MPPSC AE

Previous Year Paper
Paper - II
Electrical Engineering
(2014 Shift 2)

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State Engineering (Prelims) Exam – 2014

Second Paper – Second Shift

(Provisional Model Answer Key)

Electrical Engineering

Q1 : The unit step sequence u[n] and impulse response δ[n] are related as -	
A	$u[n] = \sum_{p=0}^{n} \delta[p-1]$
B	$u[n] = \sum_{p=0}^{-n} \delta[p]$
C	$u[n] = \sum_{p=0}^{+\infty} \delta[p]$
D	$u[n] = \sum_{p=-\infty}^{n} \delta[p]$
Answer Key: **D**	

Q2 : The system given as y(t)=x(t-8) is invertible then inverse system will be as-	
A	y(t+8)
B	y(t-8)
C	y(2t+8)
D	y(t-2)
Answer Key: **A**	

Q3 : If f(t) is a function, then the Laplace transform of $\frac{df(t)}{dt}$ will be as-

A	F(s)
B	sF(s)–f(0)
C	$s^2F(s)$
D	$s^3F(s)$- f(0)
Answer Key: **B**	

Q4 : The autocorrelation function of a real signal x(t) denoted by $R_x(\tau)$ satisfies the following condition -	
A	$R_x(\tau) = R_x(-\tau)$

B	$R_x(0) < R_x(-\tau)$
C	$R_x(\tau) > R_x(-\tau)$
D	$R_x(\tau) = 1$

Answer Key: **A**

Q5 : The discrete-time system denoted by $y[n]=x[n^3]$ is-

A	Linear, time-varying and causal system
B	Nonlinear, time-varying and causal system
C	Linear, time-invariant and non-causal system
D	Linear, time-variant and non-causal system

Answer Key: **D**

Q6 : If the voltage gain $|V_0/V_i|$ of an amplifier is $1/\sqrt{2}$, its value in dB is -

A	+10 dB
B	-6.93 dB
C	-3 dB
D	+3 dB

Answer Key: **C**

Q7 : The trigonometric Fourier series representation of an even signal does not have the following type of functions-

A	DC
B	Cosine functions
C	Sine functions
D	Odd harmonic functions

Answer Key: **C**

Q8 : The impulse response of a linear time invariant system is given by $h(t) = \delta(t-2) + \delta(t-3)$. The step response of this system at t=1 will be -

A	0
B	1
C	2

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D	3

Answer Key: **A**

Q9 : The power spectral density and the autocorrelation function of an periodic signal are related by -

A	The Fourier transformation
B	The Laplace transformation
C	Both are same
D	None of these is correct

Answer Key: **A**

Q10 : The power of a sinusoid signal x(t) = A/2 Cos(ωt) is given by -

A	$A^2/4$
B	$A^2/2$
C	A^2
D	$A^2/8$

Answer Key: **D**

Q11 : Assume that F_1 and F_2 denote the lower and upper half power frequencies of a series RLC circuit respectively and F_0 denotes the resonance frequency. The selectivity of this RLC circuit is given by-

A	$\frac{F_2-F_0}{F_0-F_1}$
B	$\frac{F_0}{F_2-F_1}$
C	$\frac{F_1-F_2}{2F_0}$
D	$\frac{F_2-F_0}{F_1-F_0}$

Answer Key: **B**

Q12 : If eight resistors of 8 Ohm resistance of each are connected in parallel then the net resistance will be:

A	1
B	64

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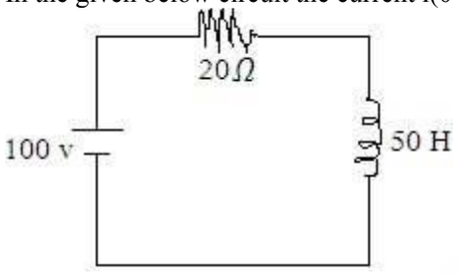
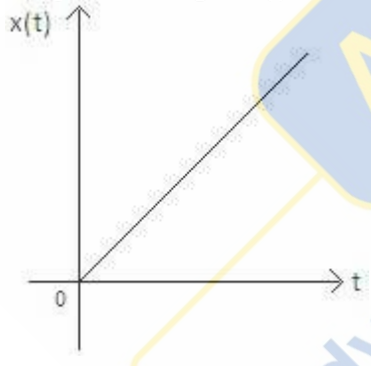
C	4
D	8
Answer Key: **A**	

