

# National Testing Agency

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<b>Subject Name :</b>	Electrical Power and Energy Engineering
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<b>Display Marks:</b>	Yes

## Electrical Power and Energy Engineering

<b>Group Number :</b>	1
<b>Group Id :</b>	68019156
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	105
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	300
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No

## Electrical Power and Energy Engineering

<b>Section Id :</b>	68019189
<b>Section Number :</b>	1

<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	75
<b>Number of Questions to be attempted :</b>	75
<b>Section Marks :</b>	300
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	680191116
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 1 Question Id : 6801914342 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A single phase half wave controlled rectifier is connected to a resistive load, the triggering angle for the circuit is ' $\alpha$ ' radians. The thyristor will conduct for

\_\_\_\_\_ .

1.  $\alpha$  radians
2. 0 radians
3.  $\pi$  radians
4.  $\pi - \alpha$  radians

**Options :**

68019116901. 1  
68019116902. 2  
68019116903. 3  
68019116904. 4

**Question Number : 2 Question Id : 6801914343 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

In a thyristor, latching current is always -

1. less than holding current
2. greater than holding current
3. equal to holding current
4. less than or equal to holding current

**Options :**

68019116905. 1

68019116906. 2

68019116907. 3

68019116908. 4

**Question Number : 3 Question Id : 6801914344 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A source with supply frequency ' $f$ ' is used to feed rectifier circuit, which of the following statements are *correct* ?

- (A). In a single phase full wave controlled rectifier, the output voltage pulsates at  $2f$ .
- (B). In a single phase full wave controlled rectifier, the output voltage pulsates at  $f$ .
- (C). In a three phase full wave controlled rectifier, the output voltage pulsates at  $6f$ .
- (D). In a three phase full wave controlled rectifier, the output voltage pulsates at  $3f$ .

1. (A) and (C) only
2. (A) and (D) only
3. (B) and (C) only
4. (B) and (D) only

**Options :**

68019116909. 1

68019116910. 2

68019116911. 3

68019116912. 4

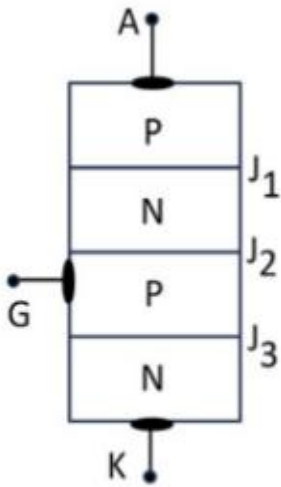
**Question Number : 4 Question Id : 6801914345 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

For the given SCR, choose the correct option which describe the states of junctions  $J_1$ ,  $J_2$  and  $J_3$  when this SCR is operating in forward blocking mode



1.  $J_1$  = forward biased,  $J_2$  = reverse biased, and  $J_3$  = forward biased
2.  $J_1$  = forward biased,  $J_2$  = forward biased, and  $J_3$  = forward biased
3.  $J_1$  = reverse biased,  $J_2$  = forward biased, and  $J_3$  = reverse biased
4.  $J_1$  = reverse biased,  $J_2$  = reverse biased and  $J_3$  = reverse biased

**Options :**

68019116913. 1

68019116914. 2

68019116915. 3

68019116916. 4

**Question Number : 5 Question Id : 6801914346 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A step up chopper is fed with 200 volts. The conduction time of a thyristor is 200  $\mu$ s & required output is 600V. If the frequency of operation is kept constant, what will be the new output voltage?

1. 600  $\mu$ sec.
2. 300  $\mu$ sec.
3. 200  $\mu$ sec.
4. 100  $\mu$ sec.

**Options :**

68019116917. 1

68019116918. 2

68019116919. 3

68019116920. 4

**Question Number : 6 Question Id : 6801914347 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The output power of solar cell is in the order of

1. 10W
2. 1W
3. 50W
4. 5W

**Options :**

68019116921. 1

68019116922. 2

68019116923. 3

68019116924. 4

**Question Number : 7 Question Id : 6801914348 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A solar module has the following specifications under Standard Test Condition (STC)

Open-circuit voltage ( $V_{OC}$ ) = 20 V

Short-circuit current ( $I_{SC}$ ) = 3 A

The Maximum power ( $P_{max}$ ) which can be drawn from such module will be

1. 60 Watt
2. slightly higher than 60 Watt
3. slightly lower than 60 Watt
4. 6.6 Watt

**Options :**

68019116925. 1

68019116926. 2

68019116927. 3

68019116928. 4

**Question Number : 8 Question Id : 6801914349 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The value of concentration ratio of flat plate collector is

1. 1
2. 10
3. 100
4. 1000

**Options :**

68019116929. 1

68019116930. 2

68019116931. 3

68019116932. 4

**Question Number : 9 Question Id : 6801914350 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Match List - I (Converter type) with List - II (Average output voltage):

LIST I		LIST II	
Converter type (connected to resistive load)		Average output voltage	
A.	1- $\phi$ Half wave diode rectifier	I.	$V_m(1+\cos\alpha)/\pi$
B.	1- $\phi$ Full wave diode rectifier	II.	$2V_m/\pi$
C.	1- $\phi$ Half wave controlled rectifier	III.	$V_m/\pi$
D.	1- $\phi$ Full wave controlled rectifier	IV.	$V_m(1+\cos\alpha)/2\pi$

Choose the *correct* answer from the options given below:

1. (A) - (II), (B) - (III), (C) - (I), (D) - (IV)
2. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
3. (A) - (III), (B) - (II), (C) - (IV), (D) - (I)
4. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

**Options :**

68019116933. 1

68019116934. 2

68019116935. 3

68019116936. 4

**Question Number : 10 Question Id : 6801914351 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A single phase half-wave controlled rectifier is used to supply an inductive load and gives an average output voltage  $V_{01}$ . In the same configuration a Free-wheeling Diode (FD) is connected in parallel with the load, and now the average output voltage is  $V_{02}$ . Mark the correct statement.

