Q. No. 1 – 25 Carry One Mark Each

1. The matrix $M = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ has Eigen values -3,-3,5. An Eigen vector corresponding to the Eigen value 5 is $\begin{bmatrix} 1 & 2 & -1 \end{bmatrix}^T$. One of the eigenvectors of the matrix M^3 is

   (A) $\begin{bmatrix} 1 & 8 & -1 \end{bmatrix}^T$ (B) $\begin{bmatrix} 1 & 2 & -1 \end{bmatrix}^T$ (C) $\begin{bmatrix} 1 & \sqrt[3]{2} & -1 \end{bmatrix}^T$ (D) $\begin{bmatrix} 1 & 1 & -1 \end{bmatrix}^T$

2. The contour integral $\oint_C e^{1/z} dz$ with C as the counter-clockwise unit circle in the Z-plane is equal to

   (A) 0 (B) 2π (C) $2\pi\sqrt{-1}$ (D) ∞

3. Consider the signal $x(t) = \begin{cases} e^{-t}, & t \ge 0 \\ 0, & t<0 \end{cases}$. Let $X(\omega)$ denote the Fourier transform of this signal. The integral $\frac{1}{2\pi}\int_{-\infty}^{\infty} X(\omega)\, d\omega$ is

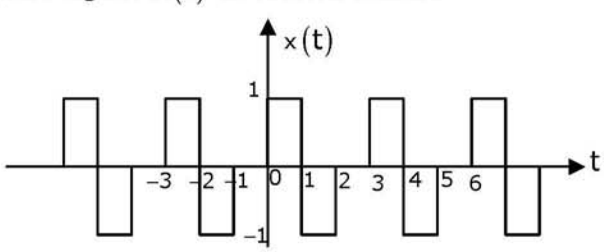
   (A) 0 (B) 1/2 (C) 1 (D) ∞

4. The continuous-time signal $x(t) = \sin \omega_0 t$ is a periodic signal. However, for its discrete-time counterpart $x[n] = \sin \omega_0 n$ to be periodic, the necessary condition is

   (A) $0 \le \omega_0 < 2\pi$ (B) $\frac{2\pi}{\omega_0}$ to be an integer

   (C) $\frac{2\pi}{\omega_0}$ to be a ratio of integers (D) none of these

5. Consider a periodic signal $x(t)$ as shown below.



It has a Fourier series representation $x(t) = \sum_{k=-\infty}^{\infty} a_k e^{j(2\pi/T)kt}$. Which one of

following statements is **TRUE**?

(A) $a_k = 0,$ for k odd integer and T=3

(B) $a_k = 0,$ for k even integer and T=3

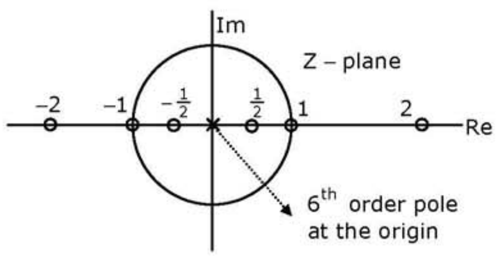
(C) $a_k = 0,$ for k even integer and T=6

(D) $a_k = 0,$ for k odd integer and T=6

6. The integral $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} t^2 e^{-t^2/2} \delta(1-2t)\, dt$ is equal to

(A) $\frac{1}{8\sqrt{2\pi}} e^{-1/8}$ (B) $\frac{1}{4\sqrt{2\pi}} e^{-1/8}$ (C) $\frac{1}{\sqrt{2\pi}} e^{-1/2}$ (D) 1

7. Shown below is a pole zero plot of a digital filter



Which one of the following statements is TRUE?

