



## Electronics & Communication 2011

Q.1 to Q.25 carry one mark each

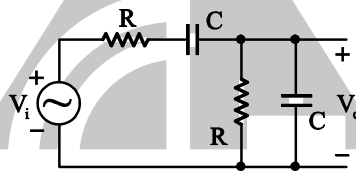
Q.1 Consider a closed surface  $S$  surrounding a volume  $V$ . If  $\vec{r}$  is the position vector of a point inside  $S$ , with  $\hat{n}$  the unit normal on  $S$ , the value of the integral  $\iiint_S 5\vec{r} \cdot \hat{n} \, ds$  is

- (A) 3V                      (B) 5V                      (C) 10V                      (D) 15V

Q.2 The solution of differential equation  $\frac{dy}{dx} = ky$ ,  $y(0) = c$  is

- (A)  $x = ce^{-ky}$                       (B)  $x = ke^{cy}$                       (C)  $y = ce^{kx}$                       (D)  $y = ce^{-kx}$

Q.3 The circuit shown below is driven by an sinusoidal input  $v_i = V_p \cos(t/RC)$ . The steady state output  $v_o$  is



- (A)  $(V_p / 3) \cos(t/RC)$                       (B)  $(V_p / 3) \sin(t/RC)$   
(C)  $(V_p / 2) \cos(t/RC)$                       (D)  $(V_p / 2) \sin(t/RC)$

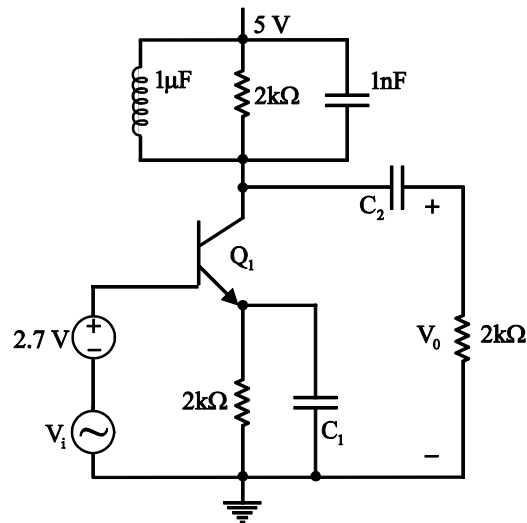
Q.4 A zener diode, when used in voltage stabilization circuits, is biased in

- (A) reverse bias region below the breakdown voltage  
(B) reverse breakdown region  
(C) forward bias region  
(D) forward bias constant current mode

Q.5 Drift current in semiconductors depends upon

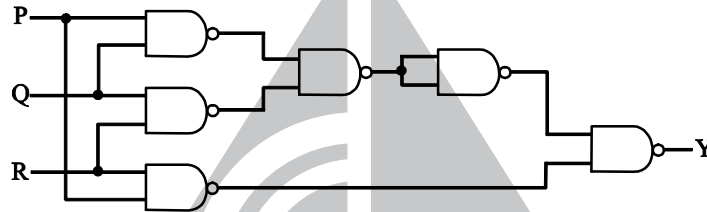
- (A) only the electric field  
(B) only the carrier concentration gradient  
(C) both the electric field and the carrier concentration  
(D) both the electric field and the carrier concentration gradient

Q.6 In the circuit shown below, capacitor  $C_1$  and  $C_2$  are very large and are shorts at the input frequency.  $v_i$  is a small signal input. The gain magnitude  $|v_o / v_i|$  at 10 Mrad/s is



- (A) maximum                      (B) minimum                      (C) unity                      (D) zero

Q.7 The output Y in the circuit below is always "1" when



- (A) two or more of the input P, Q, R, S are "0"                      (B) two or more of the inputs P, Q, R are "1"  
(C) any odd number of the inputs P, Q, R, is "0"                      (D) any odd number of the inputs P, Q, R is "1"

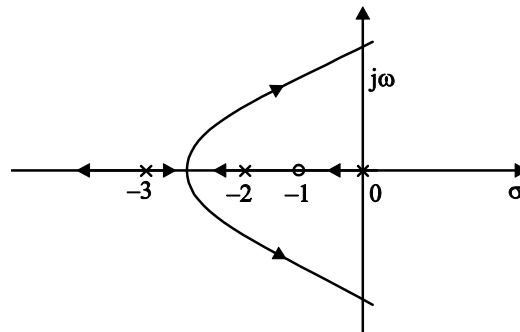
Q.8 If the unit step response of a network is  $(1 - e^{-\alpha t})$ , then its unit impulse response is

- (A)  $\alpha e^{-\alpha t}$                       (B)  $\alpha^{-1} e^{-\alpha t}$                       (C)  $(1 - \alpha^{-1}) e^{-\alpha t}$                       (D)  $(1 - \alpha) e^{-\alpha t}$

Q.9 A system is defined by its impulse response  $h(n) = 2^n u(n-2)$ . The system is

- (A) stable and causal                      (B) causal but not stable  
(C) stable but not causal                      (D) unstable and noncausal

Q.10 The root locus plot for a system is given below. The open loop transfer function corresponding to this plot is given by



- (A)  $G(s)H(s) = k \frac{s(s+1)}{(s+2)(s+3)}$                       (B)  $G(s)H(s) = k \frac{(s+1)}{s(s+2)(s+3)^2}$   
(C)  $G(s)H(s) = k \frac{1}{s(s-1)(s+2)(s+3)}$                       (D)  $G(s)H(s) = k \frac{(s+1)}{s(s+2)(s+3)}$

**Q.11** An analog signal is band-limited to 4 kHz, sampled at the Nyquist rate and the samples are quantized into 4 levels. The quantized levels are assumed to be independent and equally probable. If we transmit two quantized samples per second, the information rate is