- (A).  $V_{01} > V_{02}$
- (B).  $V_{01} < V_{02}$
- (C). There will be negative spike in output  $V_{01}$  waveform.
- (D). There will be negative spike in output  $V_{02}$  waveform.

Choose the *correct* answer from the options given below:

1. (A), (C) and (D) only.
2. (B), (C) and (D) only
3. (B) and (C) only
4. (B) and (D) only

**Options :**

68019116937. 1

68019116938. 2

68019116939. 3

68019116940. 4

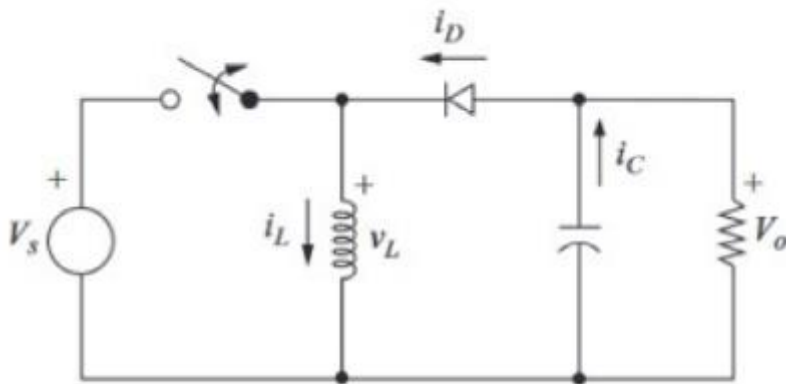
**Question Number : 11 Question Id : 6801914352 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Identify the converter shown in the given figure



1. Buck converter
2. Boost converter
3. Buck-boost converter
4. Cyclo converter

**Options :**

68019116941. 1

68019116942. 2

68019116943. 3

68019116944. 4

**Question Number : 12 Question Id : 6801914353 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**



Choose the correct option related to a thyristor switch:

1. It can be turned ON and OFF with a gate pulse
2. It can only be turned OFF with a gate pulse
3. It can only be turned ON with a gate pulse
4. Gate pulse has no control over turning ON and OFF

**Options :**

68019116945. 1

68019116946. 2

68019116947. 3

68019116948. 4

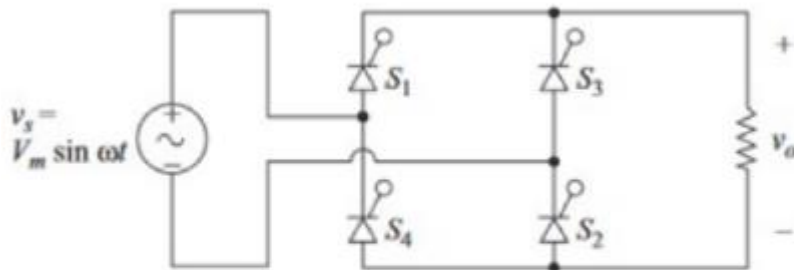
**Question Number : 13 Question Id : 6801914354 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

What will be the peak inverse voltage (PIV) for switch ' $S_2$ ' in the given circuit, where  $V_m = 100V$  ?



1. 100
2.  $\frac{100}{\sqrt{2}}$
3.  $\frac{100}{\pi}$
4. 50

**Options :**

68019116949. 1

68019116950. 2

68019116951. 3

68019116952. 4

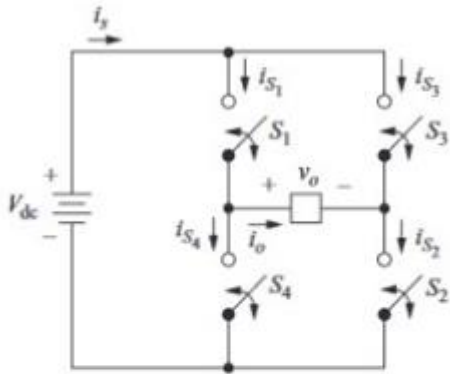
Question Number : 14 Question Id : 6801914355 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A

Minimum Instruction Time : 0

Correct Marks : 4 Wrong Marks : 1

For the given voltage source inverter choose the correct statements from the options given below:



- (A).  $S_1 = 1, S_2 = 1$ , then  $v_o = V_{dc}$
- (B).  $S_1$  and  $S_4$  can be turned on simultaneously
- (C).  $S_1 = 1, S_2 = 1$ , then  $v_o = V_{dc}/2$
- (D).  $S_1$  and  $S_4$  can not be turned on simultaneously

- 1. (A) and (B) only.
- 2. (B) and (C) only
- 3. (C) and (D) only
- 4. (D) and (A) only

Options :

68019116953. 1

68019116954. 2

68019116955. 3

68019116956. 4

Question Number : 15 Question Id : 6801914356 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A

Minimum Instruction Time : 0

Correct Marks : 4 Wrong Marks : 1

The fact that conductor carries more alternating current on the surface as compared to core, is known as

1. Ferranti effect
2. Skin effect
3. Permeability
4. Corona

**Options :**

68019116957. 1

68019116958. 2

68019116959. 3

68019116960. 4

**Question Number : 16 Question Id : 6801914357 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

It is common practice for EHV lines to use more than one conductor per phase, this practice is called \_\_\_\_\_.