(A) This is a low pass filter

(B) This is a high pass filter

(C) This is an IIR filter

(D) This is an FIR filter

8. The continuous time signal $x(t) = \cos(100\pi t) + \sin(300\pi t)$ is sampled at the rate of 100Hz to get the signal

$$x_s(t) = \sum_{n=-\infty}^{\infty} x(nT_s)\,\delta(t - nT_s);\ T_s = \text{sampling period}$$

The signal $x_s(t)$ is passed through an ideal low pass filter with cutoff frequency 100Hz. The output of the filter is proportional to

(A) $\cos(100\pi t)$

(B) $\cos(100\pi t) + \sin(100\pi t)$

(C) $\cos(100\pi t) - \sin(100\pi t)$

(D) $\sin(100\pi t)$

9. Consider a system with input x(t) and y(t) related as follows

$$y(t) = \frac{d}{dt}\{e^{-t}x(t)\}$$

Which one of the following statements is TRUE?

(A) The system is nonlinear
(B) The system is time-invariant
(C) The system is stable
(D) The system has memory

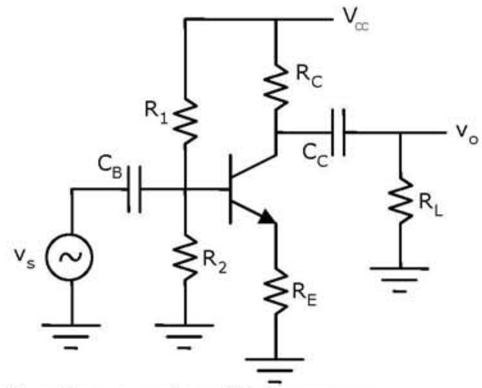
10. The first two rows of Routh's table of a third-order characteristic equation are

s^3 3 3
s^2 4 4

It can be inferred that the system has

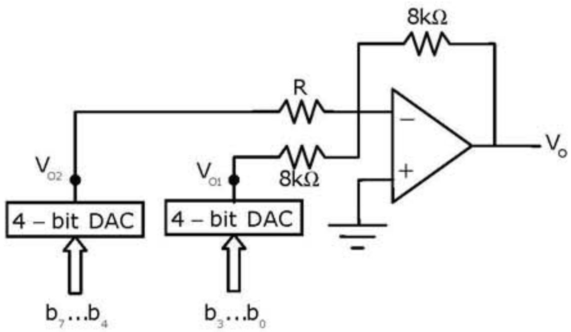
(A) one real pole in right half of s-plane
(B) a pair of complex conjugate poles in the right half of s-plane
(C) a pair of real poles symmetrically placed around s=0
(D) a pair of complex conjugate poles on the imaginary axis of the s-plane

11. The amplifier shown below has a voltage gain of -2.5, an input resistance of 10kΩ and a lower 3-dB cutoff frequency of 20Hz. Which one of following statements is TRUE when the emitter resistance R_E is doubled?



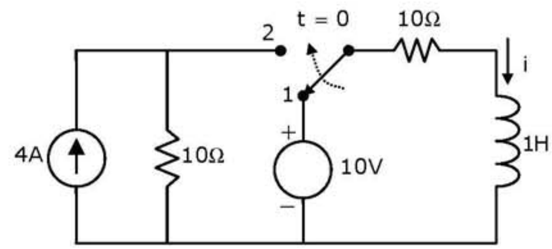
(A) Magnitude of voltage gain will decrease
(B) Input resistance will decrease
(C) Collector bias current will increase
(D) Lower 3-dB cut-off frequency will increase

12. Figure below shows a circuit for implementing an 8-bit Digital-to-Analog converter (DAC) using two identical 4-bit DAC's with equal reference voltages. Assume that b_0 represents LSB, b_7 MSB and the op-amp is ideal. To obtain correct analog values corresponding to an 8-bit DAC at the output V_O, the value of resistor R is



(A) $0.25 k\Omega$ (B) $0.5 k\Omega$ (C) $1 k\Omega$ (D) $8 k\Omega$

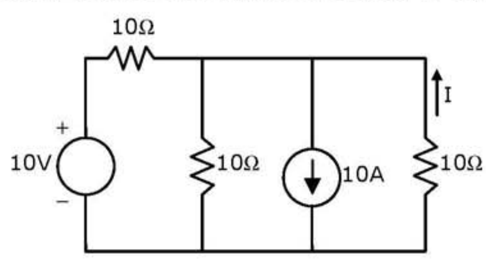
13. In the circuit, the switch, initially at position 1 for a long time, is changed to position 2 at t=0.



