# BCH-003-1015027 Seat No. _____

## B. Sc. (Sem. V) (W.E.F. 2016) Examination

**August - 2021**

## 503 - Physics

*(Solid State Electronics)*

*(New Course)*

**Faculty Code : 003**

**Subject Code : 1015027**

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

**Instructions :** (1) Symbols and notations have their usual meaning.
(2) Total marks of the question is indicated on the right side of the question.
(3) Attempt any five questions out of the following ten questions.

**1** (a) Answer the following questions in short : **4**
(1) What is a multistage amplifier ?
(2) 1 bel = _____ dB.
(3) The output stage of multistage amplifier is also called _____.
(4) Class-C amplifiers are used as _____.

(b) Answer the following question in brief : **2**
Draw the neat diagram of push-pull amplifier.

(c) Answer the following questions in detail. **3**
Explain Thermal Runaway.

(d) Write note on : **5**
Explain Push-pull amplifier.

**2** (a) Answer the following questions in short : **4**
(1) Define biased clipper circuit.
(2) Define astable multivibrator.
(3) Bistable multivibrator is also known as _____.
(4) Clipper circuit is also known as _____.

(b) Answer the following questions in short. **2**
A peak-to-peak input voltage of 20 V is applied to a positive clipper, determine output voltage for each half cycle.
($R_L$ = 1 k$\Omega$ and R = 200$\Omega$)

(c) Answer the following question in detail. **3**
Give the basic difference among three multivibrator.

(d) Answer the following question in detail : **5**
Draw the neat circuit diagram of an astable multivibrator and explain its working.

**3** (a) Answer the following in short : **4**
(1) Zener diode can be used as _____.
(2) Write the equation for voltage regulation.
(3) What is DC Power supply ?
(4) Zener diode is operated in _____ region.

(b) Answer the following question in brief. **2**
A power supply has a voltage regulation of 1%. If the no-load voltage is 30V, what is the full load voltage ?

(c) Answer the following question in detail. **3**
Explain transistor series voltage regulator.

(d) Write note on : **5**
Explain the zener diode as a voltage regulator.

**4** (a) Answer the following question in short : **4**
(1) Define Op-Amp.
(2) What indicates the (+) and (–) sing in Op-Amp. ?
(3) The Op-Amp is a _____ controlled device.
(4) Where an Op-Amp is basically used ?

(b) Answer the following question in brief : **2**
Explain : Common mode and differential mode signals.

(c) Answer the following question in detail : **3**
Explain : Adder or summing amplifier.

(d) Write note on : **5**
Explain : Inverting amplifier and Non-inverting amplifier.

**5** (a) Answer the following questions in short : **4**
(1) Strain gauge is a _____ Transducer.
(2) LVDT is a _____ inductive transducer.
(3) A transducer is device that _____ energy in one form to energy another form.
(4) A microphone is an example of _____ transducer.

(b) Answer the following question, in brief. **2**
What is transducer ? Explain it.

(c) Answer the following question in detail. **3**
Explain strain gauge.

(d) Write note on : **5**
Explain construction and working of LVDT.

6 (a) Answer the following questions in short. 4

(1) Write full form of CRO and CRT.

(2) What is a rectifier type AC meter ?

(3) Define : Multimeter.

(4) Give the types of multimeter

(b) Answer the following question in brief : 2

Explain full-wave rectifier.

(c) Answer the following question in detail. 3

Mention application of CRO.

(d) Answer the following question in detail. 5

Explain the CRO.

7 (a) Answer the following questions in short. 4

(1) For D.C., capacitor having a _____ resistance.

(2) Write the equation of total gain of a multistage amplifier.

(3) Class _____ power amplifier has the highest collector efficiency.

(4) Class _____ operation gives the maximum distortion.

(b) Answer the following question in brief. 2

Give the circuit diagram for transformer coupled amplifier.

(c) Answer the following question in detail. 3

Explain frequency response of R-C coupled amplifier.

(d) Write note on : 5

Explain transformer coupled amplifier with neat circuit diagram.

8 (a) Answer the following questions in short. 4

(1) Define a switching circuit.

(2) The multivibrator 100% positive feedback is applied. True or False ?

(3) The positive clipper removes the positive half cycle of the input voltage. True or False ?

(4) If the input to a differentiator circuit is a saw-tooth wave, the output wave will be _____.

(b) Answer the following question in brief : 2

Define the switching circuit and mention its essential parts.

(c) Answer the following question in detail. **3**
Explain how a transistor works as switch.

(d) Write note on : **5**
What is a clipper circuit ? Explain the working of positive clipper with and without bias applied.

**9** (a) Answer the following questions in short. **4**
(1) Thermistors have _____ temperature coefficient of resistance.
(2) Write the definition of transducer.
(3) Write the equation of gauge factor.
(4) Write the principle of capacitive pressure transducer.

(b) Answer the following question in short. **2**
A wire strain gauge with a gauge factor K = 5 is bonded to a iron member which is subject to a strain of $10^{-7}$. If original no-strain resistance of the gauge is 100 Ω calculate the change in gauge factor K = 5.

(c) Answer the following question in detail. **3**
Explain capacitive pressure transducer.

(d) Answer the following question in detail. **5**
Describe the carbon microphone.

**10** (a) Answer the following questions in short. **4**
(1) Flip-flop can be used as a _____ device in computer.
(2) IC 74147 is used for _____ purpose.
(3) Decimal number 786 is convert into BCD.
(4) The output of a clock circuit is _____.

(b) Answer the following question in brief. **2**
Determine the output pulse width for the monostable 555 timer, when $R_A$ = 20 KΩ and C = 0.1 $\mu F$

(c) Answer the following question in detail. **3**
Draw logic diagram and give truth table of JK flip-flop and explain in brief.

(d) Write note on : **5**
Draw the neat circuit diagram at an astable multivibrator using IC-555 and obtain the expression for its frequency.