- (A) 1 bit/sec                      (B) 2 bit/sec                      (C) 3 bit/sec                      (D) 4 bit/sec

**Q.12** The transmission line of characteristic impedance  $50\Omega$  is terminated by a  $50\Omega$  load. When excited by a sinusoidal voltage source at  $10\text{GHz}$ , the phase difference between two points spaced 2 mm apart on the line is found to be  $\pi/4$  radians. The phase velocity of the wave along the line is

- (A)  $0.8 \times 10^8 \text{ m/s}$                       (B)  $1.2 \times 10^8 \text{ m/s}$   
(C)  $1.6 \times 10^8 \text{ m/s}$                       (D)  $3 \times 10^8 \text{ m/s}$

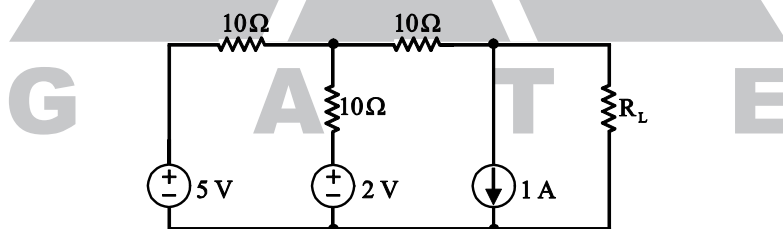
**Q.13** Consider the following statements regarding the complex Poynting vector  $\vec{P}$  for the power radiated by a point source in an infinite homogeneous and lossless medium.  $\text{Re} \vec{P}$  denotes the real part of  $\vec{P}$ ,  $S$  denotes a spherical surface, whose centre is at the point source, and  $\hat{n}$  denotes the unit surface normal on  $S$ . Which of the following statements is TRUE ?

- (A)  $\text{Re} \vec{P}$  remains constant at any radial distance from the source  
(B)  $\text{Re} \vec{P}$  increase with increasing radial distance from the source  
(C)  $\oiint_S \text{Re} \vec{P}$  remains constant at any radial distance from the source  
(D)  $\oiint_S \text{Re} \vec{P} \cdot \hat{n} \, ds$  decreases with increasing radial distance from the source

**Q.14** The value of the integral  $\oint_c \frac{-3z+4}{(z^2+4z+5)} dz$  where  $c$  is the circle  $|z|=1$  is given by

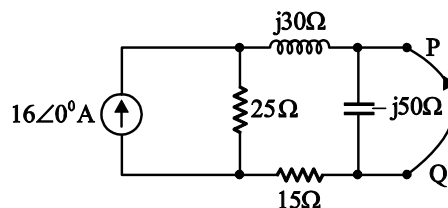
- (A) 0                      (B) 1/10                      (C) 4/5                      (D) 1

**Q.15** In the circuit shown below, the value of  $R_L$  such that the power transfer to  $R_L$  maximum is



- (A)  $5\Omega$                       (B)  $10\Omega$                       (C)  $15\Omega$                       (D)  $20\Omega$

**Q.16** In the circuit shown below, the Norton equivalent current in amperes with respect the terminals P and Q is

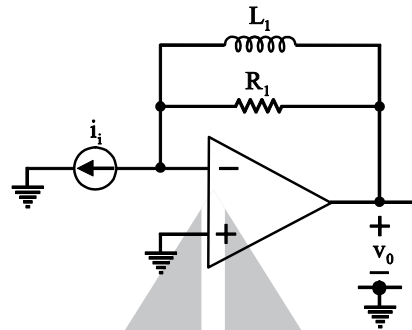


- (A)  $6.4 - j4.8$                       (B)  $6.56 - j7.87$                       (C)  $10 + j0$                       (D)  $16 + j0$

**Q.17** A silicon PN junction is forward biased with a constant current at room temperature. When the temperature is increased by  $10^{\circ}\text{C}$ , the forward bias voltage across the PN junction

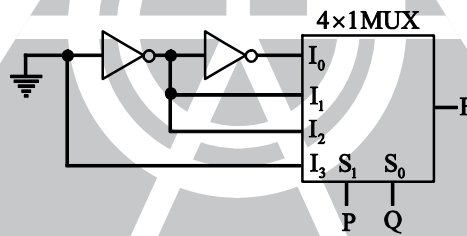
- (A) increases by 60 mV (B) decreases by 60 mV  
(C) increases by 25 mV (D) decreases by 25 mV

**Q.18** The circuit below implement a filter between the input current  $i_i$  and the output voltage  $v_o$ . Assume that the opam is ideal. The filter implemented is a



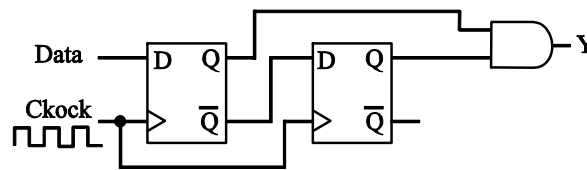
- (A) low pass filter (B) band pass filter (C) band stop filter (D) high pass filter

**Q.19** The logic function implemented by the circuit below is (ground implies a logic "0")



- (A)  $F = \text{AND}(P, Q)$  (B)  $F = \text{OR}(P, Q)$  (C)  $F = \text{XNOR}(P, Q)$  (D)  $F = \text{XOR}(P, Q)$