1. bundling
2. stranding
3. transposition
4. corona

**Options :**

68019116961. 1

68019116962. 2

68019116963. 3

68019116964. 4

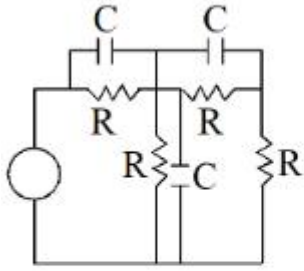
**Question Number : 17 Question Id : 6801914358 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

In a transmission line having negligible resistance, the surge impedance is



1.  $\sqrt{\frac{L}{C}}$
2.  $\sqrt{LC}$
3.  $\sqrt{\frac{C}{L}}$
4.  $\sqrt{L+C}$

**Options :**

68019116965. 1

68019116966. 2

68019116967. 3

68019116968. 4

**Question Number : 18 Question Id : 6801914359 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The ferranti effect in a long transmission line is observed when it is

1. lightly loaded
2. on full load at unity power factor
3. on full load at 0.8 lagging power factor
4. short-circuited

**Options :**

68019116969. 1

68019116970. 2

68019116971. 3

68019116972. 4

**Question Number : 19 Question Id : 6801914360 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Match List I (Equipment) with List II (Function)

LIST I		LIST II	
Equipment		Function	
A.	Circuit breaker	I.	Voltage control
B.	Governer	II.	Over voltage protection
C.	Exciter	III.	Over current protection
D.	Lightning arrester	IV.	Power control

Choose the *correct* answer from the options given below:

1. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
2. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
3. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
4. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

**Options :**

68019116973. 1

68019116974. 2

68019116975. 3

68019116976. 4

**Question Number : 20 Question Id : 6801914361 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Which of the statement is *correct* about power transformer used in power system?

1. It is designed to operate at light load
2. It is designed to operate at full load
3. It has effeciency in the range of 97%
4. It prevents ferranti effect

**Options :**

68019116977. 1

68019116978. 2

68019116979. 3

68019116980. 4

**Question Number : 21 Question Id : 6801914362 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Transmission lines are transposed to

1. Reduce the skin effect
2. Reduce the copper losses
3. To prevent short-circuit between any two lines
4. To prevent interference with neighbouring telephone lines

**Options :**

68019116981. 1

68019116982. 2

68019116983. 3

68019116984. 4

**Question Number : 22 Question Id : 6801914363 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The impedance value of a generator is 0.2 pu on a base value of 11 kV, 50 MVA.

The impedance value for a base value of 22 kV, 150 MVA is

1. 0.15 pu
2. 0.3 pu
3. 0.2 pu
4. 0.24 pu

**Options :**

68019116985. 1

68019116986. 2

68019116987. 3

68019116988. 4

**Question Number : 23 Question Id : 6801914364 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The incremental cost characteristics of two generators delivering a total load of 230MW are as follows:

$$\frac{dF_1}{dp_1} = 2.4 + 0.01P_1$$

$$\frac{dF_2}{dp_2} = 2 + 0.02P_2$$

the ratio of  $\frac{P_1}{P_2}$

1. 0.642
2. 1.55
3. 2
4. 3.12

**Options :**

68019116989. 1

68019116990. 2

68019116991. 3

68019116992. 4

**Question Number : 24 Question Id : 6801914365 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following is not an example of renewable power ?

1. Solar power
2. Thermal power
3. Tidal power
4. Hydro power

**Options :**

68019116993. 1

68019116994. 2

68019116995. 3

68019116996. 4

**Question Number : 25 Question Id : 6801914366 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

In solar cell, what role does the "band gap" play in determining efficiency?

1. It affects the color of the solar cell
2. It determines the voltage the solar cell can produce
3. It influences the cell's ability to absorb sun light
4. It regulates the size of the solar cell

**Options :**

68019116997. 1

68019116998. 2

68019116999. 3

68019117000. 4

**Question Number : 26 Question Id : 6801914367 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The measured value of a capacitor is  $205.3\mu\text{F}$ , whereas its true value is  $201.4\mu\text{F}$   
Determine the relative error in percentage -

1. 1.94%
2. 0.94%
3. 94%
4. 019.4%

**Options :**

68019117001. 1

68019117002. 2

68019117003. 3

68019117004. 4

**Question Number : 27 Question Id : 6801914368 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**



An ammeter has a current range of 0-5A, and its internal resistance is  $0.2\ \Omega$ . In order to change the range to 0-25A, we need to add a resistance of

1.  $0.8\ \Omega$  in series with the meter
2.  $1.0\ \Omega$  in series with the meter
3.  $0.04\ \Omega$  in parallel with the meter
4.  $0.05\ \Omega$  in parallel with the meter

**Options :**

68019117005. 1

68019117006. 2

68019117007. 3

68019117008. 4

**Question Number : 28 Question Id : 6801914369 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A Single Phase energy meter operating on 230V & 5A for 5 hours makes 1940 revolutions. Meter constant is 400 rev/KWh. The power factor of the load is

1. 1
2. 0.8
3. 0.7
4. 0.6

**Options :**

68019117009. 1

68019117010. 2

68019117011. 3

68019117012. 4

**Question Number : 29 Question Id : 6801914370 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A 220V, 5A dc energy meter is tested at its marked ratings. The resistance of the pressure circuit is  $8800\Omega$  and the current coil is  $0.1\Omega$ . Calculate the power consumed while testing the meter with direct loading arrangement.

