



DG-3184
Third Year B. Sc. (Sem. V) Examination
March/April – 2016
Electronics : Paper - VI
(Theory of Operational Amplifier)

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

<p>नीचे दशांशवेष निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : T. Y. B. Sc. (SEM. V)</p> <p>Name of the Subject : Electronics : Paper - 6</p> <p>Subject Code No. : 3 1 8 4 Section No. (1, 2,.....) : Nil</p>	<p>Seat No. : □ □ □ □ □ □</p> <p style="text-align: center; border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: 0 auto;">Student's Signature</p>
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- (2) Figures on the right indicates full marks.
- (3) All symbols and abbreviations have their usual meaning.
- (4) Non-programmable calculators are allowed.
- (5) Q.1 is compulsory.
- (6) Assume data if necessary.

- Q:1** Answer in brief: **14**
- 1 When a differential amplifier configuration is referred to as a balanced output?
 - 2 Define inverting input?
 - 3 What is a special case of non-inverting amplifier?
 - 4 What are the different blocks of a typical op-amp?
 - 5 Draw the pin configuration of IC 741C
 - 6 Why open loop op-amp configurations are not used in linear applications?
 - 7 Why operational amplifier is called so?
- Q2(A)** Using schematic and dc equivalent diagrams of a dual input unbalanced output differential amplifier find out its operating point **06**
- (B)** Determine the operating point for the dual- input, unbalanced output differential amplifier: $R_c = 4k\Omega$, $R_E = 10k\Omega$, supply voltage = $\pm 10V$, $\beta = 100$ and $V_{BE} = 0.7V$. **06**

OR

- Q2(A)** Discuss differential amplifier with one op-amp. **06**
- (B)** For a differential amplifier with one op-amp using 741C, $R_1 = R_2 = 1\text{k}\Omega$, $R_F = R_3 = 10\text{k}\Omega$. Determine the gain and input resistance of the amplifier. Calculate the output voltage v_o if $v_x = 2.7\text{V p-p}$ and $v_y = 3\text{V p-p}$ sine waves at 100 Hz **06**
- Q3(A)** Explain how instrumentation amplifier is used as a light intensity meter **08**
- (B)** Explain current mirror circuit? **04**
- OR**
- Q3 (A)** Explain how an op-amp can be used as an integrator circuit. Give circuit diagram, frequency response and input & output waveforms **06**
- (B)** In an integrator circuit, $R_1 C_F = 1\text{second}$ and the input is a step (dc) voltage of 4V. Determine the output voltage and sketch it. Assume that the op-amp is initially nulled. **06**
- Q4 (A)** Derive the expression for input resistance of voltage shunt amplifier with negative feedback. **08**
- (B)** The 741C is configured as a non-inverting amplifier with $R_1 = 3\text{k}\Omega$, $R_F = 30\text{k}\Omega$. Compute the closed loop voltage gain. What will be the output voltage if an input voltage of 20mV p-p sine wave at 2 kHz is applied to it? Sketch both the waveforms. **04**
- OR**
- Q4 (A)** Explain low voltage DC voltmeter. **06**
- (B)** Explain offset voltage compensating network and its design principles **06**
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