**Q.20** When the output  $y$  in the circuit below is "1", it implies that data has

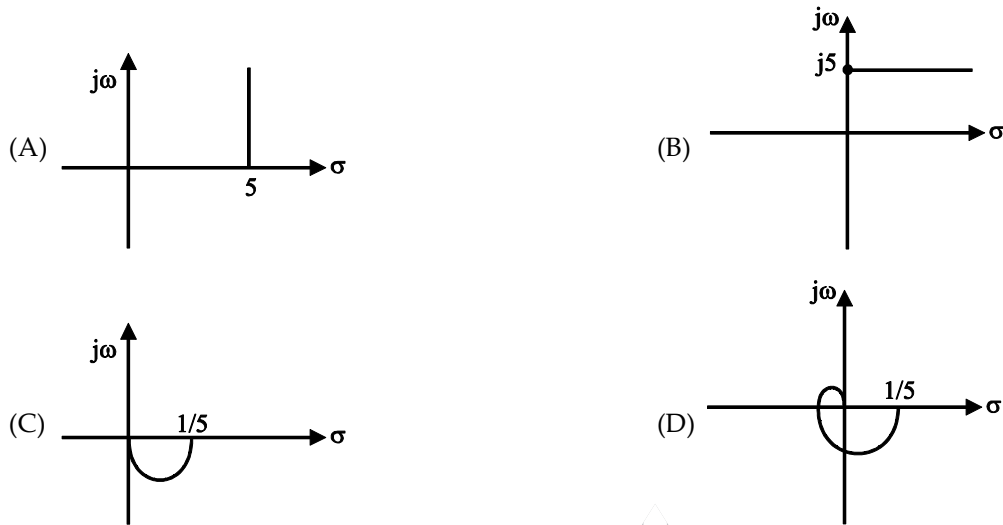


- (A) changed from "0" to "1" (B) changed from "1" to "0"  
(C) changed in either direction (D) not changed

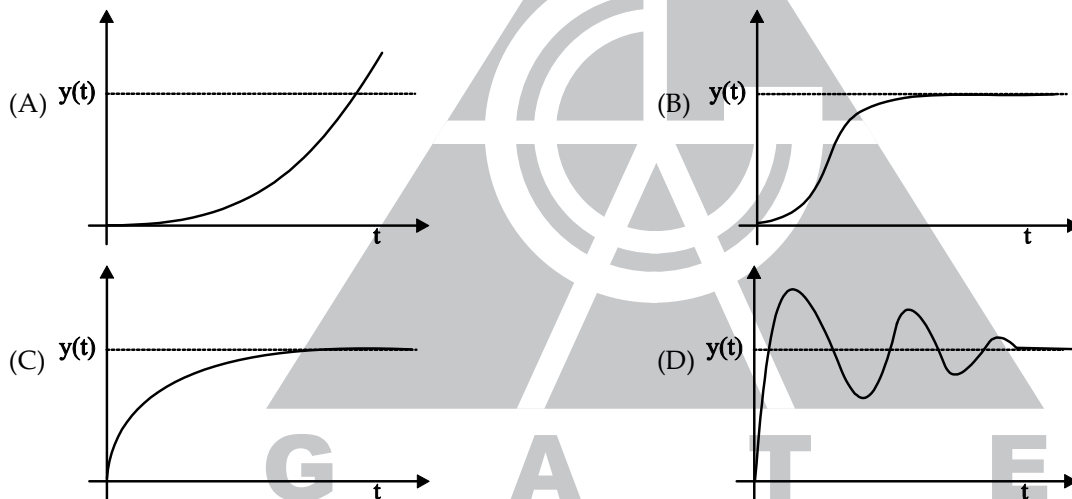
**Q.21** The trigonometric Fourier series of an even function does not have the

- (A) dc term (B) casine terms (C) sine terms (D) odd harmonic terms

**Q.22** For the transfer function  $G(j\omega) = 5 + j\omega$  the corresponding Nyquist plot for positive frequency has the form



**Q.23** The differential equation  $100 \frac{d^2 y}{dt^2} - 20 \frac{dy}{dt} + y = x(t)$  describes a system with an input  $x(t)$  and an output  $y(t)$ . The system which is initially relaxed, is excited by a unit step input. The output  $y(t)$  can be represented by the waveform



**Q.24** The Column-I lists the attributes and the Column lists the modulation systems. Match the attribute to the modulation system that best meets it.

Column I

Column -2

- P. Power efficient transmission of signals
- Q. Most bandwidth efficient transmission of voice signals
- R. Simplest receiver structure
- S. Bandwidth efficient transmission of signals with Significant dc component

- I. Conventional AM
- II. FM
- III. VSB
- IV. SSB-SC

- (A) P-IV, Q-II, R-I, S-III
- (B) P-II, Q-IV, R-I, S-III
- (C) P-III, Q-II, R-I, S-IV
- (D) P-II, Q-IV, R-III, S-I

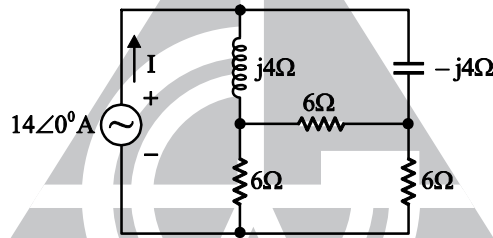
- Q.25** The modes in a rectangular waveguide are denoted by  $TE_{mn} / TM_{mn}$  where  $m$  and  $n$  are the eigen numbers along the large and smaller dimensions of the waveguide respectively. Which one of the following statements is TRUE ?
- (A) The  $TM_{10}$  mode of the waveguide does not exist  
 (B) The  $TE_{10}$  mode of the waveguide does not exist  
 (C) The  $TM_{10}$  and the  $TE_{10}$  modes both exist and have the same cut off frequencies  
 (D) The  $TE_{10}$  and the  $TM_{01}$  modes both exist and have the same cut off frequencies