The current i through the inductor for $t \geq 0$ is

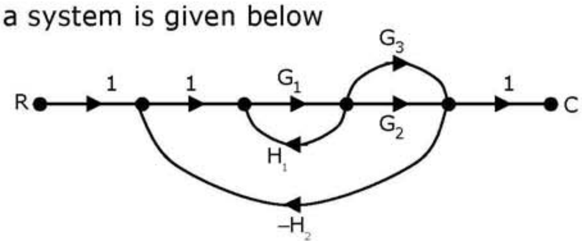
(A) $1 - e^{-20t}$ A (B) $1 + e^{-20t}$ A (C) $1 + 2e^{-20t}$ A (D) $2 - e^{-20t}$ A

14. The current I shown in the circuit given below is equal to



(A) 3A (B) 2.67A (C) 6A (D) 9A

15. The signal flow graph of a system is given below



The transfer function (C/R) of the system is

(A) $(G_1G_2 + G_1G_3)/(1 + G_1G_2H_2)$

(B) $(G_1G_2 + G_1G_3)/(1 - G_1H_1 + G_1G_2H_2)$

(C) $(G_1G_2 + G_1G_3)/(1 - G_1H_1 + G_1G_2H_2 + G_1G_3H_2)$

(D) $(G_1G_2 + G_1G_3)/(1 - G_1H_1 + G_1G_2H_2 + G_1G_3H_2 + G_1G_2G_3H_1)$

16. For the Boolean expression $f = \overline{a}\overline{b}\overline{c} + \overline{a}b\overline{c} + a\overline{b}\overline{c} + abc + ab\overline{c}$, the minimized Product of Sum (PoS) expression is

(A) $f = (b + \overline{c}).(a + \overline{c})$ (B) $f = (\overline{b} + c).(\overline{a} + c)$

(C) $f = (\overline{b} + c).(a + \overline{c})$ (D) $f = \overline{c} + abc$

17. The base of the number system for the addition operation 24+14=41 to be true is

(A) 8 (B) 7 (C) 6 (D) 5

18. An 8Kx8 bit RAM is interfaced to an 8085 microprocessor. In a fully decoded scheme, if the address of the last memory location of this RAM is 4FFFH, the address of the first memory location of the RAM will be

(A) 1000H (B) 2000H (C) 3000H (D) 4000H

19. The Treadmill Test is used to diagnose

(A) the balancing style during walk of the patient

(B) the auditory activity of the patient

(C) the visual activity of the patient

(D) the cardiac activity of the patient

20. The characteristics of a thermometer measuring ambient temperature is $2\frac{dT_i}{dt} + T_i - T_a = 0$ where T_i and T_a are the indicated and ambient temperatures, respectively, both in ^oC and time is in seconds. The -3dB cut-off frequency in the frequency response of the thermometer is

(A) $1/4\pi$ Hz (B) 1/2Hz (C) 1Hz (D) 2π Hz

21. For a copper-constantan (Type T) thermocouple, the junction potential E (in μV) at θ^oC is given by

$E = 38.74\theta + 3.3\times10^{-2}\theta^2 + 2.07\times10^{-4}\theta^3 - 2.2\times10^{-6}\theta^4 + \text{higher order terms}$, assuming the cold junction compensation. The sensitivity of thermocou[...] 100°C is approximately

(A) 45.34μV/°C (B) 42.75μV/°C (C) 38.74μV/°C (D) 0.06μV/°C

22. The temperature of a furnace is monitored at a distance of 50m away. The temperature transmitter has a range of 0-500°C and provides 4-20mA current output. The measured temperature and the output current have a straight line relationship with positive slope. The measured temperature and the output current have a straight line relationship with positive slope. The temperature is determined from the voltage measured across a resistance of 500Ω in the current loop. If the voltage measured across the resistance is 4V, the temperature of the furnace is

