



DG-3122
B. Sc. (Physics) (Sem. V) Examination
March/April – 2016
Electronics
(Generic Elective)

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

<p>नीचे दर्शावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपववी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : B. Sc. (Physics) (Sem. V)</p> <p>Name of the Subject : Electronics (GENERIC ELECTIVE)</p> <p>Subject Code No. : 3 1 2 2 Section No. (1, 2,.....): Nil</p>	<p>Seat No. : □ □ □ □ □ □</p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; width: 100%;">Student's Signature</div>
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- (2) Draw neat circuit diagram wherever necessary.
- (3) Symbols used in the question paper have their usual meaning.
- (4) Figures to the right indicate full marks of the question.
- (5) Scientific calculator may be used.

1 (a) Give the correct answer from multiple choice : 6

- (1) For maximum power transfer, the impedance of power source should be equal to that of _____.
 - (i) Load
 - (ii) transistor
 - (iii) reactance
 - (iv) none of this
- (2) At 100% modulation, the power in each side band is _____ of the carrier.
 - (i) 50%
 - (ii) 40%
 - (iii) 70%
 - (iv) 25%

- (3) If the power level of the amplifier reduces to half, the dB gain will fall by
- 0.5 dB
 - 2 dB
 - 10 dB
 - 3 dB
- (4) In radio transmission, the medium of transmission is _____.
- space
 - an antenna
 - both space and an antenna
 - cable
- (5) A differential amplifier some times called _____.
- Short-tail pair
 - Long-tail pair
 - Open-tail pair
 - Close-tail pair
- (6) R.C. Coupling is generally confined to low power application because of _____.
- Large value of coupling capacitor
 - Low efficiency
 - Large number of component
 - High efficiency

- (b) Answer the following question in short : (any four) 8
- Define CMRR. What is its ideal value ?
 - Draw pin diagram of IC 741 Op-amp.
 - What are the various coupling schemes of two stage amplifier ?
 - Write two advantages of the direct coupled amplifier over transformer coupled amplifier.
 - A carrier of 100 V and 1.2 MHz is modulated by a 50 V, 1 KHz sine wave signal. Calculate the modulation factor.
 - Convert power gain 4 bel in to voltage gain.

- 2 (a) Explain how the single stage CE amplifier produce a phase reversal between input and output voltage with neat circuit diagram. Write function of each component. 7

OR

- (a) Draw neat circuit diagram of RC coupled amplifier. What is the function of bypass capacitor ? Explain the frequency response of RC coupled amplifier.
- (b) The voltage gain of a multistage amplifier is 65 dB. If the voltage gain of the second stage is 140, calculate the voltage gain of first stage. 5

OR

- (b) Determine the necessary transformer turn ratio for transforming maximum power to a $16\ \Omega$ load from a source that has an output impedance of $10\ \text{K}\Omega$. Also calculate the current across external load if the terminal current is 1 mA rms. What is maximum power across output ?
- 3 (a) What is differential amplifier ? Obtain expression for d.c. operating point values (ICQ and VCQ) of the dual input, balanced output differential amplifier. 7

OR

- (a) Derive an expression for the common mode voltage gain of differential amplifier.
- (b) Write a short note on current mirror. 5

OR

- (b) An emitter biased dual, input-balance output differential amplifier has the following specification $|V_{CC}| = |-V_{EE}| = 10V$; $R_{C1} = R_{C2} = 2.7k\Omega$ and $R_E = 3.9k\Omega$ the gain of the each transistor $B_{ac} = B_{dc} = 100$. (take $V_{BF} = 0.715V$)

Calculate :

- (a) The operating point for each transistor.
- (b) the voltage gain
- (c) the input and output resistance.

- 4 (a) What is amplitude modulation ? Derive the voltage equation of amplitude modulated wave. From equation show that the wave contain three frequency component. 7

OR

- (a) Explain the power in AM wave, deriving necessary equation.
- (b) The r.m.s. value of carriage voltage is 100 V. After amplitude modulation by a sinusoidal a.f. voltage, the r.m.s value becomes 110 V. Calculate the modulex index. 7

OR

- (b) An AM wave is represented by the expression $V = 8(1 + 0.6 \text{ COS } 6280 t) \sin 211 \times 10^4 \text{ volts}$.
- (a) What are the minimum and maximum amplitude of AM wave ?
- (b) What frequency component are contained in modulated wave and
- (c) What is the amplitude of each component ?
