CLASS: BTECH   SEMESTER : I
BRANCH: CSE/IT/ECE/EEE   SESSION : MO/18

SUBJECT: EC101 BASICS OF ELECTRONICS AND COMMUNICATION ENGG.
TIME: 3:00 HRS.   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)   Explain the transition and diffusion capacitance of the p-n junction diode. Silicon is usually   [5]
         preferred over germanium for fabrication of semiconductor devices, justify.

Q.1(b)   Determine the range of values of V_i that will maintain the Zener diode of the following figure in   [5]
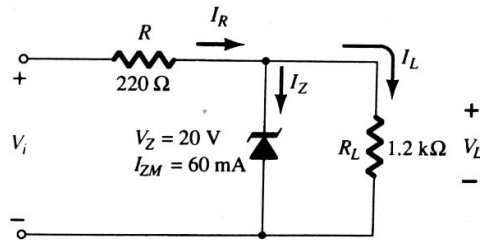   the "on" state.

Figure-1

Q.2(a)   Determine the expression for current gain and input impedance of a common-emitter amplifier   [5]
         using the hybrid model.

Q.2(b)   Explain the construction, operation and drain characteristic of n-channel JFET.   [5]

Q.3(a)   List out any four advantages of negative feedback. An amplifier with negative feedback gives an   [5]
         output of 12.5 V with an input of 1.5 V. When feedback is removed, it requires 0.25 V input for
         the same output. Find the voltage gain without feedback and the value of ß.

Q.3(b)   Define the parameters: slew rate and offset error voltage of an Op-Amp. Determine the output   [5]
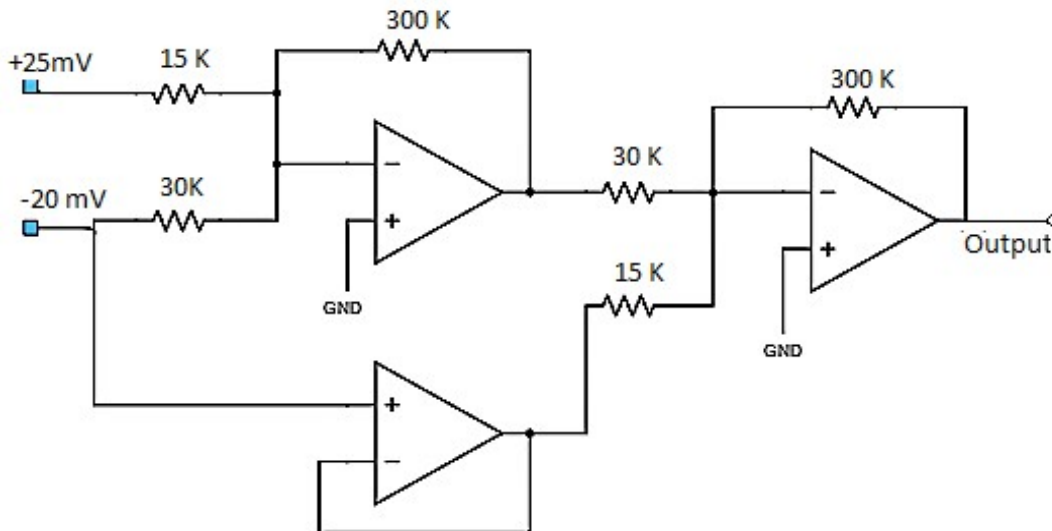   voltage for the following circuit.

Figure-2

Q.4(a) Prove the theorem of absorption in Boolean algebra. Express the following function in a sum of minterms and a product of maxterms. [5]

$$F(w, x, y, z) = y'z + wxy' + wxz' + w'x'z$$

Q.4(b) Construct a full-subtractor circuit with two half-subtractors and an OR gate. [5]

Q.5(a) Explain the different elements of an electronics communication system with a neat block diagram. Determine the required minimum antenna height for transmitting a voice signal of 1 KHz. [5]

Q.5(b) Why modulation is required in communication system? Explain the Amplitude modulation briefly. [5]

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