Con. 9457-13.   (OLD COURSE)   **LJ-10280**

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

N.B.:

    1. **Q 1 is compulsory**

    2. Answer **any four** out of remaining **six** questions

    3. Assumptions made should be clearly stated

    4. Assume any suitable data wherever required but justify the same

    5. Figures to the right indicate marks

    6. Illustrate answers with sketches wherever required

Q.1   (A) Describe the construction, principle of operation and applications of PIN diode.   (05)

    (B) Explain the need for biasing and also explain how it can help avoiding a thermal runaway in a BJT amplifier.   (05)

    (C) Describe the current series type of negative feedback in an amplifier circuit and state the impact of it on voltage gain, current gain, input impedance and output impedance.   (05)

    (D) Compare the following   (05)

        (i) BJT and JFET

        (ii) h-parameter model and r_e model of BJT

Q.2   (A) Draw a full-wave bridge rectifier circuit with C filter and describe the circuit operation with waveforms. Compare the performance of C, L and LC filters.   (08)

    (B) (B) Draw any one circuit each of single ended clipper and double ended clipper and explain their working with the help of waveforms.   (12)

Q.3   (A) For the circuit shown in Fig-1, calculate the operating point voltages V_{CE}, V_{BC} and currents I_C, I_B and I_E.   (10)

    (B) Draw the h-parameter equivalent model for the circuit given below in Fig-1. Calculate the input impedance, output impedance, voltage gain and the current gain of the given amplifier.   (10)
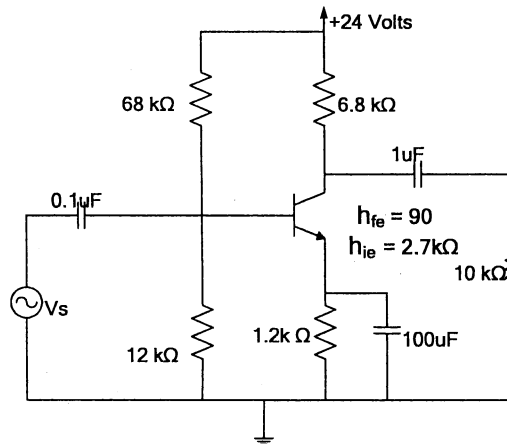

Fig-1

Q.4   (A) Determine the operating point parameters V_{GSQ}, I_{DQ} and V_{DSQ} for the circuit shown below in Fig-2.   (10)
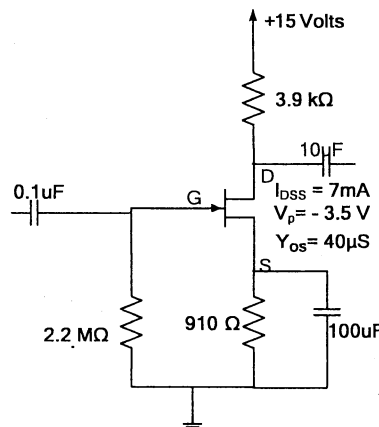

Fig-2

    (B) Draw an ac equivalent circuit for the amplifier shown in the Fig-2 and calculate voltage gain for the same.   (10)

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Q.5 (A) Give one example each of BJT amplifiers with voltage-shunt and voltage-series negative feedback. Also explain how the negative feedback affects their performance. (10)

(B) Explain the frequency response of a BJT amplifier. State and explain reasons for reduction in the gain at lower and higher frequencies. (10)

Q.6 (A) Draw the circuit diagram of a single input balanced output BJT differential amplifier and derive the relevant AC parameters for it. (10)

(B) Explain how to estimate the lower cutoff frequency for the amplifier shown in the Fig-1 and calculate the same. (10)

Q.7 (A) Write short notes on **any two**. (14)

    (i) Photovoltaic devices

    (ii) Solar cell

    (iii) LED

(B)Explain the working of Schottkey diode and its application. (6)