

मध्यप्रदेश लोक सेवा आयोग
रेसीडेन्सी एरिया
इन्दौर

क्रमांक : 1656 / 69 / 2011 / प-9

इन्दौर, दिनांक 13.01.2016

राज्य वन सेवा परीक्षा -2014 उत्तर कुंजी

-:: विज्ञप्ति ::-

आयोग के विज्ञापन क्रमांक-04/परीक्षा/2014 दिनांक 30.12.2014 के अंतर्गत आयोजित राज्य वन सेवा परीक्षा-2014 (ऐच्छिक विषय- इलेक्ट्रिकल इंजीनियरिंग एवं इलेक्ट्रॉनिक्स इंजीनियरिंग) की परीक्षा दिनांक 13.01.2016 को वस्तुनिष्ठ प्रकार के प्रश्न पत्रों की प्रावधिक उत्तर कुंजी परीक्षा परिणाम बनाने के पूर्व आयोग की वेबसाईट पर प्रकाशित की जा रही है। अभ्यर्थी आयोग की वेबसाईट पर अपना रोल नंबर एवं प्रवेश पत्र पर दिये गये पासवर्ड की सहायता से लॉग-इन कर अपनी रिस्पांस शीट का अवलोकन कर सकते हैं। यदि इस प्रावधिक उत्तर कुंजी के संबंध में किसी परीक्षार्थियों को कोई आपत्ति हो तो वे ऑनलाईन आपत्तियां 07 दिवस के अंदर प्रस्तुत कर सकते हैं। इस हेतु अभ्यर्थी प्रश्न क्रमांक, संदर्भ ग्रंथों का नाम अंकित करें। प्रावधिक उत्तर कुंजी आयोग की वेबसाईट पर अपलोड होने की तिथि से 07 दिवस की समयावधि के पश्चात प्राप्त आपत्तियों पर विचार नहीं किया जायेगा। यह विज्ञप्ति आयोग की वेबसाईट www.mppsc.com & www.mppsc.nic.in, www.mppscdemo.in पर दिनांक 13.01.2016 से उपलब्ध है।



(डॉ. आर.आर. कान्हेरे)
परीक्षा नियंत्रक

State Forest Service Examination - 2014
(Provisional Model Answer Key)

Electronics Engineering

Q1 : A resistor of 1500 ohms is required in a radio but only 1000 ohms resistors are available. How will the available 1000 ohms resistors be connected to serve the purpose?

A One in series and two in parallel

B Three in parallel

C Four in parallel and one in series

D None of these

Answer Key: **A**

Q2 : If the diameter of a current carrying conductor is doubled, its current carrying capacity will become

A Two times

B Half

C Four times

D No change in current carrying capacity

Answer Key: **C**

Q3 : An ideal voltage source of 5 volts having internal resistance of 2 ohms will be equivalent to an ideal current source of

A 10 Amperes in parallel with 2 ohms

B 5 Amperes in parallel with 2 ohms

C 2.5 Amperes in parallel with 1 ohms

D 2.5 Amperes in parallel with 1 ohms

Answer Key: **D**

Q4 : In node voltage analysis method of solving circuits, if there are N number of nodes in a circuit, then how many equations will be written

A N

B N + 1

C	N – 1
D	N – 2
Answer Key: C	

Q5 : The reactance of a 1 Henry inductor at 50Hz will be	
A	314 ohms
B	0 ohms
C	∞ ohms
D	394 ohms
Answer Key: A	

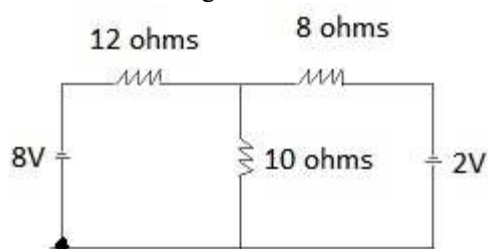
Q6 : The average power in a pure resistive circuit of 10 ohms when the current flowing through it is $10\cos \omega t$ Amperes, will be	
A	500 W
B	0 W
C	5000 W
D	None of these
Answer Key: A	

Q7 : The superposition theorem is basically based on the principle of	
A	Reciprocity
B	Duality
C	Linearity
D	Non linearity
Answer Key: C	

Q8 : The maximum power is extracted from any two given terminals of the circuit when load resistance across the terminals is	
A	Equal to the circuit resistance as viewed back from the terminals
B	Half of the resistance of the circuit as viewed back from terminals
C	Two times the resistance of the circuit as viewed back fromj the terminals

D	Four times back from the terminals
Answer Key: A	

Q9 : The current through the 10 ohms resistance in the circuit shown below will be



A	0.293 Amperes
B	0 Amperes
C	0.129 Amperes
D	Cannot be determined

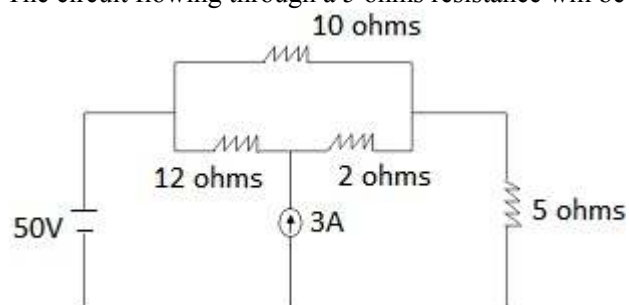
Answer Key: A

Q10 The instantaneous impressed voltage and current flowing through a AC series circuit at 50 Hz are
 : $e(t) = 200\sqrt{2} \sin(314t + 20)$ Volt and $i = 10\sqrt{2} \cos(314t - 25)$ Amperes respectively. The phase angle between $e(t)$ and $i(t)$ is

A	65 degree
B	45 degree
C	0 degree
D	10 degree

Answer Key: B

Q11 The circuit flowing through a 5 ohms resistance will be
 :



A	10 Amperes
B	0 Amperes

C	6 Amperes
D	16 Amperes
Answer Key: C	

Q12 Current flowing through a two terminal AC circuit consisting of a single element is 'I' Ampere when an inductor is connected in series with the element the current becomes 2 times 'I'. The element is	
A	An inductor
B	A capacitor
C	A resistor
D	Combination of an inductor and capacitor
Answer Key: B	

Q13 The reactance of a purely capacitive AC circuit of frequency 50 Hertz is 10 ohms. If the AC frequency is doubled the reactance offered	
A	40 ohm
B	2.5 ohm
C	5 ohm
D	20 ohm
Answer Key: C	

Q14 The rms value of the voltage : $V(t) = 3 + 4 \cos(3t)$ is	
A	$\sqrt{7}$ volts
B	5 volts
C	(3+2.9) volts
D	$\sqrt{17}$ volts
Answer Key: D	

Q15 In a series RLC circuit, the voltage across an inductor will be maximum when:	
A	At resonance

B	At 0 Hertz
C	Always
D	None of the these
Answer Key: D	

Q16 A series RLC circuit has a resistance of 1000Ω , an inductance of 100mH and a capacitance of 10pF. The Q factor and locus half power frequency of the circuit will be	
A	50, 158.35 kHz
B	100, 158.35 kHz
C	50, 159 kHz
D	100, 159 kHz
Answer Key: B	

Q17 If a small capacitance is added to a highly inductive circuit	
:	
A	The power factor will increase
B	The power factor will decrease
C	The power factor will remain unchanged
D	The power drawn will decrease
Answer Key: A	

Q18 If the color code of a carbon composition resistance is “orange, orange, red, gold”, its value will be	
:	
A	2200 ohms $\pm 5\%$
B	3300 ohms $\pm 10\%$
C	22000 ohms $\pm 100\%$
D	3300 ohms $\pm 5\%$
Answer Key: D	

Q19 A color coded carbon composition resistance of 570k $\pm 55k$ is represented by:	
:	
A	Green, violet, silver

B	Yellow, orange, gold
C	Green, yellow, gold
D	None of these
Answer Key: D	

Q20 A 4 ohms resistor is connected to a 10 mH inductor in series at 50 Hz, the total impedance of the circuit will be :	
A	$(4 + j3.14) \Omega$
B	0Ω
C	$(3.14 + j4) \Omega$
D	50Ω
Answer Key: A	

Q21 A 50 micro farad capacitor in series with a 40 k ohms resistor is charged to a potential difference of 400 volts. The time constant and energy stored in the fully charged capacitor will be :	
A	20 seconds, 2 Joules
B	2 seconds, 20 Joules
C	2 seconds, 2 Joules
D	20 seconds, 20 Joules
Answer Key: C	

Q22 High value of Q factor is preferred for coil used in radio receiver because :	
A	It makes the circuit more selective
B	It reduces the resistance of circuit
C	It improves the ratio of inductance and resistance
D	It increases the coil inductance
Answer Key: A	

Q23 A microphone is an example of :	
A	Magnetic transducer

B	Thermal transducer
C	Optical transducer
D	Acoustical transducer
Answer Key: D	

Q24 A microphone which has extremely high impedance, low distortion and excellent frequency and dynamic response is :	
A	Moving coil microphone
B	Capacitor microphone
C	Ribbon microphone
D	Crystal microphone
Answer Key: B	

Q25 If a circuit of output impedance 350 ohms is required to be coupled to a circuit of input impedance 3.5 ohms using a transformer, then the secondary to primary turn ratio will be :	
A	1/10
B	10
C	100
D	1/100
Answer Key: D	

Q26 Transformer used for radio frequency applications normally employ air cored coil to :	
A	Reduce coil weight
B	Reduce initial cost
C	Reduce labour in winding
D	Reduce core loss
Answer Key: D	

Q27 A solar cell consists of :	
A	P – N junction

B	A semiconductor bonded to metal
C	A piece of silicon
D	Photo – emission material
Answer Key: A	

Q28 Tunnel diode is used in :	
A	Rectifier
B	Filters
C	Digital circuits
D	Oscillator
Answer Key: D	

Q29 An intrinsic semiconductor at the absolute zero temperature :	
A	Has a large number of holes
B	Behaves like an insulator
C	Has a few holes and the same number of electrons
D	Behaves like a metallic conductor
Answer Key: B	

Q30 When a P or N – type impurity is added to an intrinsic semiconductor of proportion one part in one million, the : conductivity of the intrinsic semiconductor	
A	Increase by a factor of 10^3
B	Increase by a factor of 10^6
C	decrease by a factor of 10^{-3}
D	Remains unchanged
Answer Key: A	