**Q.26 to Q.55 carry two mark each**

- Q.26** A numerical solution of the equation  $f(x) = x + \sqrt{x} - 3 = 0$  can be obtained using Newton- Raphson method. If the starting value is  $x = 2$  for the iteration, the value of  $x$  that is to be used in the next step is

- (A) 0.306                      (B) 0.739                      (C) 1.694                      (D) 2.306

- Q.27** In the circuit shown below, the current  $I$  is equal to



- (A)  $1.4\angle 0^\circ$  A                      (B)  $2.0\angle 0^\circ$  A                      (C)  $2.8\angle 0^\circ$  A                      (D)  $3.2\angle 0^\circ$  A

- Q.28** If  $F(s) = L[f(t)] = \frac{2(s+1)}{s^2 + 4s + 7}$  then the initial and final values of  $f(t)$  are respectively

- (A) 0, 2                      (B) 2, 0                      (C) 0, 2/7                      (D) 2/7, 0

- Q.29** For a BJT, the common-base current gain  $\alpha = 0.98$  and the collector base junction reverse bias saturation current  $I_{CO} = 0.6\mu A$ . This BJT is connected in the common emitter mode and operated in the active region with a base drive current  $I_B = 20\mu A$ . The collector current  $I_C$  for this mode of operation is

- (A) 0.98 mA                      (B) 0.99 mA                      (C) 1.0 mA                      (D) 1.01 mA

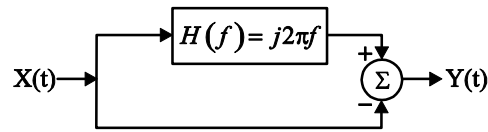
- Q.30** An input  $x(t) = \exp(-2t)u(t) + \delta(t-6)$  is applied to an LTI system with impulse response  $h(t) = u(t)$ .

The output is

- (A)  $[1 - \exp(-2t)]u(t) + u(t+6)$                       (B)  $[1 - \exp(-2t)]u(t) + u(t-6)$   
 (C)  $0.5[1 - \exp(-2t)]u(t) + u(t+6)$                       (D)  $0.5[1 - \exp(-2t)]u(t) + u(t-6)$

- Q.31** In the circuit shown below, for the MOS transistors;  $\mu_n C_{ox} = 100\mu A/V^2$  and the threshold voltage  $V_T = 1V$ . The voltage  $V_x$  at the source of the upper transistor is



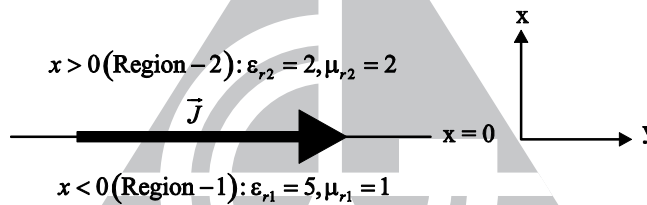


- (A)  $(4\pi^2 f^2 + 1)\exp(-\pi f^2)$  (B)  $(4\pi^2 f^2 - 1)\exp(-\pi f^2)$   
 (C)  $(4\pi^2 f^2 + 1)\exp(-\pi f)$  (D)  $(4\pi^2 f^2 - 1)\exp(-\pi f)$

**Q.35** A transmission line of characteristic impedance  $50\Omega$  is terminated in a load impedance  $Z_L$ . The VSWR of the line is measured as 5 and the first of the voltage maxima in the line is observed at a distance of  $\lambda/4$  from the load. The value of  $Z_L$  is

- (A)  $10\Omega$  (B)  $250\Omega$  (C)  $(19.23 + j46.15)\Omega$  (D)  $(19.23 - j46.15)\Omega$

**Q.36** A current sheet  $\vec{J} = 10\hat{u}_y$  A/m lies on the dielectric interface  $x = 0$  between two dielectric media with  $\epsilon_{r1} = 5$ ,  $\mu_{r1} = 1$  in Region - 1 ( $x < 0$ ) and  $\epsilon_{r2} = 2$ ,  $\mu_{r2} = 2$  in Region - 2 ( $x > 0$ ). If the magnetic field in Region - 1  $x = 0^-$  is  $\vec{H}_1 = 3\hat{u}_x + 30\hat{u}_y$  A/m, the magnetic field in Region- 2 at  $x = 0^+$  is



- (A)  $\vec{H}_2 = 1.5\hat{u}_x + 30\hat{u}_y - 10\hat{u}_z$  A/m (B)  $\vec{H}_2 = 3\hat{u}_x + 30\hat{u}_y - 10\hat{u}_z$  A/m  
 (C)  $\vec{H}_2 = 1.5\hat{u}_x + 40\hat{u}_y$  A/m (D)  $\vec{H}_2 = 3\hat{u}_x + 30\hat{u}_y + 10\hat{u}_z$  A/m

**Q.37** A far dice is tossed two times. The probability that the second toss results in a value that is higher than the first toss is

- (A)  $2/36$  (B)  $2/6$  (C)  $5/12$  (D)  $1/2$

**Q.38** The system of equations

$$x + y + z = 6$$

$$x + 4y + 6z = 20$$

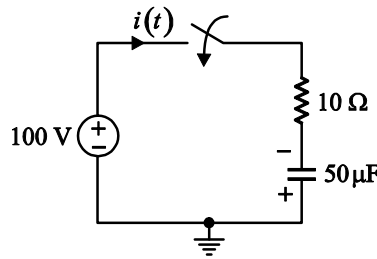
$$x + 4y + \lambda z = \mu$$

has NO solution for values of  $\lambda$  and  $\mu$  given by

- (A)  $\lambda = 6, \mu = 20$  (B)  $\lambda = 6, \mu \neq 20$  (C)  $\lambda \neq 6, \mu = 20$  (D)  $\lambda \neq 6, \mu \neq 20$