Q13 : In the given below circuit the current $i(0^+)$ and $\frac{di(0^+)}{dt}$ are given by:



A	0,0
B	0,2
C	5,0
D	0,5
Answer Key: **B**	

Q14 : The plot of the signal x(t) in the below figure represents:



A	Energy signal
B	Power signal
C	Energy signal and Power signal
D	None of these is correct
Answer Key: **D**	

Q15 : Following is the magnitude of the impedance of the series RLC circuit running at angular frequency ω :

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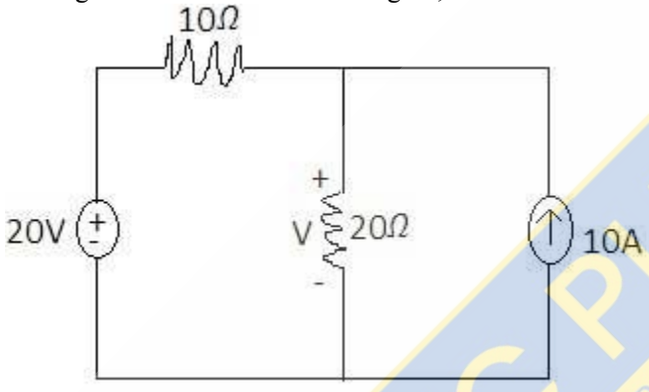
A	$[R^2 + \omega^2 L^2 + \frac{1}{\omega^2 C^2}]^{1/2}$
B	$[R^2 + \omega^2 L^2 - \frac{1}{\omega^2 C^2}]^{1/2}$
C	$[R^2 + (\omega L + \frac{1}{\omega C})^2]^{1/2}$
D	$[R^2 + (\omega L - \frac{1}{\omega C})^2]^{1/2}$

Answer Key: **D**

Q16 In the given circuit in the below Figure, the value of V will be as follows:
:



A	80
B	70
C	20
D	10

Answer Key: **A**

Q17 The superposition principle can not be applied for:
:

A	voltage computation
B	current computation
C	power computation
D	bilateral components

Answer Key: **C**

Q18 If unit step current is applied to an initially relaxed capacitor, then the voltage across the capacitor will be-
:

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A	Unit step function
B	Ramp function
C	Impulse function
D	None of these is correct
Answer Key: **B**	

Q19 The mathematical expression for the velocity for travelling electromagnetic wave in free-space can be given as: **:**	
A	$(\mu_0\varepsilon_0)^{1/2}$
B	$(\mu_0\varepsilon_0)^{-1}$
C	$\mu_0\varepsilon_0$
D	$(\mu_0\varepsilon_0)^{-1/2}$
Answer Key: **D**	

Q20 The energy density corresponding to static magnetic field is as- **:**	
A	$^{\mu}$ H^2
B	$\frac{1}{2}\mu$ H^2
C	1/2 H^2
D	(1/2μ) (H^2)
Answer Key: **B**	

Q21 The SI unit of electrostatic field strength is **:**	
A	volt-meter
B	volt^2/meter
C	volt/meter
D	volt/meter^2
Answer Key: **C**	

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Q22 : The equation $\nabla^2 = \frac{-\rho}{\varepsilon}$ is

A	Maxwell's equation
B	Laplace's equation
C	Fourier equation
D	Poisson's equation

Answer Key: **D**

Q23 : Poynting vector represents:

A	power density vector which produces electrostatic field
B	current density vector which produces electrostatic field
C	current density vector which produces electromagnetic field
D	power density vector which produces electromagnetic field

Answer Key: **D**

Q24 : The distance between adjacent maxima and minima in a standing wave of a transmission line is given by

A	$\lambda/4$
B	$\lambda/2$
C	$\lambda/8$
D	λ

Answer Key: **A**

Q25 : The intrinsic impedance of free space is given by:

A	20 Ohm
B	277 Ohm
C	177 Ohm
D	377 Ohm

Answer Key: **D**

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Q26 :	The divergence of electric flux density $D = e^{-x} \sin y\, \hat{i} - e^{-x} \cos y\, \hat{j} + 2z\, \hat{k}$, at origin is
A	2
B	4
C	-2
D	0
Answer Key: **A**	