(A) 100°C (B) 125°C (C) 150°C (D) 200°C

23. The core/ cladding index difference of a single-mode optical fiber cable is 0.01. the refractive index of the material of the core is 1.5. The maximum angle of acceptance of the fiber is approximately equal to

(A) 17.5° (B) 12.1° (C) 8.6° (D) 2.0°

24. The conventional way of expressing vibration is in terms of

(A) Richter scale (B) Acceleration due to gravity

(C) Speed of sound (D) Atmospheric pressure

25. The primary and secondary of an LVDT (stroke length ±50mm) are connected to a 3kHz sinusoidal source and ideal semiconductor diode bridge-based phase sensitive demodulator circuit. The core of the LVDT remains static at 15mm above the ideal null position. The frequency of the voltage observed at the input of the low-pass filter is

(A) 1kHz (B) 1.5kHz (C) 3kHz (D) 6kHz

Q. No. 26 – 55 Carry Two Marks Each

26. The series $\sum_{m=0}^{\infty} \frac{1}{4m}(x-1)^{2m}$ converges for

(A) $-2 < x < 2$ (B) $-1 < x < 3$ (C) $-3 < x < 1$ (D) $x < 3$

27. Consider the differential equation $\ddot{y} + 2\dot{y} + y = 0$ with boundary conditions $y(0) = 1;\ y(1) = 0$. The value of $y(2)$ is

(A) -1 (B) $-e^{-1}$ (C) $-e^{-2}$ (D) $-e^{2}$

28. The box 1 contains chips numbered 3, 6, 9, 12 and 15. The box 2 contains chips numbered 6,11,16,21 and 26. Two chips, one from each box are drawn at random. The numbers written on these chips are multiplied. The probability for the product to be an even number is

(A) 6/25 (B) 2/5 (C) 3/5 (D) 19/25

29. The extremum (minimum or maximum) point of a function f(x) is to be determined by solving $\frac{df(x)}{dx} = 0$ using the Newton Raphsons method. Let $f(x) = x^3 - 6x$ and $x_0 = 1$ be the initial guess of x. The value of x after two iterations (x_2) is

(A) 0.0141 (B) 1.4142 (C) 1.4167 (D) 1.5000

30. The unit-step response of a negative unity feedback system with the open-loop transfer function $G(s) = \frac{6}{s+5}$ is

(A) $1 - e^{-5t}$ (B) $6 - e^{-5t}$ (C) $\frac{6}{5} - \frac{6}{5}e^{-5t}$ (D) $\frac{6}{11} - \frac{6}{11}e^{-11t}$

31. The transfer function of the system described by the state-space equations

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -4 & -1 \\ -3 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u; \; y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

(A) $\frac{s}{s^2 + 5s + 1}$ (B) $\frac{2s}{s^2 + 5s + 1}$ (C) $\frac{3s}{s^2 + 5s + 1}$ (D) $\frac{4s}{s^2 + 5s + 1}$

32. Consider the second order system with the characteristic equation $s(s+3) + K(s+5) = 0$. Based on the properties of the root loci, it can be shown that the complex portion of the root loci of the given system for $0 < K < \infty$ is described by a circle, and the two breakaway points on the real axis are

(A) $-5 \pm \frac{\sqrt{5}}{2}$ (B) $-5 \pm \sqrt{5}$ (C) $-5 \pm \sqrt{10}$ (D) $-5 \pm 2\sqrt{5}$

33. In a flapper-nozzle displacement transducer, the values of the fol[...] parameters are given: Diameter of the orifice = 0.2mm, Diameter of the nozzle [...] 0.8mm, Supply pressure = 1.4×10^2kPa (guage), Ambient pressure = 0 (gauge). The maximum value of the sensitivity is

(A) 4.0 MPa/mm (B) 5.6 MPa/mm (C) 6.4 MPa/mm (D) 7.3 MPa/mm

34. A differential push-pull type capacitive displacement sensor (nominal capacitance $C_0 = 0.01\mu F$) is connected in two adjacent arms of an ac bridge in such a way that the output voltage of the bridge is independent of the frequency of the supply voltage. Supply to the bridge is 1V at 1kHz, and two equal resistances (R=3.9kΩ are placed in the other two arms of the bridge. The bridge sensitivity is