**Q.39** In the circuit shown below, the initial charge on the capacitor is 2.5 mC, with the voltage polarity as indicate. The switch is closed at time  $t = 0$ . The current  $i(t)$  at a time  $t$  after the switch is closed is

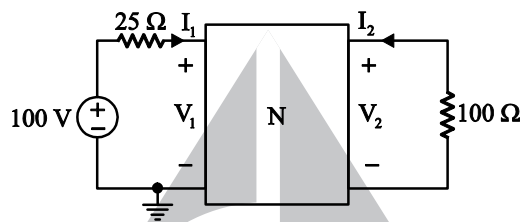




- (A)  $i(t) = 15 \exp(-2 \times 10^3 t)$  A                      (B)  $i(t) = 5 \exp(-2 \times 10^3 t)$  A  
 (C)  $i(t) = 10 \exp(-2 \times 10^3 t)$  A                      (D)  $i(t) = -5 \exp(-2 \times 10^3 t)$  A

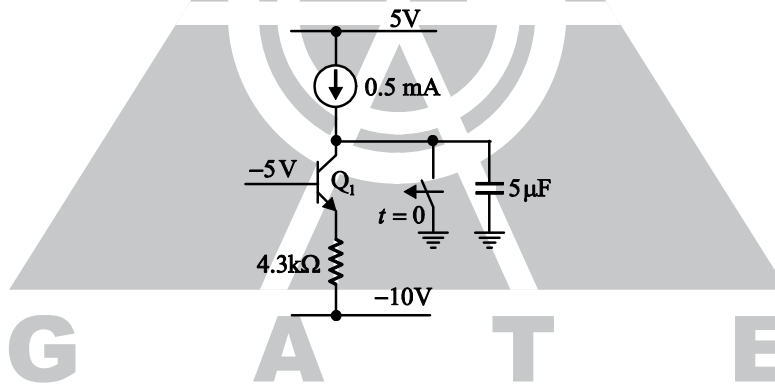
**Q.40** In the circuit shown below, the network N is described by the following Y matrix:

$$Y = \begin{bmatrix} 0.1S & -0.01S \\ 0.01S & 0.1S \end{bmatrix}. \text{ The voltage gain } \frac{V_2}{V_1} \text{ is}$$



- (A) 1/90                      (B) -1/90                      (C) -1/99                      (D) -1/11

**Q.41** For the BJT  $Q_1$  in the circuit shown below,  $\beta = \infty$ ,  $V_{BEon} = 0.7V$ ,  $V_{CEsat} = 0.7V$ . The switch is initially closed. At time  $t = 0$ , the switch is opened. The time  $t$  at the which  $Q_1$  leaves the active region is



- (A) 10 ms                      (B) 25 ms                      (C) 50 ms                      (D) 100 ms

**Q.42** The first six points of the 8-point DFT of a real valued sequence are 5,  $1-j3$ , 0,  $3-j4$ , 0 and  $3+j4$ . The last two points of the DFT are respectively

- (A) 0,  $1-j3$                       (B) 0,  $1+j3$                       (C)  $1+j3$ , 5                      (D)  $1-j3$ , 5

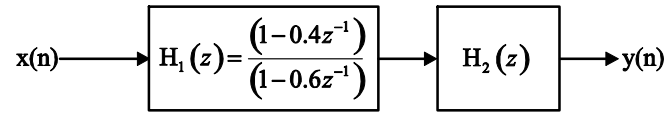
**Q.43** An 8085 assembly language program is given below. Assume that the carry flag is initially unset. The content of the accumulator after the execution of the program is

```

MVI A, 07H
RLC
MOV B,A
RLC
RLC
ADD B
RRC
    
```

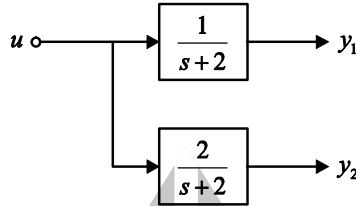
- (A) 8CH                      (B) 64H                      (C) 23H                      (D) 15H

Q.44 Two systems  $H_1(z)$  and  $H_2(z)$  are connected in cascade as shown below. The overall output  $y(n)$  is the same as the input  $x(n)$  with a one unit delay. The transfer function of the second system  $H_2(z)$  is



- (A)  $\frac{(1-0.6z^{-1})}{z^{-1}(1-0.4z^{-1})}$       (B)  $\frac{z^{-1}(1-0.6z^{-1})}{(1-0.4z^{-1})}$       (C)  $\frac{z^{-1}(1-0.4z^{-1})}{(1-0.6z^{-1})}$       (D)  $\frac{(1-0.4z^{-1})}{z^{-1}(1-0.6z^{-1})}$

Q.45 The block diagram of a system with one input  $u$  and two outputs  $y_1$  and  $y_2$  is given below.