Q27 :	The input signal for the A.C. bridges is applied from-
A	Oscillator system
B	Amplifier system
C	Regulated power supply system
D	D.C. battery system
Answer Key: **A**	

Q28 :	The internal resistance of the ammeter should be very low so that-
A	It will have high sensitivity
B	It will provide high accuracy
C	It will provide maximum voltage drop across the meter
D	It will provide minimum effect of the current in the circuit
Answer Key: **D**	

Q29 :	The Wien bridge can be used for the following-
A	Measurement of resistance
B	Measurement of frequency
C	Measurement of harmonic distortion
D	Measurement of frequency and harmonic distortion
Answer Key: **D**	

Q30 The application of thermocouple transducer is

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:

A	Measurement of temperature
B	Measurement of velocity and vibration
C	Measurement of pressure
D	Measurement of gas flow

Answer Key: **A**

Q31 A varactor can be defined as-
:

A	A diode which is used for variable capacitor
B	A diode which is used for high speed switching
C	A diode which is used for variable inductor
D	A diode which is used for variable resistor

Answer Key: **A**

Q32 Measurement of dielectric loss of capacitor can be performed by-
:

A	Using Wein bridge
B	Using Owen bridge
C	Using Schering bridge
D	Using Maxwell bridge

Answer Key: **C**

Q33 Siemens can be used as a unit for-
:

A	Measurement of conductance
B	Measurement of resistance
C	Measurement of flux density
D	Measurement of electric field

Answer Key: **A**

Q34 A cathode ray oscilloscope works based on the following -
:

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A	Electrostatic based focusing technique
B	Electromagnetic based focusing technique
C	Electrostatic and Electromagnetic based focusing technique
D	None of these is correct
Answer Key: **A**	

Q35 :	Regenerative feedback means the following-
A	Feedback with step input
B	Feedback with oscillations
C	Feedback with positive sign
D	Feedback with negative sign
Answer Key: **C**	

Q36 :	Laplace transform is not useful for analysis of the following control systems-
A	Linear systems
B	Discrete- time systems
C	Time- invariant systems
D	Unstable continuous –time systems
Answer Key: **B**	

Q37 :	The transfer function of the following state model of an LTI system with zero initial condition is $\frac{d^3y(t)}{dt^3}+6\frac{d^2y(t)}{dt^2}+11\frac{dy(t)}{dt}+6y(t)=x(t)$
A	$\frac{1}{(s+1)(s+2)(s+3)}$
B	$\frac{1}{(s+1)(s+2)(s+2)}$
C	$\frac{1}{(s+1)(s+2)(s+4)}$
D	$\frac{1}{(s+3)(s-1)(s-2)}$
Answer Key: **A**	

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Q38 : The time period of a square ware of frequency 1kHz is-	
A	1 s
B	10 s
C	10^{-3} s
D	0.1 s
Answer Key: **C**	

Q39 : If the state space representation of an LTI system is known then the transfer function of this system-	
A	Can be partially determined
B	Can be completely determined
C	Cannot be completely determined
D	None of these is correct
Answer Key: **B**	

Q40 : What number of nybbles can make one byte-	
A	1
B	2
C	4
D	8
Answer Key: **B**	

Q41 : In a microprocessor, the data bus has 16 lines and address bus has 12 lines. What will be the number of bytes in the memory-	
A	4k
B	2k
C	8k
D	24k
Answer Key: **A**	

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Q42 :	In Intel 8085 microprocessor, the address bus is 16 bit wide. The memory which can be accessed by this address bus will be-
A	64 k bytes
B	2 k bytes
C	8 k bytes
D	12 k bytes
Answer Key: **A**	

Q43 :	The following memory is a permanent memory
A	ROM
B	RAM
C	ROM AND RAM
D	None of these is correct
Answer Key: **A**	

Q44 :	The assumption of ergodic process in communication system means -
A	The random signals have identical time averages
B	The random signals have identical ensemble averages
C	The random signals have the identical time and ensemble averages
D	None of these is correct
Answer Key: **C**	

