

19 OCT 2019

Seat No.:-

EXAMINATION October/November-2019

B. SC. SEM-V (NEW CBCS)

PHYSICS: Paper: PHY-CC-506 Code: 21481

(Power Electronics, Opto-Electronics, Solar Physics)

Time: 2:30 hr]

[Maximum Marks: 70

Instructions: (1) Symbols have their usual meaning.

(2) Figures on right hand side show marks of that question.

Que-1 (A): Describe the series-fed Class-A power amplifier with a neat circuit diagram. Derive an expression for collector efficiency of the power amplifier. Show that the maximum collector efficiency of the series-fed Class-A power amplifier is only 25%. [14]

OR

Que-1 (A-1): Explain the operation of push-pull amplifier with circuit diagram. Write the advantages and disadvantages of push-pull amplifier. [07]

Que-1 (A-2): Obtain the maximum collector efficiency of Class-B push-pull power amplifier. [07]

Que-1 (B): Answer the following short questions (any four). [04]

- 1) Define collector efficiency.
- 2) What is power dissipation capability?
- 3) Write any one disadvantage of Class-A power amplifier.
- 4) When push-pull amplifier is used?
- 5) Class - A power amplifier uses transistors.
(A) one (B) two (C) three (D) four
- 6) The push-pull amplifier circuit must use operation.
(A) Class-A (B) Class-B (C) Class-C (D) all of three

Que-2 (A): Explain the amplitude modulation in the terms of side bands and waveforms. Also, draw the modulated waves with various degrees of modulation. [14]

OR

Que-2 (A-1): Explain the balanced modulator method of amplitude modulation with circuit diagram. [07]

Que-2 (A-2): Write a short note on 'FET drain Modulator method of amplitude modulation'. [07]

Que-2 (B): Answer the following short questions (any four). [04]

- 1) Define modulating signal.
- 2) Write any one need of modulation.
- 3) Give the name of square law modulation methods of amplitude modulation.

- 4) Write any one advantage of collector modulation method of amplitude modulation.
- 5) Which quantity is varied in accordance with the modulating wave in frequency modulation?
(A) Frequency (B) Amplitude (C) Phase (D) all three given
- 6) What is the unit of modulation index?
(A) Hz (B) Ampere (C) Volt (D) Dimensionless

Que-3 (A): Explain the principle of Photo-conducting sensors. Describe construction, operation and characteristics of Light Dependent Resistor (LDR). Write the advantages and disadvantages of LDR. [14]

OR

Que-3 (A-1): Explain illumination and irradiance with examples. [07]

Que-3 (A-2): Describe the construction, operation and characteristic of Photo-Diode. Write its applications. [07]

Que-3 (B): Answer the following short questions (any three). [03]

- 1) Write the principle of solar cell.
- 2) Give any two applications of PIN diode.
- 3) What is photovoltaic effect?
- 4) Which electronics device is used in relay control?
(A) PIN diode (B) LED (C) LDR (D) Solar cell
- 5) What is the unit of fill factor (FF)?
(A) mW (B) lux (C) mW/m^2 (D) Dimensionless

Que-4 (A): Describe the general configuration of a Flat-Plate Collector. Derive the basic energy balance equation and collector efficiency for it. [14]

OR

Que-4 (A-1): Write a short note on 'Pyranometer'. [07]

Que-4 (A-2): Explain the circuit operation of transistor series voltage regulator. Write its limitations. [07]

Que-4 (B): Answer the following short questions (any three). [03]

- 1) What is solar pond?
 - 2) Define regulated power supply.
 - 3) Write any one limitation of zener diode as a voltage regulator.
 - 4) Which instrument measures the both solar and terrestrial radiation?
(A) Pyranometer (B) Pyrheliometer (C) Pyrgeometer (D) Pyradiometer
 - 5) A zener diode utilises characteristic for voltage regulation.
(A) forward (B) reverse (C) both (D) none of these
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