A state space model of the above system in terms of the state vector  $\underline{x}$  and the output vector  $\underline{y} = [y_1 \ y_2]^T$  is

- (A)  $\dot{\underline{x}} = [2] \underline{x} + [1] u;$        $\underline{y} = [1 \ 2] \underline{x}$   
 (B)  $\dot{\underline{x}} = [-2] \underline{x} + [1] u;$        $\underline{y} = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \underline{x}$   
 (C)  $\dot{\underline{x}} = \begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix} \underline{x} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u;$        $\underline{y} = [1 \ 2] \underline{x}$   
 (D)  $\dot{\underline{x}} = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} \underline{x} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u;$        $\underline{y} = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \underline{x}$

Q.46 A message signal  $m(t) = \cos 2000\pi t + 4 \cos 4000\pi t$  modulates the carrier  $c(t) = \cos 2\pi f_c t$  where  $f_c = 1\text{MHz}$  to produce an AM signal. For demodulating the generated AM signal using an envelope detector, the time constant  $RC$  of the detector circuit should satisfy

- (A)  $0.5\text{ms} < RC < 1\text{ms}$       (B)  $1\mu\text{s} \ll RC < 0.5\text{ms}$   
 (C)  $RC \ll 1\mu\text{s}$       (D)  $RC \gg 0.5\text{ms}$

Q.47 The electric and magnetic fields for a TEM wave of frequency 14 GHz in a homogeneous medium of relative permittivity  $\epsilon_r$  and relative permeability  $\mu_r = 1$  are given by

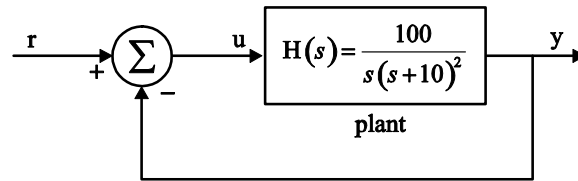
$$\vec{E} = E_p e^{j(\omega t - 280\pi y)} \hat{u}_z \text{ V/m} \quad \vec{H} = 3e^{j(\omega t - 280\pi y)} \hat{u}_x \text{ A/m}$$

Assuming the speed of light in free space to be  $3 \times 10^8 \text{ m/s}$ , the intrinsic impedance of free space to be  $120\pi$ , the relative permittivity  $\epsilon_r$  of the medium and the electric field amplitude  $E_p$  are

- (A)  $\epsilon_r = 3, E_p = 120\pi$       (B)  $\epsilon_r = 3, E_p = 360\pi$       (C)  $\epsilon_r = 9, E_p = 360\pi$       (D)  $\epsilon_r = 9, E_p = 120\pi$

**Common Data Question 48 & 49**

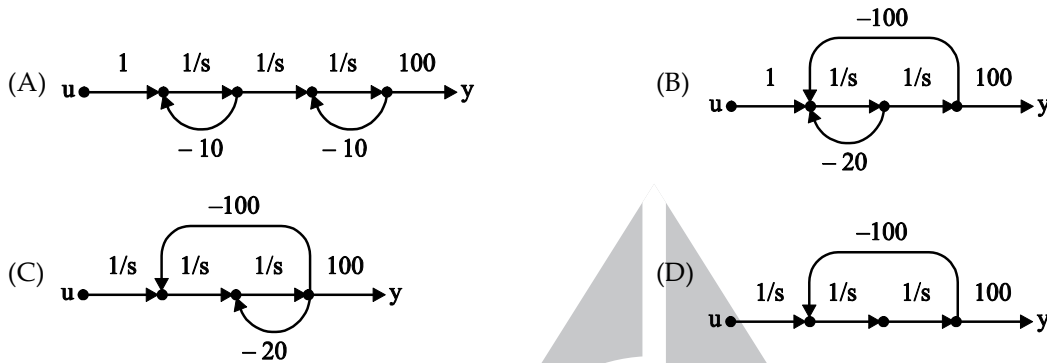
The input output transfer function of a plant  $H(s) = \frac{100}{s(s+10)^2}$ . The plant is placed in a unity negative feedback configuration as shown in the figure below.



Q.48 The gain margin of the system under closed loop unity negative feedback is

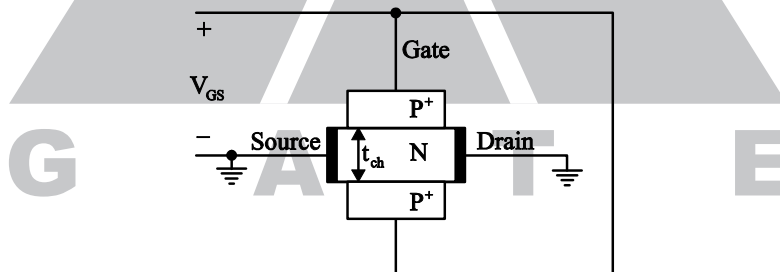
- (A) 0 dB                      (B) 20 dB                      (C) 26 dB                      (D) 46 dB

Q.49 The signal flow graph that DOES NOT model the plant transfer function  $H(s)$  is



**Common Data Question 50 & 51**

The channel resistance of an N-channel JFET shown in the figure below is  $600\Omega$  when the full channel thickness ( $t_{ch}$ ) of  $10\mu m$  is available for conduction. The built-in voltage of the gate  $P^+N$  junction ( $V_{bi}$ ) is  $-1$  V. When the gate to source voltage ( $V_{GS}$ ) is  $0$  V, the channel is depleted by  $1\mu m$  on each side due to the built-in voltage and hence the thickness available for conduction is only  $8\mu m$ .