Q31 The forbidden energy gap in semiconductors :	
A	Is located just above valence band

B	Is located just below the valence band
C	Is located between conduction band and valence band
D	None of these
Answer Key: C	

Q32 P – N junction diode is not used for :	
A	Rectification
B	Maximum power transfer
C	Clipper circuit
D	Clamper circuit
Answer Key: B	

Q33 Silicon diodes are preferred for high temperature operation in comparison to germanium because :	
A	Silicon is thermally more stable
B	Silicon can dissipate more power
C	Reverse saturation current is lesser in silicon
D	None of these
Answer Key: C	

Q34 A silicon P – N junction diode reverse bias has a depletion region of width 10 micrometer. The relative permittivity of silicon is 11.7 and permittivity of free space is 8.85×10^{-12} F/m. The depletion capacity of the diode per square meter is	
A	10 micro farad
B	100 micro farad
C	1 micro farad
D	20 micro farad
Answer Key: A	

Q35 The transition capacitance of a reverse biased P – N junction having uniform doping on both sides varies with junction voltage V_J as	
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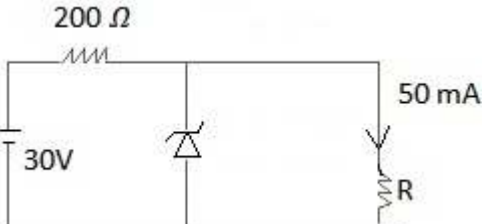
A	V_J
B	$(V_J)^{-1.5}$
C	$(V_J)^{-0.5}$
D	$1/(V_J)^{-1.5}$
Answer Key: C	

Q36 What will be the average value of $V(t)$ in the circuit given below :	
A	$-V_m/\pi$
B	$-V_m/2\pi$
C	$-V_m/\sqrt{2}$
D	0
Answer Key: A	

Q37 Silicon is preferred for making zener diodes because :	
A	It has lower breakdown voltage
B	It is cheaper
C	Needs lower doping level
D	Has high temperature and current capacities
Answer Key: D	

Q38 The light emitting diode :	
A	Has a very short life span
B	Is made of silicon
C	Depends on the recombination of holes and electrons

D	Uses a reverse biased junction
Answer Key: C	

Q39	The zener diode shown in the following figure has a reverse breakdown voltage of 10 V. The power dissipation in the $200\ \Omega$ resistance will be
	

A	1.5 watt
B	2 watt
C	20 watt
D	1 watt
Answer Key: B	

Q40	The electrons can tunnel through a P – N junction mainly because
:	
A	Barrier potential is very low
B	Depletion layer is extremely thin
C	Impurity level is low
D	They have high energy
Answer Key: B	

Q41	For a schottky barrier diode which of the following statements is true?
:	
A	Operating speed is low
B	Current flows due to minority carriers
C	There is no P – N junction
D	Current – voltage characteristics is exactly similar to P – N diode
Answer Key: C	

Q42	For a given emitter current the collector current in a transistor can be increased by
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:	
A	Reducing the recombination rate in the base junction
B	Increasing width of the base region
C	Reducing the minority carrier mobility in the base region
D	Doping the emitter region lightly
Answer Key: A	

Q43 The maximum junction temperature of a transistor is 150°C and the ambient temperature is 25°C . Given the total thermal impedance as $1^{\circ}\text{C}/\text{watt}$, the maximum power dissipation will be	
:	
A	1/125 watt
B	125 watt
C	175 watt
D	1/75 watt
Answer Key: B	

Q44 The Q – point in a voltage amplifier is selected in the middle of the active region so that	
:	
A	It needs a small dc voltage
B	The operating point becomes very stable
C	It gives distortion less output
D	Less number of resistors are required
Answer Key: C	

Q45 The main use of emitter follower configuration is as	
:	
A	Impedance matching device
B	Follower of base signal
C	Low input impedance circuit
D	Power amplifier
Answer Key: A	

Q46 An SCR can be switched from a non – conducting state to a conducting state by applying

:

- i. A voltage with high dv/dt
- ii. Voltage greater than forward break over voltage
- iii. Negative gate current with positive anode voltage
- iv. Positive gate current with positive anode voltage

Which of the following is correct?

A i, ii and iii are correct

B ii, iii and iv are correct

C i, ii and iv are correct

D i and iv are correct

Answer Key: C

Q47 The latching current of an SCR is 4 mA. Find the minimum width of gate pulse required to successfully turn on the SCR if source voltage is 100 V and inductance in the circuit is 0.1 Henry

:

A 2 micro second

B 2.5 micro second

C 0.4 micro second

D 4 micro second

Answer Key: D

Q48 Which statement is correct for a UJT?

:

A Low firing current

B Used as a wave form generator

C Has a stable negative resistance characteristics

D All options are correct

Answer Key: C

Q49 In junction field effect transistors (JFET) operating above its pinch off voltage the

:

A Drain current starts increasing

B	Drain current remain practically constant
C	Depletion region become smaller
D	Drain current rises rapidly
Answer Key: B	

Q50 The main reason for linear distortion in transistor amplifier is :	
A	Reactance associated with circuit and amplifying device
B	Change of gain with frequency
C	Unequal phase shift in component frequencies
D	None of these
Answer Key: C	

Q51 The modulation index of an AM wave is changed from 0 to 1. The transmitted power is :	
A	Unchanged
B	Halved
C	Increased by 50%
D	Quadrupled
Answer Key: C	

Q52 In an amplifier the increase in gain is 12 dB if the frequency is doubled. What will be the gain if frequency is increased 10 times?	
A	20 dB
B	40 dB
C	2.4 dB
D	60 dB
Answer Key: B	

Q53 When compared to a bipolar junction transistor (BJT) a junction field effect transistor (JFET) :	
(i) Is less noisy	
(ii) Has less input resistance	

(iii) Has a larger gain bandwidth product	
(iv) Has current flow due to majority carriers only	
Which of the following is correct	
A	(i) and (iv)
B	(ii) and (iii)
C	(i), (ii) and (iii)
D	(i),(ii),(iii) and (iv)
Answer Key: A	

Q54 The N-channel MOSFET devices are preferred over P-channel devices due to :	
A	N-channel devices being faster
B	N-channel devices having higher packing density
C	N-channel devices consuming less power
D	Both (N-channel devices being faster) and (N-channel devices having higher packing density)
Answer Key: D	

Q55 In a JFET the drain current is maximum when the applied gate to source voltage is :	
A	Negative
B	Positive
C	Equal to pinch off voltage
D	Zero
Answer Key: D	

Q56 The lower turn off time of MOSFET as compared to BJT is due to :	
A	Positive temperature coefficient
B	Absence of minority carriers
C	On state resistance

D	Input impedance
Answer Key: B	

Q57 Crystal oscillator are superior to tuned LC oscillator because :	
A	They have very high level of frequency stability
B	They have moderate level of frequency stability
C	They have a high value of Q-factor
D	Both (They have very high level of frequency stability) and (They have moderate level of frequency stability)
Answer Key: A	

Q58 A Hartley transistor oscillator is employed for generating :	
A	Radio frequency oscillations
B	Very low frequency oscillations
C	Microwave frequencies
D	Audio frequencies
Answer Key: A	

Q59 Wien bridge oscillator is used frequently :	
A	When ever high feedback ratio is required
B	When ever square output waves are required
C	When ever wide range of high purity sine waves are required
D	When ever extremely high resonant frequencies are required
Answer Key: C	

Q60 Push-pull amplifier has high power efficiency because :	
A	Transistors are placed in CE configuration
B	There is no quiescent collector current
C	Each transistor conducts on different input cycles

D	Low forward biasing voltage is required
Answer Key: B	

Q61 A single phase half wave rectifier supplies power to a 1 kilo-ohm load. If the supply voltage is 200 volts rms and forward resistance of the diode is negligible, the output ripple voltage (rms) would be	
A	1.09 volts
B	90 volts
C	200 volts
D	0.433 volts
Answer Key: A	

Q62 One of effect of negative feedback in amplifier is to	
:	
A	Decrease the harmonic distortion
B	Increase the harmonic distortion
C	Decrease the bandwidth
D	Increase the noise
Answer Key: A	

Q63 An ideal operational amplifier has	
:	
A	Infinite input and output impedance
B	Infinite input and zero output impedance
C	Very low input and output impedance
D	Low input and infinite output impedance
Answer Key: B	

Q64 An amplifier without feedback has a gain of 1000. The gain with negative feedback of 0.0009 will be	
:	
A	125
B	10
C	900

D	100
Answer Key: D	

Q65 A product modulator yields :	
A	A full AM signal
B	A DSB-SC signal
C	a VSB signal
D	An SSB signal
Answer Key: B	

Q66 Conduction extends over 360^0 in a class A amplifier because Q point is :	
A	Centred on load line
B	Located at or near cut off point
C	Located on load line
D	Located near saturation point
Answer Key: A	

Q67 An OP-AMP has a common mode gain of 0.01 and a differential mode gain of 10^5 . The value of the CMRR will be :	
A	10^5
B	10^7
C	10^{-3}
D	10^3
Answer Key: B	

Q68 An inverting amplifier is made using ideal OP-AMP. Why are the two input terminals of the OP-AMP at the same potential ?	
A	CMMR is infinity
B	The input impedance is infinity
C	The open loop gain of the OP-AMP is infinity

D	Both (CMMR is infinity) and (The input impedance is infinity)
Answer Key: D	

Q69 The open loop gain of an OP-AMP is 10^5 and open loop upper cut off frequency is 10Hz. Now if the OP-AMP is connected as an amplifier having closed loop gain of 100, the new upper cut off frequency would be	
A	100 Hz
B	10 KHz
C	10 Hz
D	100 KHz
Answer Key: B	

Q70 The slew rate of an operational amplifier is 0.8 volts per micro second. What will be the maximum amplitude of undistracted output sine wave that the OP-AMP can produce at 40 KHz ?	
A	3.18 volts
B	4 volts
C	20 volts
D	2.54 volts
Answer Key: A	

Q71 The main advantage of super heterodyne is	
:	
A	Simple circuit
B	Better tracking
C	Improvement in selectivity and sensitivity
D	Better alignment
Answer Key: C	

