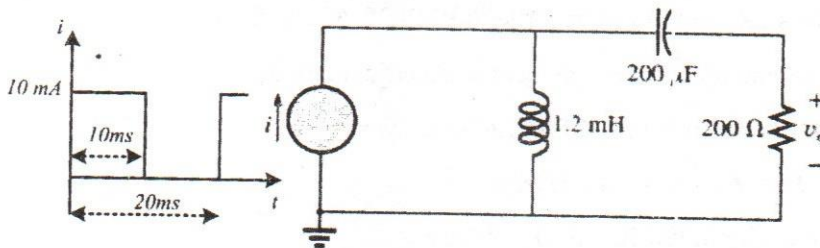
4 2 3 1,2

3 b) Write a PSpice program to print $i(t)$ and power dissipated in 5Ω in the output file for the circuit shown below



4 4 3 1,2

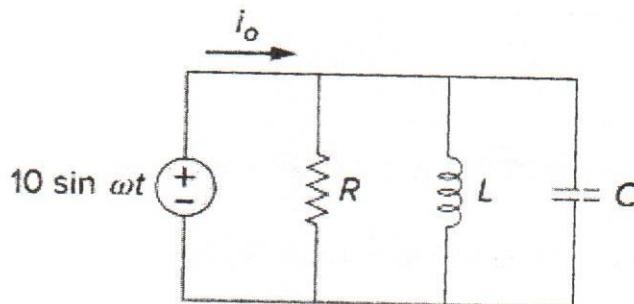
14. a) Write a PSpice program to print harmonic voltages in v_0 up to 15th harmonic for the circuit shown below.



4 2 4 1,2

b) In the following circuit, the frequency of source is varied from 50 Hz to 100 kHz with a decade increment and 20 points per decade. Write a PSpice program to print current through R, if C varies from $5\mu\text{F}$ to $10\mu\text{F}$ with a step increment of $1\mu\text{F}$. Let $R = 8\text{ k}\Omega$ and $L = 0.2\text{ mH}$.

4 3 4 1,2



15. a) For NPN transistor, write a PSpice program to plot output characteristics if V_{CE} is varied from 0 to 12 V in steps of 0.02 V and I_B is varied from 0 to 1 mA in steps of 200 μA . Use Q2N2222A NPN transistor with model parameters $I_S = 3.295\text{E-}14$, $\text{BF} = 173$, $V_A = 83.3\text{ V}$, $\text{CJE} = 29.6\text{ PF}$, $\text{CJC} = 19.4\text{ PF}$, $\text{TF} = 489.88\text{ PS}$, and $\text{TR} = 4.9\text{ NS}$.

4 2 5 1,2

b) For junction field effect transistor (JFET), plot output characteristics using PSpice program if VDD is varied from 0 to 12 V in steps of 0.2 V and VGS is varied from 0 to -4 V in steps of 1 V. The model parameters of JFET are IS = 100E-14, RD = 10, RS = 10, BETA = 1E-3, VTO = -5 V.

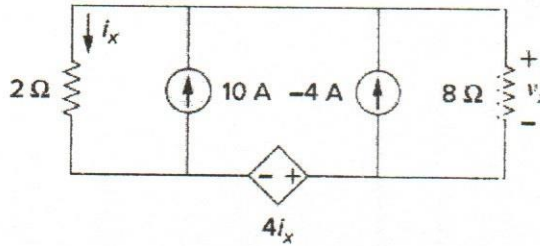
4 3 5

16. a) Describe OrCAD Pspice software in detail.

4 2 1 1,2

b) Write a PSpice program to find voltage across 8Ω resistor in the circuit shown below.

4 3 2 1,2



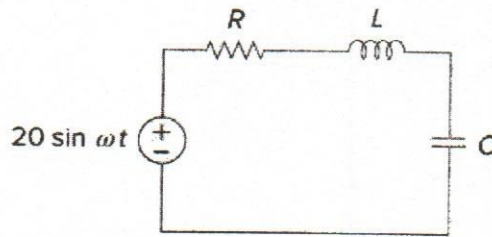
17. Answer any two of the following:

a) Explain .PROBE statement in a circuit file in PSPICE A/D software in detail.

4 2 3 1,2

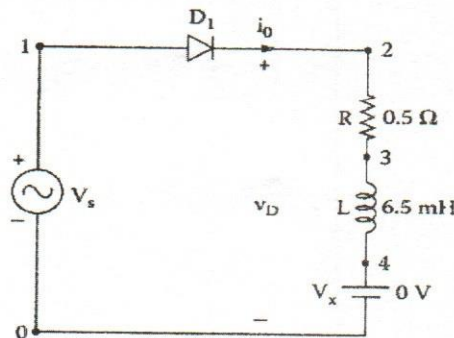
b) The circuit shown below has R = 2 Ω, L = 1 mH, and C = 0.4 μF. The frequency of source is varied from 50 Hz to 100 kHz with a decade increment and 20 points per decade. Write a PSpice program to print power dissipated in R.

4 3 4 1,2



c) For the circuit shown below, the input voltage is sinusoidal with a peak of 169.7 V, 60 Hz. The load inductance L is 6.5 mH, and the load resistance R is 0.5 Ω. The diode is of type D1N914 and the model parameters are IS = 3.93E-9, RS = 1, BV = 100V, IBV = 5E-06, CJO = 1.7PF. Use PSpice program to calculate the Fourier coefficient of the output voltage.

4 4 5 1,2



M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	40%