1. 1105.5W
2. 1100W
3. 1205.5W
4. 1200W

**Options :**

68019117013. 1

68019117014. 2

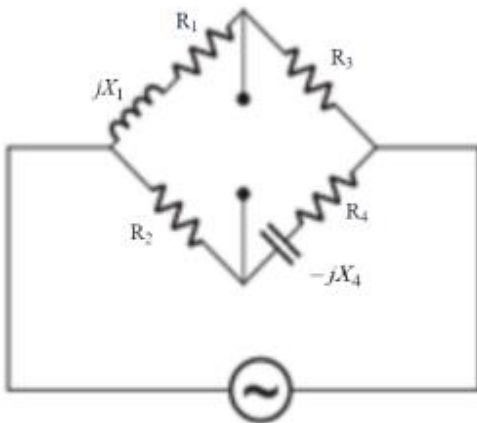
68019117015. 3

68019117016. 4

**Question Number : 30 Question Id : 6801914371 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A bridge circuit is shown in the figure. Which one of the sequence given below is most suitable for balancing the bridge ?



1. First adjust  $R_4$ , and then adjust  $R_1$
2. First adjust  $R_2$ , and then adjust  $R_3$
3. First adjust  $R_2$ , and then adjust  $R_4$
4. First adjust  $R_4$ , and then adjust  $R_2$

**Options :**

68019117017. 1

68019117018. 2

68019117019. 3

68019117020. 4

**Question Number : 31 Question Id : 6801914372 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A DC ammeter has a resistance of  $0.1\Omega$  and its current range is 0-100A. If the range is to be extended to 0-500A, then meter required the following shunt resistance

1.  $0.010\Omega$
2.  $0.011\Omega$
3.  $0.025\Omega$
4.  $1.0\Omega$

**Options :**

68019117021. 1

68019117022. 2

68019117023. 3

68019117024. 4

**Question Number : 32 Question Id : 6801914373 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

An LVDT is used to measuring 1mm displacement. For this purpose a voltmeter of range 0-2V is connected at the output of the LVDT through an amplifier having a gain of 500. Determine the sensitivity of LVDT if the output is 2mV.

1. 0.1 V/mm
2. 0.05 V/mm
3. 1 V/mm
4. 0.5 V/mm

**Options :**

68019117025. 1

68019117026. 2

68019117027. 3

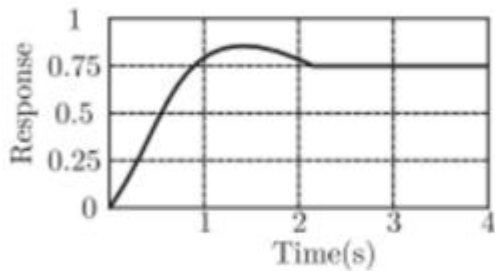
68019117028. 4

Question Number : 33 Question Id : 6801914374 Question Type : MCQ Option Shuffling : No Is  
Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A  
Minimum Instruction Time : 0

Correct Marks : 4 Wrong Marks : 1

The unit-step response of a unity feed back system with open loop transfer function

$G(s) = \frac{K}{(s+1)(s+2)}$  is shown in the figure. The value of K is



1. 0.5
2. 6
3. 2
4. 5

Options :

68019117029. 1  
68019117030. 2  
68019117031. 3  
68019117032. 4

Question Number : 34 Question Id : 6801914375 Question Type : MCQ Option Shuffling : No Is  
Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A  
Minimum Instruction Time : 0

Correct Marks : 4 Wrong Marks : 1

The transfer function of a system is given by  $G(s) = \frac{(1-s)}{(1+s)}$ , then which of the following about it is true?

1. Non-minimum phase system
2. Stable system with undershoot
3. All pass system
4. All of the above

Options :

68019117033. 1

68019117034. 2

68019117035. 3

68019117036. 4

**Question Number : 35 Question Id : 6801914376 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The impulse response of the system

$$G(s) = \frac{8}{s(s+2)(s+4)}$$

1.  $y(t) = 2 - e^{-2t} + e^{-4t}$
2.  $y(t) = 1 + 2e^{-2t} - 4e^{-4t}$
3.  $y(t) = 1 - 2e^{-2t} + e^{-4t}$
4.  $y(t) = 2 + e^{-2t} + 4e^{-4t}$

**Options :**

68019117037. 1

68019117038. 2

68019117039. 3

68019117040. 4

**Question Number : 36 Question Id : 6801914377 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The transfer function of a system is given as

$$G(s) = \frac{100}{s^2 + 20s + 100} \quad \text{The system is}$$

1. An over damped system
2. An under damped system
3. A critically damped system
4. An unstable system

**Options :**

68019117041. 1

68019117042. 2

68019117043. 3

68019117044. 4

**Question Number : 37 Question Id : 6801914378 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The open-loop transfer function of the system is

$$G(s)H(s) = \frac{1}{s(s^2 + s + 1)}$$
 The gain margin of the system is

1. 2db

2. 5db

3. 7db

4. 0db

**Options :**

68019117045. 1

68019117046. 2

68019117047. 3

68019117048. 4

**Question Number : 38 Question Id : 6801914379 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A unity feed-back control system has the following open loop transfer function

$$G(s) = \frac{as+1}{(s)^2}$$
 The value of 'a' to give a phase margin of 45 degree is equal to

1. 0.141

2. 0.221

3. 0.441

4. 0.841

**Options :**

68019117049. 1

68019117050. 2

68019117051. 3

68019117052. 4

**Question Number : 39 Question Id : 6801914380 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A system is represented by the following state space equation

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ k & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} r$$
 Find the vale of  $k$  for which the system becomes underdamped

1.  $k < 4$
2.  $k < -4$
3.  $k > -4$
4.  $k > 4$

**Options :**

68019117053. 1

68019117054. 2

68019117055. 3

68019117056. 4

**Question Number : 40 Question Id : 6801914381 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The state-space representation of the system is