Q72 The ideal dc output voltage of a comparator filter is equal to	
:	
A	Peak value of rectified voltage
B	RMS value of rectified voltage
C	Average value of rectified voltage

D	None of these
Answer Key: C	

Q73 Limiter is not essential in the following detector :	
A	Foster sealey
B	Balanced slope
C	Ratio
D	None of these
Answer Key: C	

Q74 Which one is an advantage of AM over FM :	
A	FM is more immune to noise
B	FM has better fidelity
C	Probability of noise spike generation is less in AM
D	FM has wide bandwidth
Answer Key: D	

Q75 In a log amplifier the input is 'a'. The output will be proportional to :	
A	$\log a$
B	$2.3 \log a$
C	$\log 20 a$
D	None of these
Answer Key: A	

Q76 The binary equivalent of $(11.6275)_{10}$ is :	
A	1011.1011
B	1110011
C	101.0011

D	1011.0011
Answer Key: A	

Q77 The decimal equivalent of the hexadecimal number (BAD) ₁₆ is :	
A	5929
B	2989
C	3411
D	11013
Answer Key: B	

Q78 Which of the following is the universal logic gate :	
A	NAND
B	OR
C	AND
D	INVERTER
Answer Key: A	

Q79 If the output of a logic gate is 1 when all its outputs are 0, then the gate is either :	
A	NAND or EX-OR
B	AND or EX-NOR
C	NOR or EX-OR
D	NOR or EX-NOR
Answer Key: D	

Q80 A four bit BCD (DCBA) for numeral 9 can be decoded by the following logical operations in the most economical manner :	
A	$A\bar{B}D$
B	$A\bar{C}D$
C	$A\bar{B}\bar{C}D$

D	AD
Answer Key: C	

Q81 The function $f = ABC\bar{C} + ABC + \bar{A}BC + \bar{A}B\bar{C}$ can be reduced to :	
A	$f = A$
B	$f = ABC$
C	$f = B$
D	$f = AB$
Answer Key: C	

Q82 Which of the following expression is not true? :	
A	$A + 1 = A$
B	$A \cdot \bar{A} = 0$
C	$A + \bar{A} = 1$
D	$A \cdot A = A$
Answer Key: A	

Q83 De- Morgan's theorem says that :	
A	An AND gate is equivalent to a bubbled NAND gate
B	A NAND gate is equivalent to a bubbled OR gate
C	NAND gate is equivalent to a AND gate
D	NAND gate is always complimentary to an AND gate
Answer Key: B	

Q84 The POS form of expression is suitable for circuit using :	
A	NAND
B	NOR

C	XOR
D	AND
Answer Key: B	

Q85 The reason for using grey code in Karnaugh map is :	
A	Gray code provides cell values which differ in only one bit in adjacent cells
B	Any other code can be used
C	Grey code is more efficient than binary code
D	None of these
Answer Key: A	

Q86 Which of the following is a single input logic gate :	
A	NAND
B	INVERTER
C	AND
D	OR
Answer Key: B	

Q87 In a half adder having two inputs A and B two outputs S (Sum) and C (Carry) the Boolean expression for S and C : are	
A	$S = AB + \bar{A} B$ and $C = A + B$
B	$S = \bar{A} B + A \bar{B}$ and $C = AB$
C	$S = \bar{A} \bar{B} + AB$ and $A + \bar{B}$
D	None of these
Answer Key: B	

Q88 The number of half adders required to add m-bit number is :	
A	$2m + 1$
B	$2^m - 1$

C	2m
D	2m -1
Answer Key: D	

Q89 Using S-R flip-flops and two additional gates a J-K flip-flop can be realized. Which additional gates are required ? :	
A	NOR gates
B	NOT gates
C	OR gates
D	NAND gates
Answer Key: D	

Q90 A 4-bit mod-16 ripple counter uses J-K flip-flop having propagation delay of 50ns. The maximum clock frequency that can be used is :	
A	5 MHz
B	20 MHz
C	10 MHz
D	15 MHz
Answer Key: A	

Q91 A 4-bit Johnson counter is initialized to 0101. Every time the state 1011 is reached, the counter is re-initialized to 0000 at the next clock active edge. Again when the state 0001 is reached, the counter is initialized back to 0101 at the next clock active edge. The cycle length of the counter is :	
A	8
B	16
C	6
D	12
Answer Key: D	

Q92 A multiplexer is :	
A	One to many converter

B	A sequential circuit
C	Many-to-one converter
D	All options are correct
Answer Key: C	

Q93 A 0-10 volt analog to digital converter requires to have a resolution of 0.025%. The rms value of quantization error will be	
A	176 micro volt
B	705 micro volt
C	352 micro volt
D	1410 micro volt
Answer Key: B	

Q94 A successive approximation A/D converter has a resolution of 20 mV for an analog input of 2.17 V, what will be the digital output?	
A	01101100
B	01101101
C	01101011
D	None of these
Answer Key: A	

Q95 The output of a R-2R ladder for a input 1010 will be	
:	
A	6.25
B	5.25
C	3.125
D	-5.25
Answer Key: B	

Q96 2-bit digital to analog converter has full scale output of 10V. What will be the percentage resolution and voltage resolution respectively	
:	
A	0.0244% and 2.44 mV

B	0.0544% and 5.44 mV
C	0.0244% and 5.44 mV
D	0.0544% and 2.44 mV
Answer Key: A	

Q97 An FM signal can be detected by using :	
A	Low pass filter
B	Phase locked loop
C	Discriminator
D	Average detector
Answer Key: C	

Q98 The interfacing device used for generation of accurate time delay in microcomputer system is :	
A	Intel 8251
B	Intel 8259
C	Intel 8257
D	Intel 8253
Answer Key: D	

Q99 A microprocessor perform :	
A	Low pass filtering
B	Logic operation
C	Amplification
D	None of these
Answer Key: B	

Q100 A shift register with the serial output connected back to the serial input is a :	
A	Feedback shift register

B	Shift register counter
C	Universal shift register
D	Serial to parallel converter
Answer Key: B	

Q101 Which of the following is a peripheral device :	
A	8085
B	8051
C	8255
D	None of these
Answer Key: C	

Q102 Barkhausen criterion is related to :	
A	Filter
B	Amplifier
C	Oscillator
D	None of these
Answer Key: C	

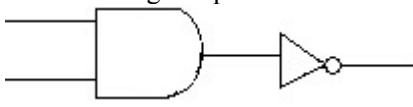
Q103 Positive feedback is utilized in :	
A	Power amplifier
B	Low power amplifier
C	Oscillator
D	None of these
Answer Key: C	

Q104 In a 8085 microprocessor, the number of pins are :	
A	21

B	19
C	27
D	40
Answer Key: D	

Q105 The logical operation performed by 8085 microprocessor, to complement a number is :	
A	NOT
B	EX-OR
C	NAND
D	OR
Answer Key: A	

Q106 Power supply required for 8085 microprocessor is :	
A	10 V
B	16 V
C	5 V
D	15 V
Answer Key: C	

Q107 The following is equivalent to :	
	
A	OR gate
B	NAND gate
C	EX OR gate
D	None of these
Answer Key: B	

Q108 The smallest valid signed integer that can be started in a memory location of a 4k x 8 bit RAM is :	
---	--

A	-128
B	-2048
C	-65536
D	Zero
Answer Key: B	

Q109 What is the address of the last memory location if 14 bits are used to address the memory :	
A	16384
B	16382
C	16383
D	16385
Answer Key: C	

Q110 Sample and hold circuit is utilized in :	
A	Multiplexer
B	Analog to digital converter
C	Amplifier
D	None of these
Answer Key: B	

Q111 A 8255 chip is selected when A2 to A7 bits are all 1. The address of port c :	
A	FB
B	FC
C	FE
D	FD
Answer Key: C	

Q112 8085 is a :	
-------------------------	--

A	8 bit microprocessor
B	16 bit microprocessor
C	64 bit microprocessor
D	It is a microprocessor
Answer Key: A	

Q113 An 8085 microprocessor based system drives a multiplexed 5-digit, 7 segment display. The digits are refreshed at a rate of 500Hz. The on time for each digit is	
A	10^{-2} second
B	0.4×10^{-3} second
C	4×10^{-3} second
D	2.5×10^{-2} second
Answer Key: B	

Q114 If the accumulator of an intel 8085 microprocessor contains 37H and the previous operation has set the carry flag, the instruction ACI 56H will give	
A	7A H
B	7E H
C	84 H
D	None of these
Answer Key: D	

Q115 Number of address lines in 8085 microprocessor are	
A	8
B	10
C	16
D	32
Answer Key: C	

Q116 Which of the following is not the modulation technique	
:	

A	PCM
B	AM
C	PSK
D	None of these
Answer Key: A	

Q117 For over modulation in AM :	
A	Modulation Index is 0
B	Modulation Index is 1
C	Modulation Index is 0.5
D	None of these
Answer Key: D	

Q118 Which of the following is angle modulation :	
A	Amplitude modulation
B	Phase modulation
C	PCM
D	None of these
Answer Key: B	

Q119 The antenna current of an AM Transmitter is 8 Ampere when only carrier is sent. When the carrier is modulated it increases to 8.93 Ampere. What is the percentage modulation ?	
A	100%
B	57%
C	43%
D	70.14%
Answer Key: D	

Q120 For accurate measurement of voltage the most suitable equipment :	
--	--

A	Analog Voltmeter
B	Digital Voltmeter
C	CRO
D	None of these
Answer Key: C	

Q121 Wheat stone bridge is used for the measurement of :	
A	Capacitance
B	Resistance
C	Inductance
D	None of these
Answer Key: B	

Q122 Which of the following device is not a transducer :	
A	LVDT
B	Strain gauge
C	Filter
D	None of these
Answer Key: C	

Q123 When a radio receiver is tuned to 455 kHz, its local oscillator provides an input at 1010 kHz to the mixer. The frequency of the other station will be :	
A	1465 kHz
B	355 kHz
C	455 k Hz
D	910 kHz
Answer Key: A	

Q124 For satisfactory operations, in an AM system carrier frequency must be x times the bandwidth of message signal. The value of x should be greater than :	
---	--

A	5
B	50
C	2
D	10
Answer Key: B	

Q125 What is the assigned bandwidth of each of the channels in the AM broadcast band? :	
A	10 kHz
B	5 kHz
C	200 kHz
D	15 kHz
Answer Key: A	