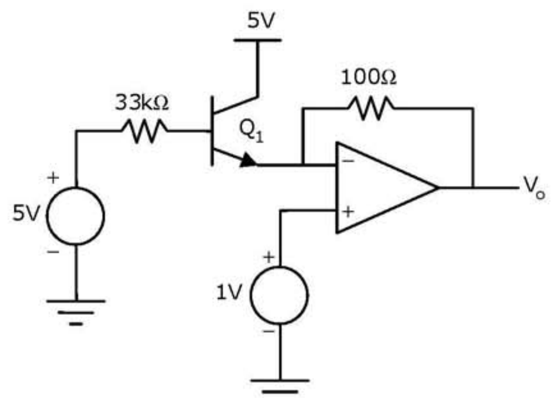
(A) 0.001mV / pF (B) 0.05 mV / pF (C) 0.1 mV / pF (D) 0.5 mV / pF

35. A turbine flow meter is rotating at 72rpm. The flux ψ linked to the nearby magnet and coil assembly is given by $\psi(\theta) = 3 + \cos(4\theta)$ mWb where θ is the angular position (in radian). The amplitude and frequency of the output voltage signal, respectively, are

(A) 4mV and 45.8Hz (B) 30.2mV and 4.8Hz

(C) 30.2mV and 30.2Hz (D) 288mV and 45.8Hz

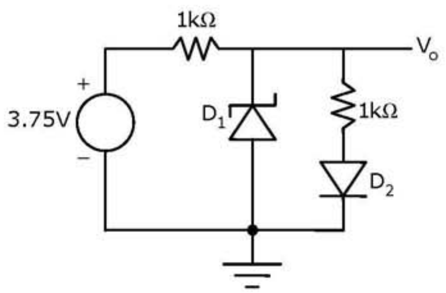
36. Assuming base-emitter voltage of 0.7 V and $\beta = 99$ of transistor Q_1 the output voltage V_0 in the ideal op-amp circuit shown below is

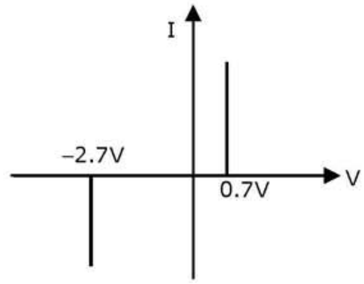


(A) −1 V (B) −1/3.3 V (C) 0V (D) 2V

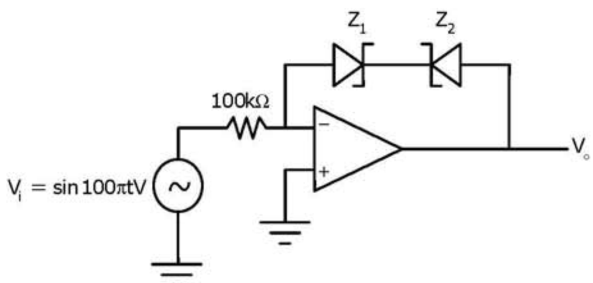
37. Assuming Zener diode D_1 has current-voltage characteristics as shown below on th
and forward voltage drop of diode D_2 is 0.7 V, the voltage V_o in the circuit shown be
is

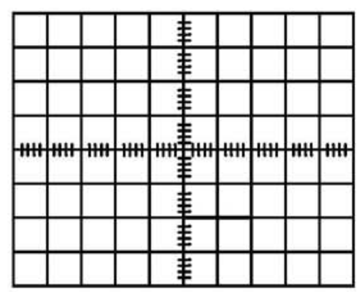
(A) 3.7 V (B) 2.7 V (C) 2.2 V (D) 0V





38. The transfer characteristics of the circuit drawn below is observed on an oscilloscope used in XY mode. The display on the oscilloscope is shown on the right hand side. V,- is connected to the X input with a setting of 0.5 V/div, and V_o is connected to the Y input with a setting of 2 V/div. The beam is positioned at the origin when V, is zero.