Q45 :	The power spectral density of the stationary noise whose autocorrelation is $R(\tau)=e^{-3\|\tau\|}$, will be-
A	$\frac{3}{\omega^2+3}$
B	$\frac{3}{3-\omega^2}$
C	$\frac{6}{9-\omega^2}$
D	$\frac{6}{\omega^2+9}$

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Answer Key: **D**

Q46 Entropy commonly measures :

A	The average informtion
B	The rate of information
C	The probability of information
D	The loss of information

Answer Key: **A**

Q47 The autocorrelation function of a signal at zero -lag will be :

A	Mean value of signal
B	Average power of signal
C	Average voltage of signal
D	Zero

Answer Key: **B**

Q48 In DSB-SC system, at the receiver the detection process is expensive because :

A	It requires synchronous detection
B	Generation of local carrier is difficult at the receiver
C	Power level of received signal is very low
D	All options are correct

Answer Key: **A**

Q49 In a PCM system, the signal to quantization error ratio for 8-bit words will be :

A	54 dB
B	30 dB
C	40 dB
D	64 dB

Answer Key: **A**

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Q50 : Companding operation is useful because :	
A	It overcomes quantization noise in PCM
B	It protects small signals in PCM from quantizing noise
C	It reduces impulse noise in PWM receivers
D	None of these is correct
Answer Key: **B**	

Q51 : Which of the following pulse modulation technique is analog:	
A	Differential PCM
B	PCM
C	PWM
D	Delta
Answer Key: **C**	

Q52 : Frequency shift keying can be considered as a method for introducing:	
A	Frequency modulation
B	Amplitude modulation
C	Phase modulation
D	None of these is correct
Answer Key: **A**	

Q53 : In a first order passive low-pass fifteen (R-C) circuit, the input voltage square wave is fed. The output voltage, with respect to ground, is measured across :	
A	Supply
B	Resister
C	Capacitor
D	Ground
Answer Key: **C**	

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Q54 :	The main disadvantage of CW Doppler radar is :
A	It does not provide the target velocity
B	It does not provide target range
C	It requires a transponder at the target
D	It does not provide the target position
Answer Key: **B**	

Q55 :	In an R-L series circuit, the ratio of inductive impedance to resistance is $1/\sqrt{3}$. The power factor of the A.C. circuit at steady state is:
A	0.87 lag
B	0.87 lead
C	0.5 lag
D	0.5 lead
Answer Key: **A**	

Q56 :	In television, we use interlacing for the following purpose:
A	To provide the illusion of motion
B	To ensure that all lines on the screen are scanned
C	To simplify the vertical sync pulse train
D	To avoid flicker
Answer Key: **D**	

Q57 :	Which statement is not true :
A	The phase array radar has very fast scanning compared to other types of radar
B	The phase array radar has ability to track and scan simultaneously compared to other types of radar
C	The phase array radar has circuit simplicity compared to other types of radar
D	The phased array radar has the ability to track many targets simultaneously as compared to other types of radar
Answer Key: **C**	

Q58	The satellites used for the purpose of intercontinental communications are called as:

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:	
A	Intelsat
B	Damsat
C	Comsat
D	Marisat
Answer Key: **A**	

Q59 A waveguide can be treated as a : :	
A	Low pass filter
B	High pass filter
C	Band pass filter
D	Band stop filter
Answer Key: **B**	

Q60 The radiation power of an antenna which has radiation resistance equal to 500 ohm and fed by 20 A current, will be: :	
A	100 kW
B	150 kW
C	200 kW
D	250 kW
Answer Key: **C**	

Q61 What is the magnitude of the attractive force (in vacuum) between the charge $Q_1 = 3 \times 10^{-4}$ C at location (1,2,3) and the charge $Q_2 = -10^{-4}$ C at location (2,0,5) ? :	
A	120 N
B	60 N
C	40 N
D	30 N
Answer Key: **D**	

Q62 A full- wave diode bridge rectifier circuit has : :

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A	3 diodes
B	2 diodes
C	4 diodes
D	8 diodes
Answer Key: **C**	

Q63 Which is not an Omni-directional antenna: **:**	
A	Marconi antenna
B	Discone antenna
C	Log-periodic antenna
D	Half-wave dipole antenna
Answer Key: **C**	

Q64 In order to separate the channels in an TDM receiver, we need to use following : **:**	
A	Band pass filters
B	And gates
C	Differentiator
D	Integrator
Answer Key: **B**	