Q126 Out of the following which one is considered as an AM signal :	
A	Binary phase shift keying
B	Differential phase shift keying
C	Differential encoded phase shift keying
D	QPSK
Answer Key: D	

Q127 Quantization noise is related to :	
A	AM
B	FM
C	PM
D	PCM
Answer Key: D	

Q128 Preemphasis is required in :	
---	--

A	AM
B	FM
C	Delta modulation
D	None of these
Answer Key: B	

Q129 If the maximum deviation in FM is 75 kHz and maximum modulation frequency is 15 kHz, the maximum required bandwidth is	
A	30 kHz
B	150 kHz
C	15 kHz
D	180 kHz
Answer Key: D	

Q130 Minimum shift keying (MSK) is an orthogonal FSK scheme that gets its name because	
:	
A	The phase shift is minimum
B	Power transmission is minimum
C	The error probability is minimum
D	Bandwidth required for transmission is minimum
Answer Key: A	

Q131 In a pulse code modulation (PCM) system if the quantization level is increased from 2 to 8 the bandwidth requirement will	
:	
A	Get tripled
B	Remain the same
C	Become eight times
D	Get doubled
Answer Key: A	

Q132 CRO can not measure	
:	

A	Power
B	Voltage
C	Frequency
D	None of these
Answer Key: A	

Q133 Which of the following diode is used for voltage regulation :	
A	Tunnel diode
B	LED
C	Zener diode
D	Schottky diode
Answer Key: C	

Q134 The most suitable method for detecting a modulation signal $(2.5 + 5 \cos \omega_m t) \cos \omega_c t$ is :	
A	Envelop detector
B	Synchronous detector
C	Radio detector
D	Both (Envelop detector) and (Synchronous detector)
Answer Key: B	

Q135 As compared to analog transmission which one of the following is a disadvantage of digital transmission? :	
A	Multiplexing of digital signals is not efficient
B	Digital transmission is less immune to channel noise
C	Before transmission, coding of digital signals is necessary
D	More bandwidth is required for digital transmission
Answer Key: D	

Q136 The main advantage of PCM is :	
--	--

A	Less bandwidth
B	Less power
C	Better performance in presence of noise
D	Possibility of multiplexing
Answer Key: C	

Q137 The standard data rate of a PCM voice channel is :	
A	8 Kbps
B	8 bps
C	16 bps
D	64 Kbps
Answer Key: D	

Q138 The quantization noise depends on :	
A	Sampling rate
B	Number of quantization levels
C	Signal power
D	None of these
Answer Key: B	

Q139 LVDT is used for the measurement of :	
A	Displacement
B	Speed
C	Pressure
D	None of these
Answer Key: A	

Q140 A PLL can be used to demodulat :	
--	--

A	AM
B	PCM
C	FM
D	None of these
Answer Key: C	

Q141 A 0-300 V Voltmeter has an error of $\pm 2\%$ of full deflection. What would be the range of readings if true voltage is 30 V ?	
A	20 V to 40 V
B	29 V to 30.6 V
C	24 V to 36 V
D	28 V to 32 V
Answer Key: C	

Q142 A 1mA ammeter has a resistance of 100Ω . It is to be converted to a 1A ammeter. The required shunt resistance will be	
A	100Ω
B	0.001Ω
C	100000Ω
D	0.1001Ω
Answer Key: D	

Q143 A d-Arronal movement is rated at 50 microamperes. Its sensitivity is	
A	$20000\Omega/V$
B	$200000\Omega/V$
C	$200\Omega/V$
D	$2000\Omega/V$
Answer Key: A	

Q144 Which instrument has the highest frequency range with accuracy within reasonable limits?	
:	

A	Electrodynamometer
B	Thermocouple
C	Moving iron
D	Rectifier type
Answer Key: B	

Q145 The bandwidth of a CRO is from 0-20 MHz. The fastest rise time for a sine wave which can be reproduced accurately by the instrument is	
A	35 micro seconds
B	0.175 micro seconds
C	35 nano seconds
D	17.5 nano seconds
Answer Key: D	

Q146 The advantage of Hay's bridge over maxwell's inductance-capacitance bridge is	
:	
A	It can be used for measurement of inductance of high Q-coils
B	It can be used for measurement of inductance of low Q-coils
C	Its equation for balance do not contain any frequency term
D	None of these
Answer Key: A	

Q147 A 100 KV, 50 Hz supply is fed to a bridge rectifier ammeter through a capacitor. The PMMC ammeter of the rectifier reads 45 mA. The value of capacitor will be	
:	
A	$17.66 \times 10^{-9} \text{ F}$
B	$15.9 \times 10^{-10} \text{ F}$
C	$15.9 \times 10^{-12} \text{ F}$
D	$17.66 \times 10^{-12} \text{ F}$
Answer Key: B	

Q148 In a Wheat stone bridge a change of 6Ω in the unknown arm of the bridge produces a change in deflection	
: produces a change in deflection of 3 mm of the galvanometer. The sensitivity of the instrument is	

A	2%
B	2 Ω /mm
C	0.5 mm/ Ω
D	5%
Answer Key: C	

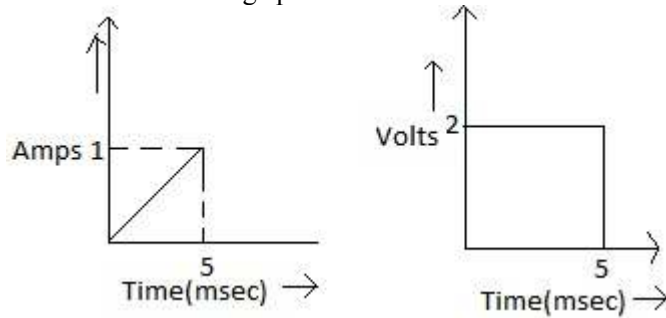
Q149 CRO works in :	
A	Frequency domain
B	Time domain
C	Digital domain
D	None of these
Answer Key: B	

Q150 Envelop detector is used for the demodulation of :	
A	FSK
B	BPSK
C	AM
D	None of these
Answer Key: C	

State Forest Service Examination - 2014 (Provisional Model Answer Key)

Electrical Engineering

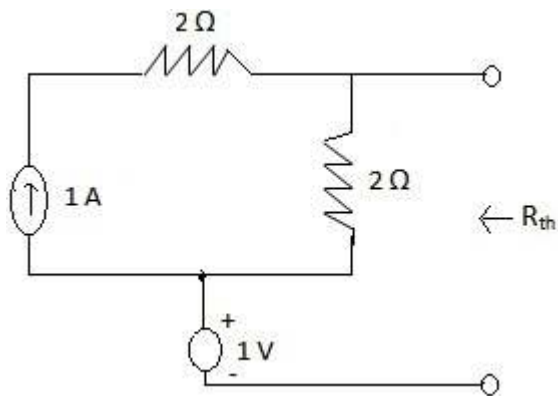
Q1 : The current and voltage profile of an element Vs. time is shown below. Determine the element and its value.



- | | |
|---|---|
| A | Resistor, $2\text{m}\Omega$ |
| B | Inductor, 10 mH |
| C | Capacitor, 10 mF |
| D | Cannot be identified with the given information |

Answer Key: **B**

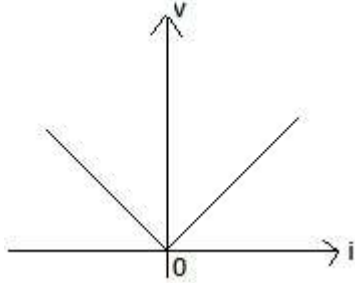
Q2 : The Thevenin's equivalent resistance R_{th} for the given network is



- | | |
|---|--------------|
| A | $01\ \Omega$ |
| B | $02\ \Omega$ |
| C | $04\ \Omega$ |
| D | Infinity |

Answer Key: **B**

Q3 : The v-i characteristic of an element is shown in the figure given below. The element is



A Non-linear, active, non-bilateral

B Linear, active, non-bilateral

C Non-linear, passive, non-bilateral

D Linear, active, bilateral

Answer Key: **B**

Q4 : Superposition theorem is not applicable for

A Voltage calculation

B Bilateral elements

C Power calculations

D Passive elements

Answer Key: **C**

Q5 : When two-wattmeter method of measurement of power is used to measure power in a balanced three phase circuit, if the wattmeter reading is zero, then

A Power consumed in the circuit is zero

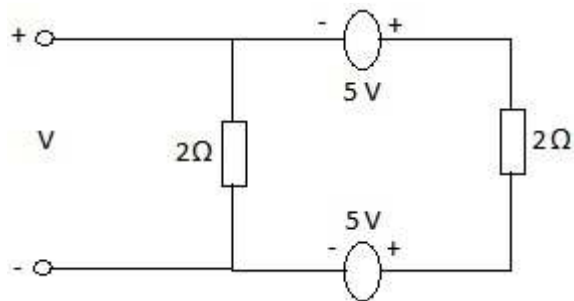
B Power factor of the circuit is zero

C Power factor is unity

D Power factor is 0.5

Answer Key: **D**

Q6 : Consider the following circuit:

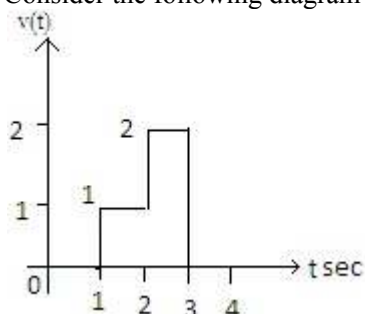


Which one of the following statement is correct ?

- | | |
|---|------------------------|
| A | Passive and linear |
| B | Active and linear |
| C | Passive and non-linear |
| D | Active and non-linear |

Answer Key: A

Q7 : Consider the following diagram

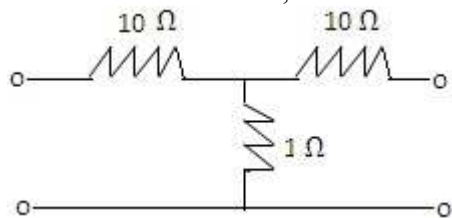


Which one of the following gives Laplace transform of the voltage $v(t)$ shown in the above diagram ?