Assuming that the op-amp is ideal and the Zener diodes have forward biased voltage drop of 0.7 V, the values of reverse break-down voltages of *Z1* and Z2 are, respectively,

(A) 3.3 V and 5.3 V (B) 4.7 V and 6.7 V

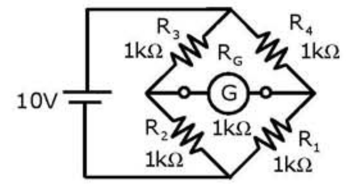
(C) 6.7 V and 4.7 V (D) 5.3 V and 3.3 V

39. Power in a three phase star connected balanced inductive load is measured by two wattmeter method. The phase voltage and phase current are 230 V and 5 A, respectively. The power factor of the load is 0.707. The readings PI and P2 of the two Wattmeters are

(A) PI = 298 W andP2 = 1111 (B) PI = 516 W and P2 = 1924 W

(C) PI = 1220 W and P2 = 1220 W (D) P1 = 1111 Wand P2 = -516W

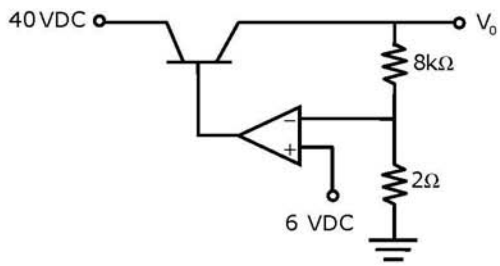
40. In the Wheatstone bridge shown below, when the resistance R1 increas[...] 1ohm, the current through the galvanometer is



(Consider the Thevenin's equivalent resistance of the bridge in the calculations)

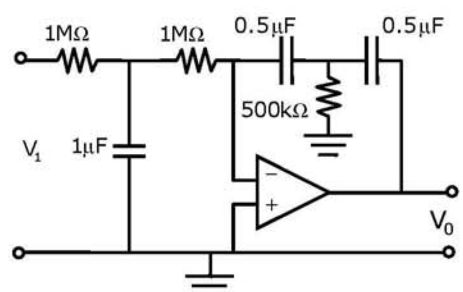
(A) 1.25μA (B) 2.5μA (C) 12.5μA (D) 25μA

41. The value of V_0 of the series regulator shown below is



(A) 24 V (B) 28 V (C) 30 V (D) 32 V

42. The ideal op-amp based circuit shown below acts as a



(A) low-pass filter (B) high-pass filter

(C) band-pass filter (D) band-reject filter

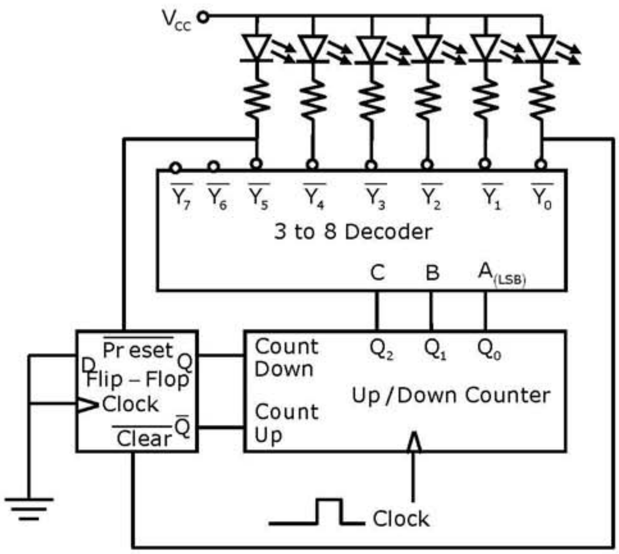
43. A 4-bit successive approximation type of A/D converter has an input range of 0 to 15 volts. The output bit b_1 next to the LSB has a stuck-at-zero fault. The pair of input voltages that produces the same output code word is