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 2 & 0 \\ 0 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u$$
$$y = [4 \quad 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

with  $u$  as unit impulse and with zero initial state, the output  $y$  becomes

1.  $2e^{2t}$
2.  $4e^{2t}$
3.  $2e^{4t}$
4.  $4e^{4t}$

**Options :**

68019117057. 1

68019117058. 2

68019117059. 3

68019117060. 4

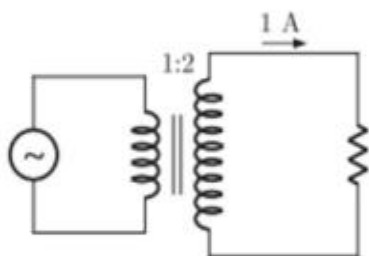
**Question Number : 41 Question Id : 6801914382 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A Single-phase transformer has a turns ratio 1:2, and is connected to a purely resistive load as shown in the figure. The magnetizing current drawn is 1A, and the secondary current is 1A. If core losses and leakage reactances are neglected, the primary current is



1. 1.41A
2. 2.24A
3. 2A
4. 3A

**Options :**

68019117061. 1



68019117062. 2

68019117063. 3

68019117064. 4

**Question Number : 42 Question Id : 6801914383 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A Single phase transformer on full load has a impedance drop 20V and resistance drop 10V. The value of the power factor for zero voltage regulation will be

1. 1
2. 0.866 (leading)
3. 0.866(laging)
4. 0.5

**Options :**

68019117065. 1

68019117066. 2

68019117067. 3

68019117068. 4

**Question Number : 43 Question Id : 6801914384 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A field excitation of 20A in a certain alternator results in an armature current of 400A in short circuit and a terminal voltage of 2000V on open circuit. The magnitude of the internal voltage drop within the machine at a load current of 200A

1. 1000V
2. 100V
3. 10V
4. 1V

**Options :**

68019117069. 1

68019117070. 2

68019117071.3

68019117072.4

**Question Number : 44 Question Id : 6801914385 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A single-phase transformer when supplied from 220V, 50Hz has eddy current loss of 50W. If the transformer is connected to a voltage of 330V, 50Hz, the eddy current loss will be

1. 168.75W
2. 50W
3. 75W
4. 112.5W

**Options :**

68019117073.1

68019117074.2

68019117075.3

68019117076.4

**Question Number : 45 Question Id : 6801914386 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

For controlling the speed of an induction motor the frequency of supply is increased by 10%. For magnetizing current to remain the same, the supply voltage must be

1. remain constant
2. increased by 10%
3. reduced by 10%
4. reduced by 20%

**Options :**

68019117077.1

68019117078.2

68019117079.3

68019117080.4

**Question Number : 46 Question Id : 6801914387 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

V curve for synchronous motor represent relation between

1. power factor and armature current
2. field current and applied voltage
3. applied voltage and armature current
4. armature current and field current

**Options :**

68019117081.1

68019117082.2

68019117083.3

68019117084.4

**Question Number : 47 Question Id : 6801914388 Question Type : MCQ Option Shuffling : No Is**

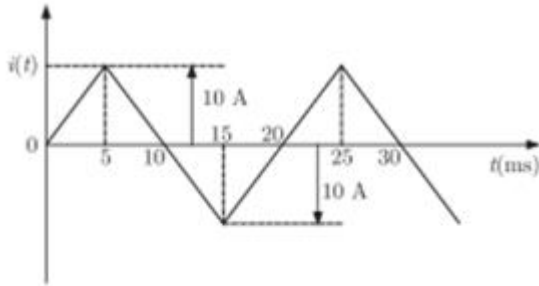
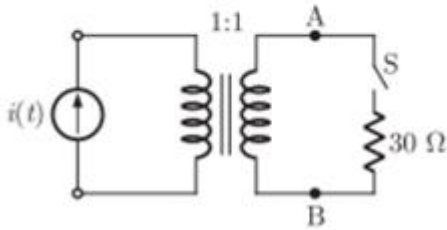
**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The circuit diagram shows a two-winding lossless transformer with no leakage flux excited from a current source  $i(t)$ , whose waveform is shown in the figure. The transformer has a magnetizing inductance of  $400/\pi$  mH.

The peak voltage across A and B, when switch S is open



1.  $\frac{400}{\pi} V$
2.  $800 V$
3.  $\frac{4000}{\pi} V$
4.  $\frac{800}{\pi} V$

**Options :**

68019117085. 1

68019117086. 2

68019117087. 3

68019117088. 4

**Question Number : 48 Question Id : 6801914389 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Mark the *correct* statement regarding O.C test in a transformer

1. gives iron losses and generally performed at LV side
2. gives iron losses and generally performed at HV side
3. gives copper losses and generally performed at LV side
4. gives copper losses and generally performed at HV side

**Options :**

68019117089. 1

68019117090. 2

68019117091. 3

68019117092. 4

**Question Number : 49 Question Id : 6801914390 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A 400V, 15kW, 4-pole, 50Hz, Y-connected induction motor has full load slip of 4%. The output torque of the machine at full load is

1. 624.73 Nm

2. 99.49 Nm

3. 9.50 Nm

4. 1.66 Nm

**Options :**

68019117093. 1

68019117094. 2

68019117095. 3

68019117096. 4

**Question Number : 50 Question Id : 6801914391 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

If a 400V, 50Hz, star connected, 3-phase squirrel cage induction motor is operated from a 400V, 75Hz supply, the torque that the motor can now provide while drawing rated current from the supply

1. reduces

2. increases

3. remains the same

4. increases or reduces depending upon the rotor resistance

**Options :**

68019117097. 1

68019117098.2

68019117099.3

68019117100.4

**Question Number : 51 Question Id : 6801914392 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

In a network containing resistances and reactances the roots of the characteristic equation for the circuit