Q65 Which statement is not true ? **:**	
A	Losses in optical fibers can caused by impurities
B	Losses in optical fibers can caused by microbending
C	Losses in optical fibers can caused by attenuation in the glass
D	Losses in optical fibers can caused by stepped index operation
Answer Key: **D**	

Q66 Laser light is: **:**	
A	Coherent emission

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B	Stimulated emission
C	Spontaneous emission
D	Coherent and stimulated emissions
Answer Key: **D**	

Q67 The core in optical fiber has following :	
A	Less refractive index than the air
B	Less refractive index than the cladding
C	More refractive index than the cladding
D	Same refractive index like cladding
Answer Key: **C**	

Q68 The electrical torque in terms of supply voltage V in a 3-phase induction motor, is proportional to the following? :	
A	V^2
B	V^{-1}
C	$V^{1/2}$
D	V
Answer Key: **A**	

Q69 The following motor is used for the compressors. :	
A	Reluctance motor
B	DC series motor
C	Shaded pole motor
D	Capacitor-start capacitor-run motor
Answer Key: **D**	

Q70 Which of the following statement is true ? :	
A	Single-phase induction motor requires only one winding
B	Single-phase induction motor can rotate in one direction only

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C	Single-phase induction motor is self starting
D	Single-phase induction motor is not self-starting
Answer Key: **D**	

Q71 :	Which distortion is least significant for the audio amplifiers?
A	Frequency
B	Phase
C	Intermodulation
D	Harmonic
Answer Key: **B**	

Q72 :	The following relay is used for protection of motors against overload?
A	Thermal relay
B	Buchholz relay
C	Impedance relay
D	Electromagnetic attraction type
Answer Key: **A**	

Q73 :	To charge a feeder cable the following sequence of operation is true :
A	Make the isolator followed by make the switch gear
B	Make the switch gear followed by make the isolator
C	Simultaneously make the isolator and switch gear
D	Break the isolator followed by make the switch gear
Answer Key: **A**	

Q74 :	The fuse rating is given in terms of the following :
A	kVA
B	VAR
C	Voltage

D	Current

Answer Key: **D**

Q75 Oil switches are applied :

A	For low current circuits
B	For low voltage circuits
C	For high voltages and large current circuits
D	For all circuits

Answer Key: **C**

Q76 Which statement is true :

A	Reluctance motor can be considered as a variable torque motor
B	Reluctance motor can be considered as low torque variable speed motor
C	Reluctance motor can be considered as self starting type synchronous motor
D	Reluctance motor can be considered as a low noise and slow speed motor

Answer Key: **C**

Q77 Which motor has series characteristics :

A	Shaded pole motor
B	Capacitor start motor
C	Repulsion motor
D	None of these is correct

Answer Key: **C**

Q78 The variable speed operation is desired for the following application :

A	Water pump
B	Refrigerator
C	Ceiling fan
D	Exhaust fan

Answer Key: **C**

Q79 : Given that X and Y are two independent Gaussian random variables, each one has average value=0, and variance $=\sigma^2$, then the joint density function can be defined as :

A	f(x,y) = (f(x))/(f(y))
B	f(x,y) = f(x) f (y)
C	f(x,y) = f(x) -f (y)
D	f(x,y) = f(x) +f (y)

Answer Key: **B**

Q80 : The material used for insulating in a cable should have the following property :

A	Low cost
B	High dielectric strength
C	High mechanical strength
D	All options are correct

Answer Key: **D**

Q81 : If the length of a cable is doubled then its capacitance will be :

A	One-fourth
B	One-half
C	Double
D	Remain unchanged

Answer Key: **C**

Q82 : Which transmission system has skin effect absence, less line cost, low corona effect?