(A) 2 V and 4 V (B) 4 V and 6 V (C) 1 V and 2 V (D) 8 V and 9 V

44. The number of objects crossing a window sequentially at variable speed is counted using an interrupt in the 8085 microprocessor. The objects are sensed an optical source and a detector with associated signal conditioning circuit. The circuit produces a logic high output as long as the object is in front of the window, and this output is used to interrupt the processor. The duration of an object being in front of the window is in the range of 100 ms to 2 s. The processor takes 1 ms to process the input after an interrupt. The best choice of interrupt for an error free counting is

(A) RST 5.5 (B) RST 6.5 (C) RST 7.5 (D) INTR

45. The circuit below shows an up/down counter working with a decoder and a flip-flop. Preset and Clear of the flip-flop are asynchronous active-low inputs



Assuming that the initial value of counter output (Q_2 Q_1 Q_0) as zero, the counter outputs in decimal for 12 clock cycles are

(A) 0, 1,2,3,4,4,3,2, 1,1,2,3,4
(B) 0,1, 2, 3,4, 5, 0,1,2,3,4,5,0
(C) 0,1, 2, 3, 4,5,5,4,3,2,'!, 0,1
(D) 0,1, 2, 3,4, 5,4, 3, 2, 1,0,1,2

46. A square wave (amplitude ±10mV, frequency 5 kHz, duty cycle 50%) is passed through an ideal low-pass filter with pass-band gain and cut-off frequency of 0 dB and 10 kHz respectively. The filtered signal is subsequently "buried" additively into a zero-mean noise process of one-sided power-spectral density (PSD) of 25 pW Hz^{-1} up to a frequency of 2 MHz. The PSD of the noise is assumed to be zero beyond 2 MHz. The signal-to-noise ratio of the output is

(A) 0 dB (B) O.1 dB (C) 1.0 dB (D) 3 dB

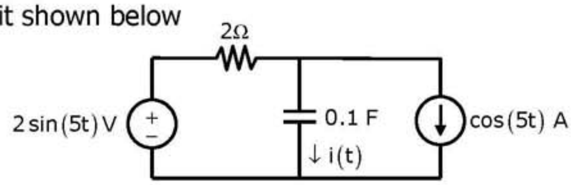
47. Consider the difference equation $y[n]-\frac{1}{3}y[n-1]=x[n]$ and suppose $x[n]=\left(\frac{1}{2}\right)^n u[n]$. Assuming the condition of initial rest, the solution for $y[n]$, $n \ge 0$, is

(A) $3\left(\frac{1}{3}\right)^n-2\left(\frac{1}{2}\right)^n$ (B) $-2\left(\frac{1}{3}\right)^n+3\left(\frac{1}{2}\right)^n$

(C) $\frac{2}{3}\left(\frac{1}{3}\right)^n+\frac{1}{3}\left(\frac{1}{2}\right)^n$ (D) $\frac{1}{3}\left(\frac{1}{3}\right)^n+\frac{2}{3}\left(\frac{1}{2}\right)^n$

Common Data Questions: 48 & 49

Consider the circuit shown below



48. The current i(t) through the capacitor is

(A) sin(5t) A (B) cos(5t) A (C) sin (5t − 45°) A (D) 1 A

49. The average total power delivered by the two sources is

(A) 0 W (B) 0.5 W (C) 2 W (D)4W

Common Data Questions: 50 & 51

The open-loop transfer function of a unity negative feedback control system is given by

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

50. The value of *K* for the phase margin of the system to be 45° is

(A) $250\sqrt{5}$ (B) $250\sqrt{2}$ (C) $125\sqrt{5}$ (D) $125\sqrt{2}$

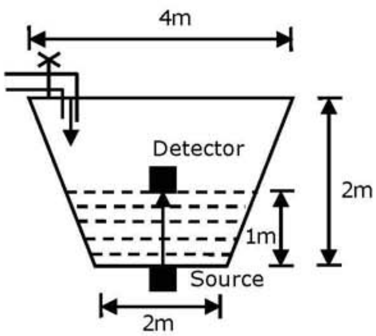
51. The value of K for the damping ratio ζ to be 0.5 corresponding to the dominant closed-loop complex conjugate pair is

(A) 250 (B) 125 (C) 75 (D) 50

Linked Answer Questions: Q.52 to Q.55 Carry Two Marks Each

Statement for Linked Answer Questions: 52 & 53

The level of water, stored in a truncated conical bath, is measured by a gamma-ray radiation sensor. The *initial* level of water is 1 m, and the level is increasing due to water inflow at the constant rate of $0.125 m^3/s$. Assume mass absorption coefficient of water is 77×10^{-4} m^2/kg and density of water is 1000 kg/m^3.