- | | |
|---|-----------------------------------|
| A | $[e^s + e^{2s} + 2e^{3s}]/s$ |
| B | $[e^s + e^{2s} - 2e^{3s}]/s$ |
| C | $[e^{-s} + e^{-2s} - 2e^{-3s}]/s$ |
| D | $[e^{-s} + e^{-2s} + 2e^{-3s}]/s$ |

Answer Key: C

Q8 : Two identical T-sections, such as one shown below are connected in series



What is the y_{11} of the combination ?

A	11/240
B	22/240
C	11/360
D	22/120
Answer Key: A	

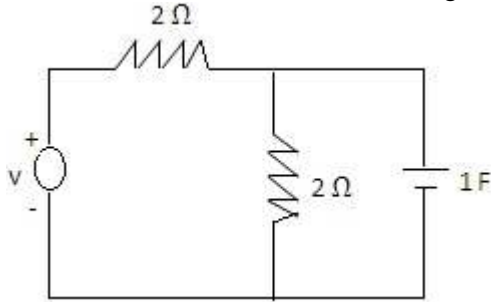
Q9 : A 3-phase delta-connected symmetrical load consumes P watt of power from a balanced supply. If the same load is connected in a star to the same supply, then what is the power consumption ?	
A	P/3
B	P
C	$\sqrt{3}P$
D	3P
Answer Key: B	

Q10 What is the transfer function of a system whose impulse response is $e^{-3t}\sin 2t$?	
:	
A	$\frac{13}{s^2+6s+13}$
B	$\frac{1}{s^2+6s+13}$
C	$\frac{2}{s^2+6s+13}$
D	$\frac{5}{s^2+6s+13}$
Answer Key: C	

Q11 When is a series RLC Circuit over-damped ?	
:	
A	$\frac{R^2}{4L^2} = \frac{1}{LC}$
B	$\frac{R^2}{4L^2} < \frac{1}{C}$

C	$\frac{R^2}{4L^2} > \frac{1}{C}$
D	$\frac{R^2}{4C^2} = \frac{1}{LC}$
Answer Key: C	

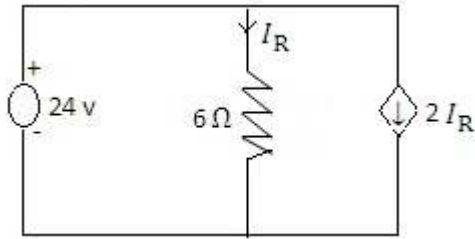
Q12 A 3-phase 3-wire supply feeds a star connected load consisting of 3 equal resistors. If one of the resistors is to be removed, then what is the reduction in power as compared to the original power ?	
A	25% of the original power
B	33.3% of the original power
C	50% of the original power
D	66.6% of the original power
Answer Key: C	

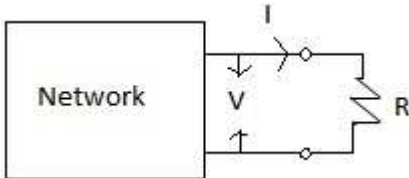
Q13 What is the time constant of the circuit given below ?	
	
A	0.5s
B	1s
C	2s
D	4s
Answer Key: B	

Q14 A series R-L-C circuit is switched on to a step voltage v at t=0. What are the initial and final values of the current in the circuit, repectively ?	
A	V/R, V/R
B	Zero, Infinity
C	Zero, zero

D	Zero, V/R
Answer Key: C	

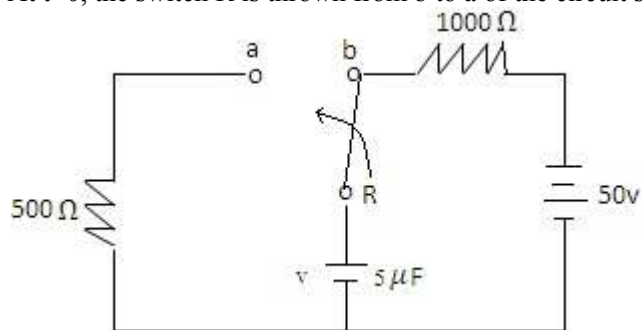
Q15 Two coils are coupled in such a way that the mutual inductance between them is 16 mH. If the inductances of the coils are 20 mH and 80 mH, respectively, the coefficient of coupling is :	
A	0.01
B	0.4
C	0.1
D	0.0025
Answer Key: B	

Q16 Consider the circuit in the below figure. What is the power delivered by the 24 v source ?	
:	
	
A	96 W
B	144 W
C	192 W
D	288 W
Answer Key: D	

Q17 For the network shown below, when $I=0$, $V=20\text{v}$ and when $R=0$, $I=10\text{A}$. If now $R=3\Omega$, what is the value of the current I ?	
:	
	
A	6.67A
B	6.0A
C	4.0A
D	10A

Answer Key: C

Q18 At $t=0$, the switch R is thrown from b to a of the circuit shown below. What are the values of $v(0^+)$ and $i(0^+)$?



A 50v, 90mA

B 50v, 100mA

C 50v, 110mA

D 50v, 120mA

Answer Key: B

Q19 In a network made up of linear resistors and ideal voltage sources, values of all resistors are doubled. Then the voltage across each resistor is :

A Doubled

B Halved

C Decreases four times

D Not changed

Answer Key: D

Q20

:

The driving point impedance function $Z(s) = \frac{s^2 + 2s + s}{s^2 + s + 1}$ can be realized as a

A R-C network

B R-L network

C L-C network

D R-L-C network

Answer Key: D

Q21 Lap winding is most suitable for :	
A	Low voltage high current
B	High voltage low current
C	Low voltage low current
D	Lap winding is obsolete now-a-days
Answer Key: A	

Q22 A 4-pole, 1200 rpm, lap wound dc generator has 1520 conductors. If the flux per pole is 0.01 wb, the emf of generator is :	
A	608v
B	304v
C	152v
D	76v
Answer Key: B	

Q23 Mechanical power developed in a dc motor is maximum when : :	
A	Back emf=Applied voltage
B	Back emf= $\sqrt{\text{Applied Voltage}}$
C	Back emf=Applied voltage/2
D	Back emf=Applied voltage/ $\sqrt{2}$
Answer Key: C	

Q24 The use of higher flux density in transformer design :	
A	Reduces the weight per kVA
B	Increases the weight per kVA
C	Allows less number of turns
D	Reduces the weight per kVA with less number of turns
Answer Key: D	

Q25 Direction of rotation in single phase induction motor can be reversed by :	
A	Changing the connection of starting capacitor
B	Changing the connection of mains supply
C	By changing connection of starting and main winding simultaneously
D	By either Changing the connection of starting winding or Changing the connection of main winding
Answer Key: D	

Q26 A 200MW, 21kV, three-phase, 50Hz cylindrical rotor synchronous generator having synchronous reactance of 0.5Ω /phase and negligible resistance is delivering power to an infinite bus at 0.8 power factor lagging. Find line to line excitation voltage E_f and power angle (s)	
A	14.4kV, 10.97°
B	25.02kV, 10.97°
C	12.2kV, -10.97°
D	20.5kV, -10.97°
Answer Key: B	

Q27 The breakdown torque of synchronous motor :	
A	Varies in proportional to applied voltage
B	Varies in proportional to square root of applied voltage
C	Varies in proportional to square of applied voltage
D	does not depend upon supply voltage
Answer Key: A	

Q28 V-curves in synchronous motor are curve between :	
A	Armature current and power factor
B	Field current and armature current
C	Terminal voltage and load factor
D	Power factor and field current

Answer Key: **B**

Q29 For distribution transformer :
:

- | | |
|---|--|
| A | Keeping copper losses less is more important |
| B | keeping core losses less is more important |
| C | Core losses can be high |
| D | No special core is taken |

Answer Key: **B**

Q30 The maximum efficiency in a transformer occurs when
:

- | | |
|---|--|
| A | Core loss > copper loss, p.f.= unity |
| B | Core loss = copper loss, p.f.= unity |
| C | Core loss = copper loss, p.f.= leading |
| D | Core loss = copper loss, p.f.= lagging |

Answer Key: **B**

Q31 Crawling of induction motor takes place due to the presence of :
:

- | | |
|---|--------------------------|
| A | 3 rd Harmonic |
| B | 5 th Harmonic |
| C | 7 th Harmonic |
| D | 4 th Harmonic |

Answer Key: **C**

Q32 In domestic fans, motor used is
:

- | | |
|---|---|
| A | DC shunt motor with rectifier |
| B | Single phase capacitor start, capacitor run motor |
| C | Single phase resistance start motor |
| D | Shaded pole single phase induction motor |

Answer Key: **B**

Q33 In an electromechanical energy conversion device, the developed torque depends upon :

- | | |
|---|---|
| A | Stator field strength and torque angle |
| B | Stator field and motor field strengths |
| C | Stator field and motor field strengths and the torque angle |
| D | Stator field strength only |

Answer Key: **C**

Q34 Match list I (Tests) with list II (Machines) and select the correct answer :
:

List I

List II

- | | |
|-----------------------------------|--------------------|
| a. No load and blocked motor test | 1. Transformer |
| b. Sumpner's test | 2. Induction motor |
| c. Swinburne's test | 3. dc motor |

- | | |
|---|------------------|
| A | a- 1, b- 3, c- 2 |
| B | a- 2, b- 1, c- 3 |
| C | a- 2, b- 3, c- 1 |
| D | a- 3, b- 2, c- 1 |

Answer Key: **B**

Q35 The current drawn by a 120v dc motor with back emf of 110v and armature resistance of 0.4 ohm is :

- | | |
|---|------|
| A | 4A |
| B | 25A |
| C | 274A |
| D | 300A |

Answer Key: **B**

Q36 A capacitor start single phase induction motor is used for :

- | | |
|---|---------------------|
| A | Easy to start loads |
|---|---------------------|

B	Medium start loads
C	Hard to start loads
D	Any type of start loads
Answer Key: C	

Q37 In induction motor, air gap power is 10 kW and mechanically developed power is 8 kW. What are the rotor ohmic losses ?	
A	1kW
B	3kW
C	2kW
D	0.5kW
Answer Key: C	

Q38 A 500 kvA transformer has constant losses of 500 w and copper losses at full load are 2000w. Then at what load, is the efficiency maximum ?	
A	250kvA
B	500kvA
C	1000kvA
D	125kvA
Answer Key: A	