1. The force response
2. The total response
3. The natural response
4. The damped response

**Options :**

68019117101.1

68019117102.2

68019117103.3

68019117104.4

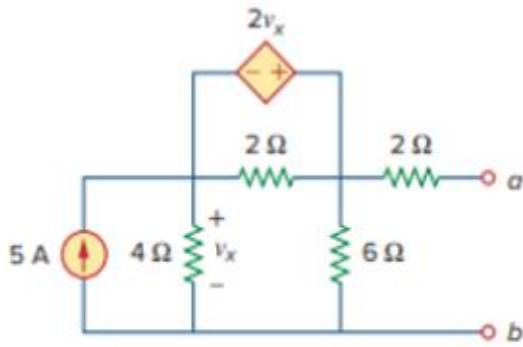
**Question Number : 52 Question Id : 6801914393 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

In the given network, find Thevenin equivalent resistance  $R_{TH}$  across terminal a-b.



1. 8 ohm
2. 4.5 ohm
3. 6 ohm
4. 12 ohm

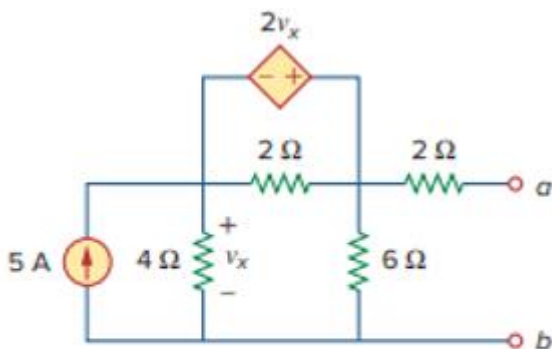
**Options :**

- 68019117105. 1
- 68019117106. 2
- 68019117107. 3
- 68019117108. 4

**Question Number : 53 Question Id : 6801914394 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Find Norton's current ( $I_N$ ) of the given circuit across terminals a-b.



1. 6.75 Amp
2. 7.25 Amp
3. 7 Amp
4. 7.5 Amp

**Options :**

- 68019117109. 1

68019117110. 2

68019117111. 3

68019117112. 4

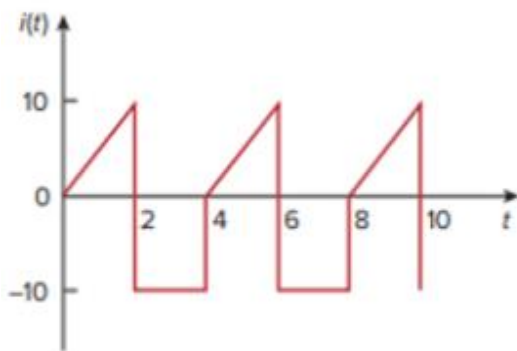
**Question Number : 54 Question Id : 6801914395 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

If the current is passed through a  $2\Omega$  resistor, find the average power absorbed by the resistor, if the current waveform of the circuit is given in the figure



1. 164.6W
2. 133.3W
3. 152.8W
4. 185.2W

**Options :**

68019117113. 1

68019117114. 2

68019117115. 3

68019117116. 4

**Question Number : 55 Question Id : 6801914396 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**



Which of the following governs the response of an unforced reactive circuit?

1. Magnitude of the voltage source
2. Method of interconnection of the elements
3. Time constant of the circuit
4. Magnitude of the current source

**Options :**

68019117117. 1

68019117118. 2

68019117119. 3

68019117120. 4

**Question Number : 56 Question Id : 6801914397 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A  $32 \times 10$  ROM contains a decoder of size of

1.  $5 \times 32$
2.  $32 \times 32$
3.  $32 \times 10$
4.  $10 \times 32$

**Options :**

68019117121. 1

68019117122. 2

68019117123. 3

68019117124. 4

**Question Number : 57 Question Id : 6801914398 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The simplified SOP ( Sum of Product) from the Boolean expression is

$$(P + \bar{Q} + \bar{R}).(P + \bar{Q} + R).(P + Q + \bar{R})$$

1.  $P + \bar{Q}\bar{R}$
2.  $\bar{P}Q + \bar{R}$
3.  $\bar{P}Q + R$
4.  $PQ + R$

**Options :**

68019117125. 1

68019117126. 2

68019117127. 3

68019117128. 4

**Question Number : 58 Question Id : 6801914399 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The data bus and address bus with a ROM size of  $2048 \times 8$  bits is

1. 11 and 8 respectively
2. 12 and 7 respectively
3. 8 and 11 respectively
4. 7 and 12 respectively

**Options :**

68019117129. 1

68019117130. 2

68019117131. 3

68019117132. 4

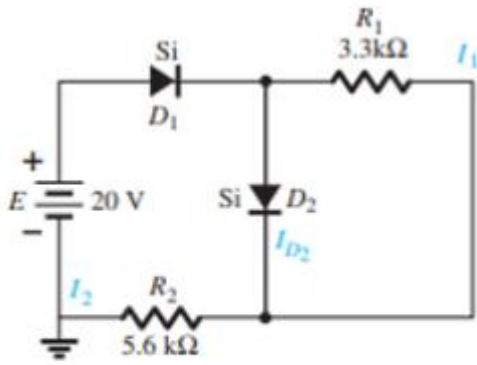
**Question Number : 59 Question Id : 6801914400 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Consider the diode circuit given below. The value of  $I_2$  is



1. 3.32 mA
2. 3.11 mA
3. 2.32 mA
4. 2.11 mA

**Options :**

68019117133. 1

68019117134. 2

68019117135. 3

68019117136. 4

**Question Number : 60 Question Id : 6801914401 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A clipper circuit is shown in the figure with input waveform. What is the output waveform of this clipper circuit?