Q.50 The channel resistance when  $V_{GS} = -3$  V is

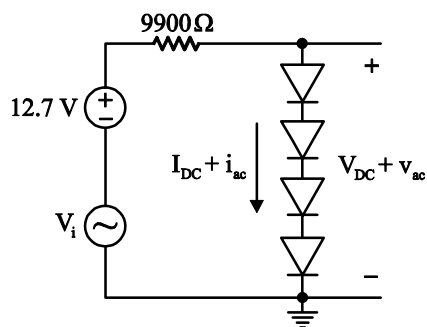
- (A)  $360\Omega$                       (B)  $917\Omega$                       (C)  $1000\Omega$                       (D)  $3000\Omega$

Q.51 The channel resistance when  $V_{GS} = 0$  V is

- (A)  $480\Omega$                       (B)  $600\Omega$                       (C)  $750\Omega$                       (D)  $1000\Omega$

**Statement For Linked Answer Questions 52 & 53**

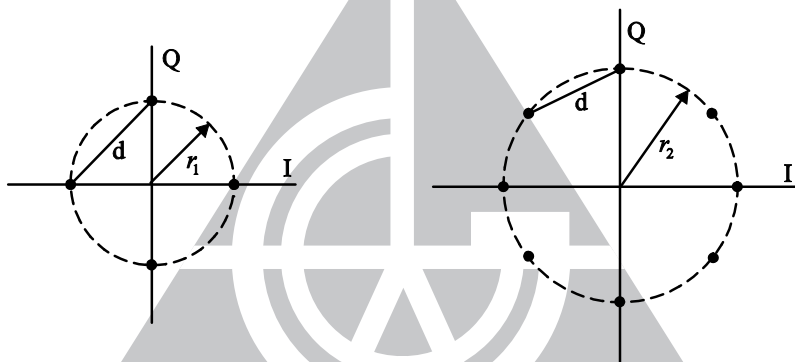
In the circuit shown below, assume that the voltage drop across a forward biased diode is  $0.7$  V. The thermal voltage  $V_t = kT/q = 25mV$ . The small signal input  $v_i = V_p \cos(\omega t)$  where  $V_p = 100mV$ .



- Q.52 The bias current  $I_{DC}$  through the diodes is  
 (A) 1 mA                      (B) 1.28 mA                      (C) 1.5 mA                      (D) 2 mA
- Q.53 The ac output voltage  $v_{ac}$  is  
 (A)  $0.25 \cos(\omega t)$  mV                      (B)  $1 \cos(\omega t)$  mV                      (C)  $2 \cos(\omega t)$  mV                      (D)  $22 \cos(\omega t)$  mV

**Statement For Linked Answer Questions 54 & 55**

A four-phase and an eight-phase signal constellation are shown in the figure below.



- Q.54 For the constraint that the minimum distance between pairs of signal points be  $d$  for both constellations, the radii  $r_1$  and  $r_2$  of the circles are  
 (A)  $r_1 = 0.70d, r_2 = 2.782d$                       (B)  $r_1 = 0.707d, r_2 = 1.932d$   
 (C)  $r_1 = 0.707d, r_2 = 1.545d$                       (D)  $r_1 = 0.707d, r_2 = 1.307d$
- Q.55 Assuming high SNR and that all signals are equally probable, the additional transmitted signal energy required by the 8-PSK signal to achieve the same error probability as the 4-PSK signal is  
 (A) 11.90 dB                      (B) 8.73 dB                      (C) 6.79 dB                      (D) 5.33 dB

**Q.56 to Q.60 carry one mark each**

Q.56 Choose the word from the options given below that is most nearly opposite in meaning to the given word:

**Frequency**

- (A) periodicity                      (B) rarity                      (C) gradualness                      (D) persistency

Q.57 Choose the most appropriate word from the options given below to complete the following sentence :

**Under ethical guidelines recently adopted by the Indian Medical Association, human genes are to be manipulated only to correct diseases for which \_\_\_\_\_ treatments are unsatisfactory.**

- (A) similar                      (B) most                      (C) uncommon                      (D) availabel

Q.58 The question below consists of a pair of related words followed by four pairs of words. Select the pair the best expresses the relation in the original pair :

**Gladiator : Arena**

(A) dancer : stage (B) commuter : train (C) teacher : classroom (D) lawyer : courtroom

**Q.59** There are two candidates P and Q in an election. During the campaign, 40% of the voters promised to vote for P, and rest for Q. However, on the day of election 15% of the voters went back on their promise to vote for P and instead voted for Q. 25% of the voters went back on their promise to vote for Q and instead voted for P. Suppose, P lost by 2 votes, then what was the total number of voters ?

(A) 100 (B) 110 (C) 90 (D) 95

**Q.60** Choose the most appropriate word from the options given below to complete the following sentence :

**It was her view that the country's problem had been \_\_\_\_\_ by foreign technocrats, so that to invite them to come back would be counter-productive.**

(A) identified (B) ascertained (C) exacerbated (D) analysed

**Q.61 to Q.65 carry two marks each**

**Q.61** Given that  $f(y) = |y|/y$ , and q is any non-zero real number, the value of  $|f(q) - f(-q)|$  is

(A) 0 (B) -1 (C) 1 (D) 2

**Q.62** The sum of n terms of the series  $4+44+444+\dots$  is

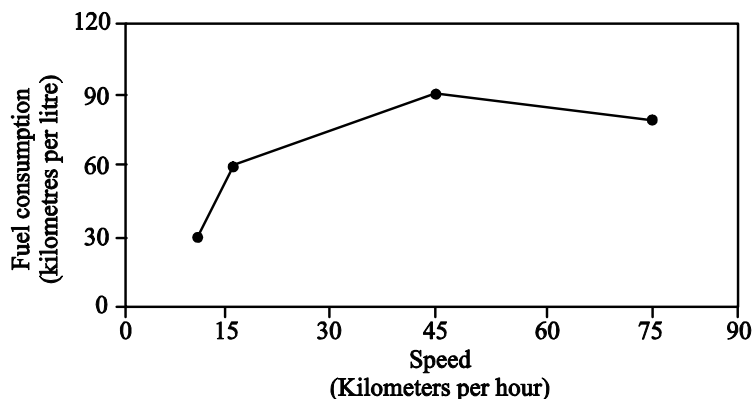
(A)  $(4/81)[10^{n+1} - 9n - 1]$  (B)  $(4/81)[10^{n-1} - 9n - 1]$   
(C)  $(4/81)[10^{n+1} - 9n - 10]$  (D)  $(4/81)[10^n - 9n - 10]$

**Q.63** The horse has played a little known but very important role in the field of medicine. Horses were injected with toxins of diseases until their blood built up immunities. Then a serum was made from their blood. Serums to fight with diphtheria and tetanus were developed this way.