Q39 Cores of large power transrormers are made from which on of the following ?	
A	Hot-rolled steel
B	Cold-rolled non-grain oriented steel
C	Cold-rolled grain oriented steel
D	Ferrite
Answer Key: C	

Q40 What is the operating slip of a 400 v, 50Hz, 6-pole, 3-phase induction motor, while the speed is 936 rpm with a 400v, 48Hz, 3-phase supply ?	
A	0.036

B	0.064
C	0.025
D	0.075
Answer Key: C	

Q41 Which parameters are zero for lossless transmission line :	
A	R and L
B	L and C
C	R and G
D	G and C
Answer Key: C	

Q42 Zero sequence currents can flow from a line into a transformer bank if the windings are in :	
A	Grounded star-delta
B	Delta-star
C	Star-grounded star
D	Delta-delta
Answer Key: A	

Q43 Reactance relay are used for phase fault in :	
A	Long line
B	Medium line
C	Short line
D	Any one of these
Answer Key: C	

Q44 In transposition, :	
A	Distance between phases should be large and between conductors of a phase small

B	Distance between conductors of a phase large and between phase small
C	Both should be small
D	None of these
Answer Key: B	

Q45 In Which type of faults given below, all the 3 components I_{a0} , I_{a1} and I_{a2} are equal :	
A	Single line to ground fault
B	Line to line (LL) fault
C	Double line to ground fault
D	None of these
Answer Key: A	

Q46 Series compenstaion on EHV lines is resorted to :	
A	Improve the stability
B	Reduce the fault level
C	Improve the voltage profite
D	As a substitute for synchronous phase modifier
Answer Key: A	

Q47 The equal area criterian of stability as adopted for :	
A	One machine and infinite bus bar
B	More than one machine and infinite bus bar
C	Only when synchronous machines are loaded on infinite bus bar
D	When there is no load on the bus-bar
Answer Key: A	

Q48 If the torque angle increases indefinitely it shows :	
A	Absolute stability

B	Instability
C	Transient instability
D	None of these
Answer Key: B	

Q49 Travelling wave in transmission line moves from :	
A	One end to another
B	Centre to both ends
C	Induces static charges
D	None of these
Answer Key: B	

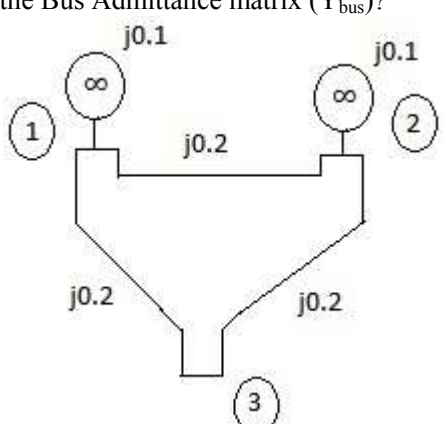
Q50 In the HVDC system, the ac harmonics which gets effectively eliminated with 12 pulse bridge converters are :	
A	Triplen harmonics
B	Triplen and 5 th harmonics
C	Triplen, 5 th and 7 th harmonics
D	5 th and 7 th harmonics
Answer Key: D	

Q51 For transmission line which one of the following relation is true ? :	
A	$AD - BC = 1$
B	$-AD - BC = 1$
C	$AD - BC = -1$
D	$AD - BC = 0$
Answer Key: A	

Q52 In HVDC transmission, there are predominant :	
A	Voltage harmonics on dc side and current harmonics on ac side of converters

B	Current harmonics on dc side and voltage harmonics on ac side of converters
C	Current harmonics only on the dc side of converters
D	Voltage harmonics only on the ac side of converters
Answer Key: A	

Q53	D_s is the GMR of each sub-conductor of a four sub-conductor bundled conductor and d is the bundle spacing. What is the GMR of the equivalent single conductor ?
A	$1.09\sqrt{D_sXd^3}$
B	$1.09\sqrt{D_s^3Xd^3}$
C	$1.09^4\sqrt{D_s^3Xd^3}$
D	$1.09^4\sqrt{D_sXd^3}$
Answer Key: D	

Q54	A sample power system network is shown below. The reactances marked are in P.u. What is the Pu value of Y22 of the Bus Admittance matrix (Y_{bus})?
	
A	j10.0
B	j0.4
C	-j0.1
D	-j20.0
Answer Key: D	

Q55	What is the approximate value of the surge impedance loading of a 400 kV, 3-phase, 50Hz overhead single circuit transmission line ?
------------	---

A	230MW
B	400MW
C	1000MW
D	1600MW
Answer Key: B	

Q56 The incremental cost characteristics of two generators delivering a total load of 200 MW are as follows $\frac{dF_1}{dP_1} = 2.0 + 0.01P_1$; $\frac{dF_2}{dP_2} = 1.6 + 0.02P_2$ What should be the values of P_1 and P_2 for economic operation ?	
A	$P_1 = P_2 = 100$ MW
B	$P_1 = 80$ MW, $P_2 = 120$ MW
C	$P_1 = 200$ MW, $P_2 = 0$ MW
D	$P_1 = 120$ MW, $P_2 = 80$ MW
Answer Key: D	

Q57 When the ferranti effect on long overhead lines experienced ?	
A	The line is lightly loaded
B	The line is heavily loaded
C	The line is fully loaded
D	The power factor is unity
Answer Key: A	

Q58 The per unit impedance of a circuit element is 0.30. If the base KV and base MVA are halved, then the new value of the per unit impedance of the circuit element will be :	
A	0.30
B	0.60
C	0.0030
D	0.0060
Answer Key: B	

Q59 Consider the following statements regarding HVDC power transmission : : 1. The modern HVDC systems use 12 pulse converters 2. DC systems never use ground or sea return 3. Most of present day dc schemes are two terminal which of the statements given above is/are correct ?	
A	1,2 and 3
B	1 only
C	2 and 3 only
D	1 and 3
Answer Key: D	

Q60 The transfer of reactive power over a line mainly depends upon :	
A	V_r
B	V_s
C	$ V_s - V_r $
D	Power angle
Answer Key: C	

Q61 The phase angle of the system :	
$G(s) = \frac{s+5}{s^2+4s+9}$ varies between	
A	0° and 90°
B	0° and -90°
C	0° and -180°
D	-90° and -180°
Answer Key: B	

Q62 If the Nyquist plot cuts the negative real axis at a distance of 0.4, then the gain margin of the system is : :	
A	0.4
B	-0.4
C	0.04

D	2.5
Answer Key: D	

Q63 Consider the single input, single output system with its state variable representation : $\dot{X} = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} X + \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} U$ $Y = [1 \ 0 \ 2] X$ The system is :	
A	Neither controllable nor observable
B	Controllable but not observable
C	Uncontrollable but observable
D	Both controllable and observable
Answer Key: A	

Q64 A particular control system is described by the following state equations: $\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U \text{ and } Y = [2 \ 0] X$ The transfer function of this system is :	
A	$\frac{Y(s)}{U(s)} = \frac{1}{2s^2 + 3s + 1}$
B	$\frac{Y(s)}{U(s)} = \frac{2}{2s^2 + 3s + 1}$
C	$\frac{Y(s)}{U(s)} = \frac{1}{s^2 + 3s + 2}$
D	$\frac{Y(s)}{U(s)} = \frac{4}{2s^2 + 3s + 2}$
Answer Key: D	

Q65 Which of the following are the characteristics of closed loop system ? : 1. It does not compensate for disturbances 2. It reduces the sensitivity of plant-parameter variations 3. It does not involve output measurements 4. It has the ability to control the system transient response	
--	--

Select the correct answer using the codes given below :

A 1 and 4

B 2 and 4

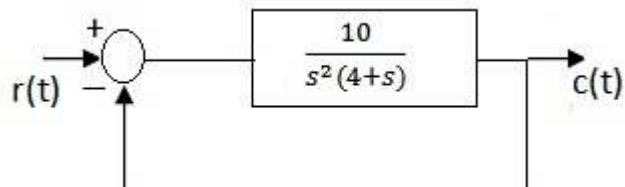
C 1 and 3

D 2 and 3

Answer Key: **B**

Q66

:



The steady state error resulting from an input $r(t) = 2+3t+4t^2$ for given state is :

A 2.4

B 4.0

C zero

D 3.2

Answer Key: **D**

Q67 Which of the following are the characteristics of the root locus of

:

$$G(s)H(s) = \frac{K(s+5)}{(s+1)(s+3)}$$

1. It has one asymptote
2. It has intersection with jw-axis
3. It has two real axis intersections
4. It has two zeros at infinity

Select the correct answer using the codes given below

A 1 only

B 2 and 3

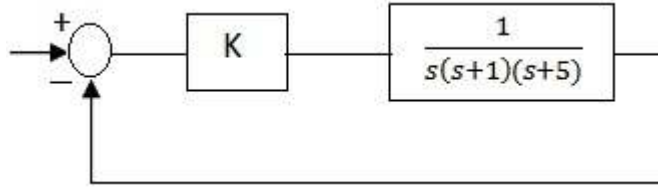
C 3 and 4

D 1 and 3

Answer Key: **A**

Q68 the closed loop system shown below becomes marginally stable if the constant K is chosen to be :

:



A 10

B 20

C 30

D 40

Answer Key: C

Q69 the characteristic equation of a system is given by $3s^4 + 10s^3 + 5s^2 + 2 = 0$. This system is :

:

A Stable

B Marginally stable

C Unstable

D None of these

Answer Key: A

Q70 Indicate which one of the following transfer functions represent phase lead compensator?