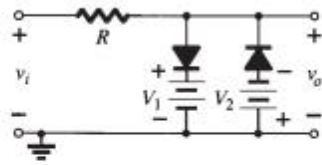
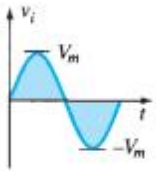
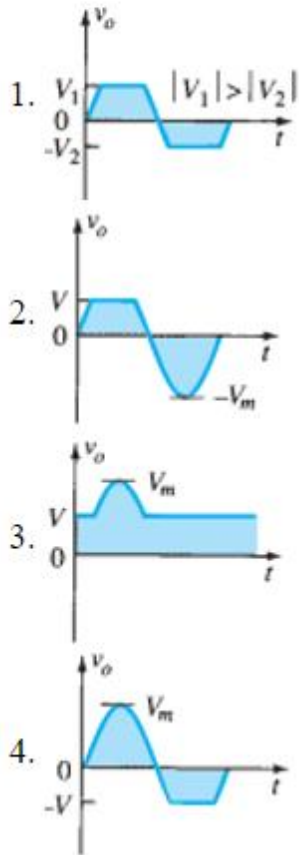


Fig. Input wave form

Fig. Clipper circuit



Options :

68019117137. 1

68019117138. 2

68019117139. 3

68019117140. 4

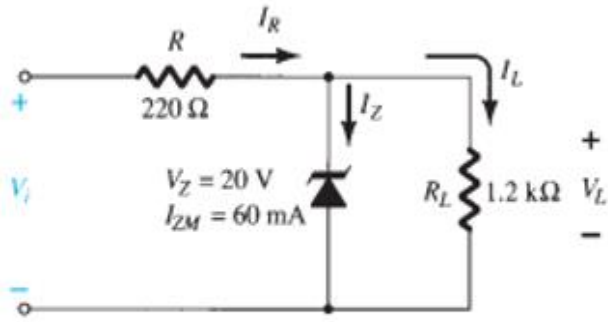
Question Number : 61 Question Id : 6801914402 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A

Minimum Instruction Time : 0

Correct Marks : 4 Wrong Marks : 1

consider the shunt regulator circuit given below. Determine the range of values, of input voltage to maintain the Zener diode 'ON' state.



1. 21.67V and 35.87V
2. 22.67V and 35.87V
3. 23.67V and 36.87V
4. 24.67V and 37.87V

**Options :**

68019117141. 1  
 68019117142. 2  
 68019117143. 3  
 68019117144. 4

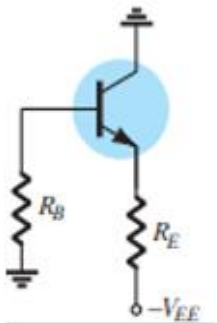
**Question Number : 62 Question Id : 6801914403 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Consider the dc biasing circuit of BJT given below. Which one is correct for given circuit?



1. fixed bias
2. Emitter bias
3. Emitter-follower bias
4. voltage divider bias

**Options :**

68019117145. 1

68019117146. 2

68019117147. 3

68019117148. 4

**Question Number : 63 Question Id : 6801914404 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A NAND gate with positive logic will operate as -

1. NOR with negative logic
2. AND with negative logic
3. OR with negative logic
4. AND with positive logic

**Options :**

68019117149. 1

68019117150. 2

68019117151. 3

68019117152. 4

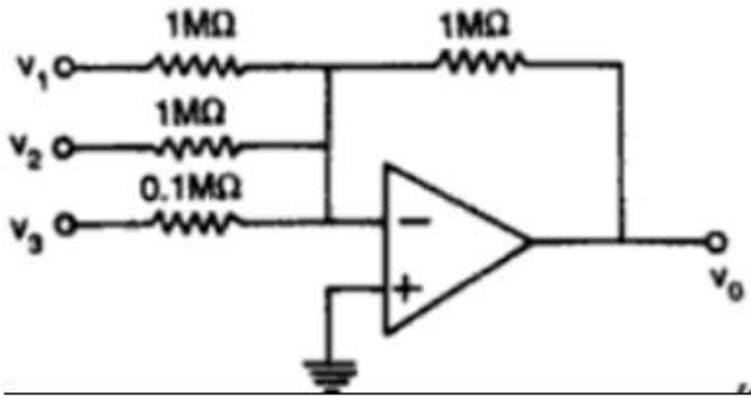
**Question Number : 64 Question Id : 6801914405 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Consider the summing amplifier given below. If input voltages  $V_1$ ,  $V_2$  and  $V_3$  are 2V, 4V and 1V respectively. Find the output voltage  $V_o$



1. - 5V
2. - 15V
3. - 16V
4. - 14V

**Options :**

68019117153. 1

68019117154. 2

68019117155. 3

68019117156. 4

**Question Number : 65 Question Id : 6801914406 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

An A/D converter contains 8-bit register to store the response. The input voltage range is 0 to 15V. Calculate the resolution of the system and what will be output when input is 7.5V.

1. 58.8mV and 01111111
2. 58.8mV and 11111110
3. 17V and 01111111
4. 17V and 11111110

**Options :**

68019117157. 1

68019117158. 2

68019117159. 3

68019117160. 4

**Question Number : 66 Question Id : 6801914407 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The standardized random variable  $Z$  corresponding to random variable  $X$ , mean  $\mu$  and standard deviation given by  $Z = \frac{X - \mu}{\sigma}$  has the mean \_\_\_\_\_ and variance \_\_\_\_\_.