A	HVDC
B	EHV-AC
C	UHB-AC
D	HVDC and EHV-AC

Answer Key: **A**

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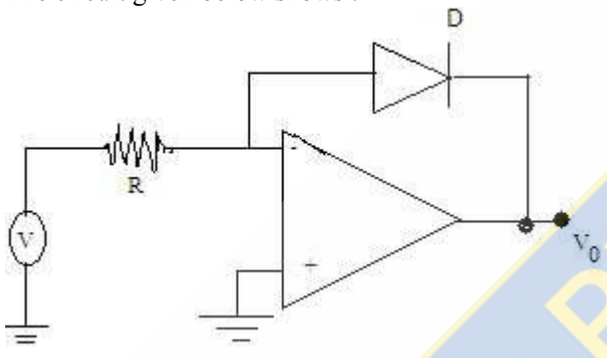
Q83 The load curve is used for :

A	Deciding schedule of generating units
B	Deciding sizes of generating units
C	Deciding total installed capacity of the plant
D	Deciding schedule and sizes of the generating units and capacity of the plant

Answer Key: **D**

Q84 The circuit given below shows :



A	A logarithmic amplifier
B	An integrator
C	A differentiator
D	A clamper

Answer Key: **A**

Q85 An ideal voltage amplifier has :

A	Input resistance = 0, Output resistance = ∞
B	Input resistance = 0, Output resistance = 0
C	Input resistance = ∞, Output resistance = 0
D	Input resistance = ∞, Output resistance = ∞

Answer Key: **C**

Q86 Which statement is true :

A	A clipper circuit may generate harmonics

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B	A clipper circuit increases the RMS value of the signal
C	A clipper circuit improves the power factor of the linear passive load
D	A clipper circuit increases the load VA rating of the linear passive load
Answer Key: **A**	

Q87 In order to sustain the oscillations, the Barkhausen criteria states that :	
A	The loop gain of the circuit should be negligible
B	The loop gain of the circuit should be equal to 1 with phase shift 180 degree lagging
C	The phase shift around the circuit should be 90 degree lag
D	None of these is correct
Answer Key: **B**	

Q88 The following experession T = X $\bar{Y}$ Z + X $\bar{Y}\bar{Z}$ + XYZ can be simplied as :	
A	T = XZ+X$\bar{Y}$
B	T=$\bar{X}$Z+XY
C	T=X$\bar{Z}$+XY
D	T=X$\bar{Z}$+X$\bar{Y}$
Answer Key: **A**	

Q89 Which interrupt is unmaskable interrupt ?	
A	INTR
B	RST 7.5
C	TRAP
D	RST 5.5
Answer Key: **C**	

Q90 Gray code for number 4 is given by,	
A	0111
B	0110

C	0101
D	0100
Answer Key: **B**	

Q91 :	Which relation is not true in Boolean algebra ?
A	A(BC) = (AB)C
B	A(B + C) = AB + AC
C	A + AC = A
D	A(A + C) = 1
Answer Key: **D**	

Q92 :	The value of $\beta = \frac{I_C}{I_B}$ of a BJT is :
A	>1
B	about 0.1
C	about 10^{-3}
D	about 10^{-5}
Answer Key: **A**	

Q93 :	The enhancement type MOSFET is known as :
A	N-type MOSFET
B	P-type MOSFET
C	Normally off MOSFET
D	Normally on MOSFET
Answer Key: **C**	

Q94 :	The following circuit is a sequential circuit :
A	AND gate
B	NAND gate
C	Bistable multivibrator

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D	EX-OR gate

Answer Key: **C**

Q95 The nature of transconductance curve of a JFET is :

A	Straight line
B	Parabolic
C	Hyperbolic
D	Inverted V-type

Answer Key: **B**

Q96 Which diode works under forward-biased condition :

A	Photo diode
B	Zener diode
C	Light emitting diode
D	Varactor diode

Answer Key: **C**

Q97 Which statement is true ?

A	Hall effect can be used to measure magnetic field intensity
B	Hall effect can be used to measure electric field intensity
C	Hall effect can be used to measure electric and magnetic field intensities
D	Hall effect can be used to measure carrier concentration

Answer Key: **A**

Q98 The most heavily doped region of a transistor is :

A	Base
B	Collector
C	Emitter
D	None of these is correct

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Answer Key: **C**

Q99 Which is true statement ? :	
A	A bistable multivibrator is a free-running oscillator
B	A bistable multivibrator is a triggered oscillator
C	A bistable multivibrator is a saw tooth wave generator
D	A bistable multivibrator is a crystal oscillator
Answer Key: **B**	

Q100 BJT is considered better than MOSFET when : :	
A	There is a requirement of low cost
B	There is a requirement of low power dissipation
C	There is a requirement of high noise margin
D	None of these is correct
Answer Key: **A**	

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