It can be inferred from the passage, that horses were

(A) given immunity to diseases  
(B) generally quite immune to diseases  
(C) given medicines to fight toxins  
(D) given diphtheria and tetanus serums

**Q.64** The fuel consumed by a motorcycle during a journey while traveling at various speeds is indicated in the graph below.



The distances covered during four laps of the journey are listed in the table below

Lap	Distance (Kilometres)	Average Speed (Kilometres per hour)
P	15	15
Q	75	45
R	40	75
S	10	10

From the given data, we can conclude that the fuel consumed per kilometers was least during the lap

- (A) P (B) Q (C) R (D) S

**Q.65** Three friends R, S and T shares toffee form a bowl. R took  $\frac{1}{3}$ <sup>rd</sup> of the toffees, but returned four to the bowl. S took  $\frac{1}{4}$ <sup>th</sup> of what was left but turned three toffees to the bowl. T took half of the remained but the bowl. If the bowl had 17 toffees left, how many toffees were originally there in the bowl ?

- (A) 38 (B) 31 (C) 48 (D) 41

**END OF THE QUESTION PAPER**

**ANSWERS**

1.	A	2.	D	3.	A	4.	B	5.	C	6.	A	7.	B	8.	A
9.	B	10.	B	11.	D	12.	C	13.	C	14.	A	15.	C	16.	B
17.	D	18.	D	19.	D	20.	A	21.	C	22.	A	23.	A	24.	B
25.	A	26.	C	27.	B	28.	B	29.	D	30.	D	31.	C	32.	D
33.	A	34.	A	35.	A	36.	C	37.	C	38.	B	39.	A	40.	D
41.	C	42.	B	43.	C	44.	B	45.	B	46.	B	47.	D	48.	C
49.	D	50.	C	51.	C	52.	A	53.	B	54.	D	55.	D	56.	B
57.	D	58.	D	59.	A	60.	C	61.	D	62.	C	63.	B	64.	B
65.	C														



# Gate Academy

steps to success...

## GATE 2011 EC (Electronics & Telecommunication Engineering) Answer Key

Set – A

Set – B

Set – C

Set – D

1.	A	34.	A
2.	B	35.	B
3.	A	36.	C
4.	A	37.	C
5.	C	38.	A
6.	A	39.	A
7.	D	40.	A
8.	D	41.	D
9.	D	42.	C
10.	A	43.	D
11.	C	44.	D
12.	A	45.	B
13.	C	46.	B
14.	C	47.	C
15.	D	48.	C
16.	B	49.	C
17.	B	50.	D
18.	A	51.	C
19.	B	52.	D
20.	A	53.	D
21.	C	54.	A
22.	B	55.	B
23.	A	56.	D
24.	D	57.	A
25.	C	58.	C
26.	D	59.	B
27.	B	60.	D
28.	B	61.	B
29.	B	62.	B
30.	C	63.	C
31.	B	64.	D
32.	C	65.	C
33.	D		

1.	C	34.	B
2.	C	35.	B
3.	D	36.	C
4.	B	37.	D
5.	B	38.	B
6.	A	39.	B
7.	B	40.	B
8.	A	41.	C
9.	C	42.	B
10.	B	43.	C
11.	A	44.	D
12.	D	45.	A
13.	A	46.	B
14.	C	47.	C
15.	B	48.	C
16.	A	49.	C
17.	A	50.	C
18.	C	51.	D
19.	A	52.	A
20.	D	53.	B
21.	D	54.	D
22.	D	55.	D
23.	A	56.	A
24.	C	57.	C
25.	A	58.	B
26.	C	59.	D
27.	A	60.	D
28.	A	61.	B
29.	A	62.	C
30.	D	63.	D
31.	C	64.	C
32.	D	65.	B
33.	D		

1.	A	34.	B
2.	C	35.	B
3.	A	36.	D
4.	D	37.	C
5.	D	38.	B
6.	D	39.	B
7.	A	40.	D
8.	C	41.	D
9.	A	42.	C
10.	A	43.	D
11.	B	44.	A
12.	A	45.	A
13.	C	46.	C
14.	D	47.	A
15.	A	48.	D
16.	B	49.	C
17.	C	50.	C
18.	A	51.	C
19.	B	52.	D
20.	A	53.	D
21.	B	54.	A
22.	B	55.	B
23.	D	56.	C
24.	C	57.	B
25.	C	58.	D
26.	B	59.	D
27.	C	60.	A
28.	A	61.	C
29.	D	62.	D
30.	C	63.	C
31.	B	64.	B
32.	C	65.	B
33.	B		

1.	D	34.	A
2.	C	35.	A
3.	A	36.	C
4.	B	37.	C
5.	C	38.	B
6.	A	39.	A
7.	B	40.	D
8.	A	41.	C
9.	B	42.	B
10.	B	43.	C
11.	D	44.	B
12.	C	45.	B
13.	C	46.	B
14.	A	47.	D
15.	C	48.	C
16.	A	49.	D
17.	D	50.	C
18.	D	51.	C
19.	D	52.	A
20.	A	53.	B
21.	C	54.	D
22.	A	55.	D
23.	A	56.	B
24.	B	57.	D
25.	A	58.	D
26.	C	59.	A
27.	B	60.	C
28.	B	61.	D
29.	D	62.	C
30.	D	63.	B
31.	C	64.	B
32.	D	65.	C
33.	A		