Complete the statement with correct option .

1. 1 and 0 respectively
2. 0 and 1 respectively
3. 1 and 1 in both
4. 0 and 0 in both

**Options :**

68019117161. 1

68019117162. 2

68019117163. 3

68019117164. 4

**Question Number : 67 Question Id : 6801914408 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Let  $f(z)$  be analytic at  $z = z_0$  and have a \_\_\_\_\_ of  $n$ th order at  $z = z_0$ . Then  $\frac{1}{f(z)}$  has a \_\_\_\_\_ of  $n$ th order at  $z = z_0$ ; so does  $\frac{h(z)}{f(z)}$ , provided  $h(z)$  is analytic at  $z = z_0$  and  $h(z_0) \neq 0$ .

Fill in the blanks with appropriate option.

1. Pole, Zero
2. Zero, Pole
3. Pole, Pole
4. Zero, Zero

**Options :**

68019117165. 1

68019117166. 2

68019117167. 3



68019117168.4

**Question Number : 68 Question Id : 6801914409 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

For given differential equation  $y'' + y' - 2y = 0$ ,  $y(0) = 4$ ,  $y'(0) = -5$ , the solution is

1.  $y = e^{-2x} - 3e^x$

2.  $y = e^{2x} + 3e^{-x}$

3.  $y = e^x - 3e^{2x}$

4.  $y = e^x + 3e^{-2x}$

**Options :**

68019117169.1

68019117170.2

68019117171.3

68019117172.4

**Question Number : 69 Question Id : 6801914410 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

From symmetrical theorem  $\iiint (f\nabla g - g\nabla^2 f) dV$  is given by

1.  $\iint_s g \frac{\partial g}{\partial n} - f \frac{\partial f}{\partial n} ds$

2.  $\iint_s g^2 \frac{\partial g}{\partial n} - f \frac{\partial f}{\partial n} ds$

3.  $\iint_s f \frac{\partial g}{\partial n} - g \frac{\partial f}{\partial n} ds$

4.  $\iint_s g \frac{\partial g}{\partial n} - f^2 \frac{\partial f}{\partial n} ds$

**Options :**

68019117173.1

68019117174.2

68019117175.3

68019117176.4

**Question Number : 70 Question Id : 6801914411 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The eigen values of the given matrix  $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$  is

1. -8, 2, 2
2. -2, 8, 2
3. 8, -2, 2
4. 8, 2, 2

**Options :**

68019117177.1

68019117178.2

68019117179.3

68019117180.4

**Question Number : 71 Question Id : 6801914412 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A 100 hp motor is being used to run a pump in a process industry. The motor can be retrofitted with a variable speed drive that costs Rs 8 lakhs. The motor runs for 7000 hrs. annually (3000 hours at part load). Take 90% as the full load efficiency. During part load operation, an average saving of 30% of the full load consumption is possible with the variable speed drive. The life of the VSD can be taken as 10 years. The electricity price is Rs. 5/kWh. The minimum rate of return on investment for the company is 30%. Calculate benefit to cost Ratio and Capital recovery rate.

1. 1.43 and 0.323 respectively
2. 0.43 and 0.523 respectively
3. 0.323 and 1.43 respectively
4. 0.523 and 0.43 respectively

**Options :**

68019117181. 1

68019117182. 2

68019117183. 3

68019117184. 4

**Question Number : 72 Question Id : 6801914413 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The trend of world energy use for the last two thousand years would show

1. Exponential growth similar to the population growth
2. Exponential growth with a growth rate less than the population growth
3. Exponential growth with growth rate higher than the population
4. Monotonic growth that initially followed the population growth but a reversal of growth seen after 1970's

**Options :**

68019117185. 1

68019117186. 2

68019117187. 3

68019117188. 4

**Question Number : 73 Question Id : 6801914414 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

The primary energy resources are

1. Coal, Crude Oil, Solar, battery
2. Coal, Electricity, Solar, Natural Gas
3. Coal, Crude Oil, Solar, Natural Gas
4. Coal, Crude Oil, Electricity, Natural Gas

**Options :**

68019117189. 1

68019117190. 2

68019117191. 3

68019117192.4

**Question Number : 74 Question Id : 6801914415 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

Match List I (Types of air pollution) with List II (effect of air pollution)

LIST I (Types of Air pollution)		LIST II (Effect of Air pollution )	
A.	SO <sub>2</sub> , NO <sub>x</sub> , CO	I.	Radiation balance alteration
B.	CO <sub>2</sub>	II.	Ultraviolet radiation absorption
C.	CFC	III.	Photochemical smog, visibility, Modification of atmospheric properties

Choose the correct answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III)
2. (A) - (I), (B) - (III), (C) - (II)
3. (A) - (III), (B) - (I), (C) - (II)
4. (A) - (III), (B) - (II), (C) - (I)

**Options :**

68019117193.1

68019117194.2

68019117195.3

68019117196.4

**Question Number : 75 Question Id : 6801914416 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No Calculator : Scientific Response Time : N.A Think Time : N.A**

**Minimum Instruction Time : 0**

**Correct Marks : 4 Wrong Marks : 1**

A Country has an annual production of coal in 2018 of 600 million tonnes. The production of coal in 2013 was 500 million tonnes. The proven reserves is 140,000 million tonnes.

Calculate the static R/P ratio and number of years that the coal will last if the growth rate is as 2013-18 exponential model.

1. 233 years and 61.3 years
2. 133 years and 61.3 years
3. 233 years and 16.3 years
4. 323 years 61 year

**Options :**

68019117197. 1

68019117198. 2

68019117199. 3

68019117200. 4