:

A $\frac{s+1}{s+2}$

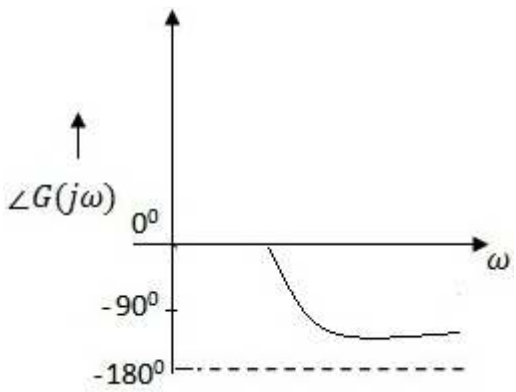
B $\frac{6s+3}{6s+2}$

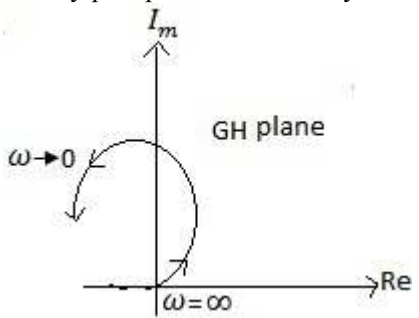
C $\frac{s+5}{3s+2}$

D $\frac{s+8}{s^2+5s+6}$

Answer Key: A

Q71 The Bode phase angle plot of a system is shown below. The type of the system is:

: 	
A	0
B	1
C	2
D	3
Answer Key: A	

Q72 The Nyquist plot of a control system is shown below. For this system, $G(s) H(s)$ is equal to : : 	
A	$\frac{k}{s(1+sT_1)}$
B	$\frac{k}{s^2(1+sT_1)}$
C	$\frac{k}{s^2(1+sT_1)}$
D	$\frac{k}{s^2(1+sT_1)s(1+sT_1)}$
Answer Key: D	

Q73 A property of phase-lead compensation is that the : :
--

A	Overshoot is increased
B	Bandwidth of closed loop system is reduced
C	Rise time of closed loop system is reduced'
D	Gain margin is reduced
Answer Key: C	

Q74 A minimum phase unity feedback system has a Bode plot with a constant slope of - 20db/decade for all frequencies. : What is the value of the maximum phase margin for the system ?	
A	0^0
B	90^0
C	-90^0
D	180^0
Answer Key: B	

Q75 What is the effect of phase lead compensator on gain cros-over frequency (ω_{cg}) and on the bandwidth (ω_b) ? :	
A	Both are increased
B	ω_{cg} is increased but ω_b is decreased
C	ω_{cg} is decreased but ω_b is increased
D	Both are decreased
Answer Key: A	

Q76 An electromechanical closed loop system has the transfer function : $\frac{C(S)}{R(S)} = \frac{k}{s(s^2 + s + 1)(s + 4) + k}$ Which one of the following is correct ?	
A	The system is stable for all positive values of k
B	The system is unstable for all values of k
C	The system is stable for values of k between zero and 3.36
D	The system is stable for values of k between 1.6 and 2.5
Answer Key: C	

Q77 which one of the following statement is not correct :	
:	
A	Root loci can be used for analyzing stability and transient performance
B	Root loci provide insight into system stability and performance
C	Shape of root locus gives idea of type of controller needed to meet design specification
D	Root locus can be used to handle more than one variable at time
Answer Key: D	

Q78 The phase lag compensator is used for which one of the following	
:	
A	To increase bandwidth
B	For fast dynamic response
C	To reduce steady state error
D	None of these
Answer Key: C	

Q79 for a second order system natural frequency of oscillation is 10 rad/s and damping ratio is 0.1 what is the 2% settling time :	
:	
A	40 S
B	10 S
C	0.4 S
D	4 S
Answer Key: D	

Q80 If the poles of a system lie on the imaginary axis the system will be :	
:	
A	Stable
B	Conditionally stable
C	Marginally stable
D	Unstable
Answer Key: C	

Q81 The snubber circuit is used in thyristor circuit for : :	
A	Triggering
B	dv/dt protection
C	di/dt protection
D	Phase shifting
Answer Key: B	

Q82 In case of voltage source inverter, free wheeling be needed for the load of : :	
A	Inductive nature
B	Capacitive nature
C	Resistive nature
D	Back emf nature
Answer Key: A	

Q83 PWM switching is preferred in voltage source inverters for the purpose of : :	
A	Controlling output voltage
B	Output harmonies
C	Reducing filter size
D	Controlling output voltage, output harmonies and reducing filter size
Answer Key: D	

Q84 For a step up dc-dc chopper with an input dc voltage of 220 volts, if the output voltage required is 330 volts and the non- conducting time of thyristor chopper is 100 μ s, then on time of thyristor chopper would be :	
A	66.6 μ s
B	100 μ s
C	150 μ s
D	200 μ s
Answer Key: D	

Q85 Compared to a single phase half-bridge inverter, the output power of a single phase –full bridge inverter is higher by a factor of	
A	12
B	8
C	4
D	2
Answer Key: C	

Q86 The turn –off time of the thyristor with a series connected RL circuit can be reduced by	
A	Increasing the value of R
B	Decreasing the value of R
C	Increasing the value of L
D	Decreasing the value of L
Answer Key: D	

Q87 For a three phase bridge inverter with 180° conduction mode, the nature of the line voltage waveform with a resistive load is	
A	A stepped waveform
B	A square waveform
C	A quasi square waveform
D	None of these
Answer Key: C	

Q88 A boost regulator has an input voltage of 5V and the average output of 15 V, the duty cycle is	
A	$3/2$
B	$2/3$
C	$5/2$
D	$15/2$
Answer Key: B	

Q89 In a three phase half wave rectifier, the value of the phase voltage is 200 V then the required PIV for each diode is :	
A	400 V
B	200 V
C	370 V
D	346 V
Answer Key: D	

Q90 In the buck boost converter, what is maximum value of the switch utilization factor :	
A	1.00
B	0.75
C	0.50
D	0.25
Answer Key: B	

Q91 Latching current of a thyristor compared to its holding current is :	
A	equal
B	greater
C	less
D	either less or equal
Answer Key: B	

Q92 The speed of a dc shunt motor above normal speed can be controlled by :	
A	Armature voltage control method
B	Flux control method
C	Both Armature voltage control method and Flux control method
D	None of these
Answer Key: B	

Q93 The circulating current inductor is required in a dual converter to :	
A	Improve the power factor
B	Smoothen the waveform of circulating current
C	Limit the circulating current
D	Increase the circulating current
Answer Key: C	

Q94 A three pulse converter feeding a purely resistive load. What is the value of firing delay angle α , which dictated the : boundary between continuous and discontinues mode of current conduction	
A	$\alpha=0^0$
B	$\alpha=30^0$
C	$\alpha=60^0$
D	$\alpha=150^0$
Answer Key: D	

Q95 When the firing angle α , of a single phase fully controlled rectifier feeding constant dc current into the load is 30^0 , : what is the displacement factor of the rectifier	
A	1
B	0.5
C	$\sqrt{3}$
D	$\sqrt{3}/2$
Answer Key: D	

Q96 In a three phase voltage source inverter operating in square wave mode, the output line voltage is free from :	
A	3 rd harmonic
B	7 rd harmonic
C	11 rd harmonic
D	13 rd harmonic
Answer Key: A	

Q97 What is the maximum output voltage of a 3 phase bridge rectifier supplied with line voltage of 440 V? :	
A	528 V
B	396 V
C	594 V
D	616 V
Answer Key: C	

Q98 Which one of the following is the main advantage of SMPS over linear power supply : :	
A	No transformer is required
B	Only one stage of conversion
C	No filter is required
D	Low power- dissipation
Answer Key: D	

Q99 Match list I (Device) with list II (monolithic construction) and select correct answer using the code given below the : list									
	<table> <tr> <th>List I</th><th>List II</th></tr> <tr> <td>a. Triac</td><td>1. Two thyristors in anti-parallel</td></tr> <tr> <td>b. RCT</td><td>2. A thyristor and a diode in thyristor Anti parallel</td></tr> <tr> <td>c. Diac</td><td>3. Two diodes anti parallel</td></tr> </table>	List I	List II	a. Triac	1. Two thyristors in anti-parallel	b. RCT	2. A thyristor and a diode in thyristor Anti parallel	c. Diac	3. Two diodes anti parallel
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a. Triac	1. Two thyristors in anti-parallel								
b. RCT	2. A thyristor and a diode in thyristor Anti parallel								
c. Diac	3. Two diodes anti parallel								
A	a-1,b-2,c-3								
B	a-3,b-2,c-1								
C	a-2,b-3,c-1								
D	a-3,b-1,c-2								
Answer Key: A									

Q100 A single phase full- bridge inverter is connected to a load of 2.4Ω the dc input voltage is 48 V. What is the rms : output at fundamental frequency :
--

A	$\frac{4 \times 48}{\sqrt{2} \pi} V$
B	$\frac{2 \times 48}{\sqrt{2} \pi} V$
C	$\frac{4 \times 48}{\pi} V$
D	$\frac{2 \times 48}{\pi} V$
Answer Key: A	

Q101 Guard circuits are used in the measurement of high resistance to :	
A	Eliminate the error caused by leakage current over insulation
B	To eliminate the capacitive effect
C	To guard against the error caused by frequency
D	To avoid damage caused by high voltage used in measurement of such resistance.
Answer Key: A	

Q102 For measurement of inductance having high Q, preferred AC bridge is :	
A	Maxwell's bridge
B	Owen bridge
C	Hay bridge
D	Heaviside bridge
Answer Key: C	

Q103 250V, 100W bulb at 100 volts consumes :	
A	40 w
B	84 w
C	16 w
D	52 w
Answer Key: C	

Q104 Electrostatic instruments are mainly used for :	
A	Low voltage
B	High Voltage
C	Energy
D	High Current
Answer Key: B	

Q105 Which of the following cannot be determined directly from CRO without external arrangement :	
A	Voltage
B	Current
C	Frequency
D	Phase between two voltage
Answer Key: B	

Q106 In induction type instrument, angle between two fluxes should be :	
A	0°
B	90°
C	180°
D	45°
Answer Key: B	

Q107 A stationary lissajous pattern on a CRO has 3 horizontal maximum values and 5 vertical maximum values. If : horizontal frequency is 1500 Hz, vertical frequency will be	
A	900Hz
B	2500Hz
C	22.5KHz
D	Data is insufficient
Answer Key: A	

Q108 In a single phase, power factor meter, the controlling torque is :	
A	Provided by spring control
B	Provided by gravity control
C	Provided by stiffness of suspension
D	Not required
Answer Key: D	

Q109 Which one of the following transducers can be used for measurement of pressures as high as 100,000 atmosphere :	
A	McLeod gauge
B	Pirani gauge
C	Bridgman gauge
D	Knudsen gauge
Answer Key: B	

Q110 Spectrum analyzer is a combination of :	
A	Narrow band super heterodyne receiver and CRO
B	Signal generator and CRO
C	Oscillator and wave analyzer
D	VTVM and CRO
Answer Key: A	

Q111 Which of the following transducers is classified as an active transducer :	
A	Metallic strain gauge
B	Capacitive microphone
C	LVDT
D	Piezoelectric transducer
Answer Key: D	

Q112 The difference between the indicated value and the true value of a quantity is :	
A	Gross error
B	Absolute error
C	Dynamic error
D	Relative error
Answer Key: B	

Q113 A multi-meter is used for the measurement of the following: : 1. Both ac and dc voltage 2. Both ac and dc current 3. Resistance 4. Frequency Power Select the current answer using the codes given below..	
A	1,2, and 4
B	2,3 and 4
C	1,3 and 4
D	1,2 and 3
Answer Key: D	

Q114 which one of the following decides the time of response of an indicating instrument ? :	
A	Deflecting system
B	Controlling system
C	Damping system
D	Pivot and jewel bearing
Answer Key: C	

Q115 In modern electronic multi-meter a FET or MOSFET is preferred over BJT because :	
--	--

A	Its input resistance is low
B	Its input resistance is high
C	Its input resistance is high and does not vary with the change of range
D	It is cheaper
Answer Key: C	

Q116 Which of the following bridges can be used for inductance measurement ?