52. When the intensity of radiation received by the floating detector is half of the intensity detected initially, the level of water is

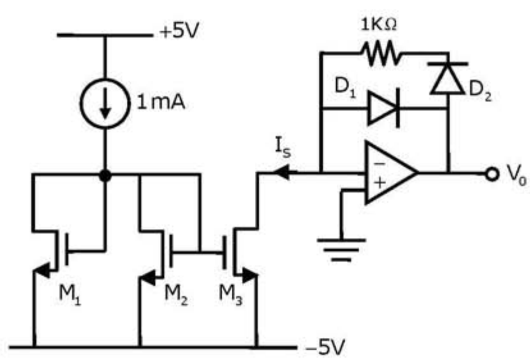
(A) 1.09 m (B) 1.5 m (C) 1.8 m (D) 1.9 m

53. When the floating detector is at the level calculated in Q.52, the time elapsed is

(A) 4.1 s (B) 5.23 s (C) 10.52 s (D) 50.63 s

Statement for Linked Answer Questions: 54 & 55

M1, M2 and M3 in the circuit shown below are matched N-channel enhancement mode MOSFETs operating in saturation mode, forward voltage drop of each diode is 0.7 V, reverse leakage current of each diode is negligible and the op-amp is ideal.



54. The current I_s in the circuit is

(A) −1 mA (B) 0.5 mA (C) 1 mA (D) 2 mA

55. For the computed value of current I_S, the output voltage V_0 is

(A) 1.2 V (B) 0.7V (D) 0.2V (D) -0.7 V

Q. No. 56 – 60 Carry One Mark Each

56. 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

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

Gladiator: Arena

(A) dancer: stage (B) commuter: train

(C) teacher: classroom (D) lawyer: courtroom

58. 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) available

59. 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

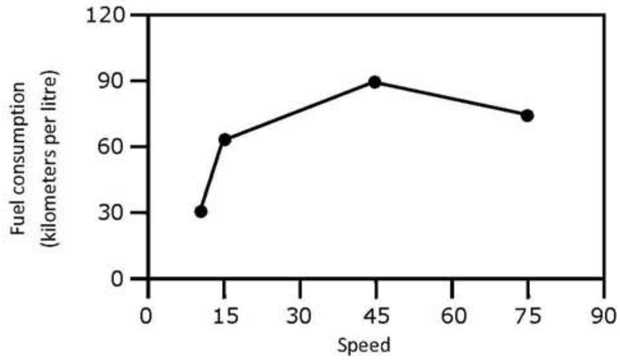
60. Choose the most appropriate word from the options given below to complete the following sentence:

It was her view that the country's problems had been ___________ by foreign technocrats, so that to invite them to come back would be counter-productive

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

Q. No. 61 – 65 Carry Two Marks Each

61. The fuel consumed by a motorcycle during a journey while traveling at various sp
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 kilometre was least during the lap

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

62. 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

63. The sum of n terms of the series 4+44+444+.... is

(A) $(4/81)\left[10^{n+1}-9n-1\right]$ (B) $(4/81)\left[10^{n-1}-9n-1\right]$

(C) $(4/81)\left[10^{n+1}-9n-10\right]$ (D) $(4/81)\left[10^{n}-9n-10\right]$

64. Given that f(y) |y|/y, and q is any non-zero real number, the va
$\left|f(q) - f(-q)\right|$ is

(A) 0 (B) −1 (C) 1 (D) 2

65. Three friends, R, S and T shared toffee from a bowl. R took l/3rd of the toffees, but returned four to the bowl. S took l/4th of what was left but returned three toffees to the bowl. T took half of the remainder but returned two back into 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

IN -GATE -2011-Keys

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