:

1. Maxwell's bridge
2. Schering bridge
3. Wein bridge
4. Hay's bridge
5. Wheatstone bridge

Select the correct answer using the codes given below.

A	1 and 2
B	2 and 3
C	3,4 and 5
D	1 and 4
Answer Key: D	

Q117 A permanent magnet moving coil instrument having internal resistance of 50 ohm gives full scale deflection with a current of 50 mA. What is the shunt resistance value required to extend its range to 20A

:

A	1.253 Ω
B	0.1253 Ω
C	12.53 Ω
D	125.3 Ω

Answer Key: B

Q118 Continuous recording of a signal is not possible in

:

A	Magnetic tape recorder
---	------------------------

B	Strip chart recorder
C	X-Y recorder
D	Galvanometric recorder
Answer Key: D	

Q119 The number of output pins of a 8085 microprocessor are :	
A	40
B	27
C	21
D	19
Answer Key: B	

Q120 Which one of the following functions is performed by the 8085 instruction MOV H, C ? :	
A	Moves the contents of H register to C register
B	Moves the contents of C register to H register
C	Moves the contents of C register to HL pair
D	Moves the contents of HC pair to C register
Answer Key: B	

Q121 Memory-mapped I/o- scheme for the allocation of address to memories and I/O devices, is used for :	
A	Small systems
B	Large systems
C	Both large and small systems
D	Very large systems
Answer Key: B	

Q122 Ports are used to connect the CPU to which of the following units :	
1. Printer	

2. Floppy disk drives
3. Video display unit
4. Incoming power supply

Select the correct answer using the codes given below :

A	1 and 2
B	2 and 3
C	3 and 4
D	1 and 3
Answer Key: D	

Q123 In 8085, the DAA instructions are used for
:

A	Direct Address Accumulator
B	Double Address Accumulator
C	Decimal Adjust Accumulator
D	Direct Access Accumulator
Answer Key: C	

Q124 Processor status word of 8085 microprocessor has five flags. Which are these five flags ?
:

A	S, Z, AC, P, CY
B	S, OV, AC, P, CY
C	S, Z, OV, P, CY
D	S, Z, AC, P, OV
Answer Key: A	

Q125 The power failure alarm must be connected to which one of the following interrupt of 8085
:

A	RST 7.5
B	TRAP
C	INTR

D	HOLD
Answer Key: B	

Q126 The cycle required to fetch and execute an instruction in a 8085 microprocessor is which one of the following? :	
A	Clock Cycle
B	Memory Cycle
C	Machine Cycle
D	Instruction Cycle
Answer Key: D	

Q127 Which one of the following statements does not describe property/characteristics of a stack pointer – register in 8085 microprocessor? :	
A	It points to top of the stack
B	It is Up/Down counter
C	It is automatically initialized to 0000H on power-on
D	It is a 16-bit register
Answer Key: D	

Q128 Both the ALU and control section of CPU employ which special purpose storage location ? :	
A	Buffers
B	Decoders
C	Accumulators
D	Registers
Answer Key: C	

Q129 If a silicon diode has forward current of 50 mA at 1V, approximate bulk resistance of diode will be :	
A	20 Ω
B	14 Ω
C	5 Ω

D	$0\ \Omega$
Answer Key: C	

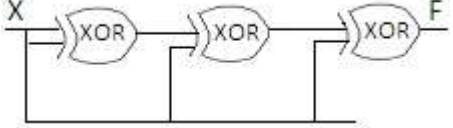
Q130 A diode is used to rectify a sine wave to 5 V rms. The minimum break in voltage of diode should be: :	
A	5 V
B	0.7 V
C	7.07 V
D	4.5 V
Answer Key: C	

Q131 In zener diode, large reverse current is due to :	
A	Rupture of bonds
B	Collision
C	Low resistance in reverse biased region
D	Presence of impurities
Answer Key: A	

Q132 The gain of an amplifier in general is :	
A	Complex
B	Real
C	Imaginary
D	None of these
Answer Key: A	

Q133 In Boolean algebra , if $F = (A+B) (\bar{A}+C)$, then :	
A	$F = AB + \bar{A}C$
B	$F = AB + \overline{AB}$
C	$F = AC + \bar{A}B$

D	$F = A + \bar{A}B$
Answer Key: C	

Q134 For the circuit shown below, the output F will be : 	
A	1
B	Zero
C	X
D	$\bar{X}$
Answer Key: B	

Q135 Early effect in BJT refers to :	
A	Avalanche breakdown
B	Thermal runaway
C	Base narrowing
D	Zener breakdown
Answer Key: C	

Q136 Match list I (Device) with list II (Application) and select the correct answer using the code given below the lists :

:

List - I		List - II	
a.	Diode	1.	Amplifier
b.	Transistor	2.	Oscillator
c.	Tunnel diode	3.	Rectifier
d.	Zener diode	4.	Voltage regulator

codes:

A	a-4, b-1, c-2, d-3
B	a-3, b-2, c-1, d-4
C	a-4, b-2, c-1, d-3
D	a-3 b-1 c-2 d-4

Answer Key: **D**

Q137 The lower turn off time of MOSFET when compared to BJT can be attributed to which one of the following?
:

- | | |
|---|----------------------------------|
| A | Input impedance |
| B | Positive temperature coefficient |
| C | Absence of minority carriers |
| D | On-state type resistance |

Answer Key: **C**

Q138 The shunt type regulator is suitable for which of the following?
:

- | | |
|---|----------------------------|
| A | Low current, high Voltage |
| B | Low current, low voltage |
| C | High current, low voltage |
| D | High current, high voltage |

Answer Key: **C**

Q139 Point charges 30nC, - 20nC and 10nC are located at (-1,0,2), (0,0,0) and (1, 5, -1), respectively. The total flux leaving a cube of side 6m centered at the origin is
:

- | | |
|---|-------|
| A | -20nC |
| B | 10nC |
| C | 20nC |
| D | 30nC |

Answer Key: **B**

Q140 In cylindrical coordinates, the equation
: is called

$$\frac{\partial^2 \Psi}{\partial \varphi^2} + \frac{1}{\varphi} \frac{\partial \Psi}{\partial \varphi} + \frac{\partial^2 \Psi}{\partial z^2} + 10 = 0$$

- | | |
|---|--------------------|
| A | Maxwell's equation |
| B | Laplace's equation |
| C | Poisson's equation |

D	Helmholtz's equation
Answer Key: C	

Q141 A potential difference V_0 is applied to a mercury column in a cylindrical container. The mercury is now poured into another cylindrical container of half the radius and the same potential difference V_0 applied across the ends. As a result of this change of space, the resistance will be increased	
A	2 times
B	4 times
C	8 times
D	16 times
Answer Key: D	

Q142 Two identical coaxial circular coils carry the same current I but in opposite directions. The magnitude of the magnetic field B at a point on the axis midway between the coils is	
A	Zero
B	The same as that produced by one coil
C	Twice that produced by one coil
D	Half that produced by one coil
Answer Key: A	

Q143 Electric field potential due to a point charge	
:	
A	Falls inversely proportional to the distance
B	Falls inversely proportional to the square of the distance
C	Falls inversely proportional to the square root of the distance
D	It does not change with distance
Answer Key: A	

Q144 Two thin parallel wires carry current along the same direction. The force experienced by one due to the other is	
:	
A	Parallel to the lines
B	Perpendicular to the lines and attractive

C	Perpendicular to the lines and repulsive
D	Zero
Answer Key: B	

Q145 If a vector field $\vec{B}$ is solenoid, which of these is true? :	
A	$\oint_L \vec{B} \cdot d\vec{l} = 0$
B	$\oint_s \vec{B} \cdot d\vec{s} = 0$
C	$\nabla \times \vec{B} = 0$
D	$\nabla \cdot \vec{B} \neq 0$
Answer Key: B	

Q146 The flux through each turn of a 100 – turn coil is $(t^3 - 2t)$ mWb, where t is in seconds. The induced emf at $t = 2$ s is :	
A	1 V
B	-1 V
C	4 mV
D	0.4 V
Answer Key: B	

Q147 A uniform plane wave has a wavelength of 2 cm in free space and 1 cm in a perfect dielectric. What is the relative permittivity of the dielectric? :	
A	2.0
B	0.5
C	4.0
D	0.25
Answer Key: C	

Q148 What is the magnetic field due to an infinite linear current carrying conductor? :	
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A	$H = \frac{\mu I}{2\pi r} \text{ A/m}$
B	$H = \frac{I}{2\pi r} \text{ A/m}$
C	$H = \frac{\mu I}{2r} \text{ A/m}$
D	$H = \frac{I}{r} \text{ A/m}$
Answer Key: B	

Q149 . A loop is rotating about the y-axis in a magnetic field $B = B_0 \sin \omega t \hat{a}_x \text{ Wb/m}^2$. The voltage induced in the loop is due to :	
A	Motional emf
B	Transformer emf
C	A combination of motional and transformer emf
D	None of these
Answer Key: C	

Q150 A long straight wire carries a current $I = 10\text{A}$. At what distance is the magnetic field $H = 1 \text{ A/m}$? :	
A	1.19 m
B	1.39 m
C	1.59 m
D	1.79 m
Answer Key: C	