Roll No. | | | | | | | |

(Write Roll Number from left side exactly as in the Admit Card)

Signature of Invigilators

1. _____

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2117

Question Booklet Series **X**

PAPER–III

Question Booklet No.

(Identical with OMR Answer Sheet Number)

Subject Code : 21

ELECTRONIC SCIENCE

Time : 2 Hours 30 Minutes *Maximum Marks: 150*

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page as well as on the OMR Sheet provided.
2. At the commencement of the examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and verify it:
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page.
   (ii) Faulty booklet, if detected, should be get replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
   (iii) Verify whether the Question Booklet No. is identical with OMR Answer Sheet No.; if not, the full set to be replaced.
   (iv) After this verification is over, the Question Booklet Series and Question Booklet Number should be entered on the OMR Sheet.
3. This paper consists of seventy-five (75) multiple-choice type questions. All the questions are compulsory. Each question carries *two* marks.
4. Each Question has four alternative responses marked: (A) (B) (C) (D). You have to darken the circle as indicated below on the correct response against each question.

   Example: (A) (B) ● (D), where (C) is the correct response.
5. Your responses to the questions are to be indicated correctly in the OMR Sheet. If you mark your response at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Rough work is to be done at the end of this booklet.
7. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
8. Do not tamper or fold the OMR Sheet in any way. If you do so, your OMR Sheet will not be evaluated.
9. You have to return the Original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry question booklet and duplicate copy of OMR Sheet after completion of examination.
10. **Use only Black Ball point pen.**
11. **Use of any calculator or mobile phone etc. is strictly prohibited.**
12. **There are no negative marks for incorrect answers.**

[Please Turn Over]

ELECTRONIC SCIENCE

PAPER III

1. The Laplace transform of the following function

$$F(t) = \begin{cases} 0 & t \le 0 \\ \sin t & 0 < t \le 2\pi \\ \sin t + \cos t & t > 2\pi \end{cases}$$

is

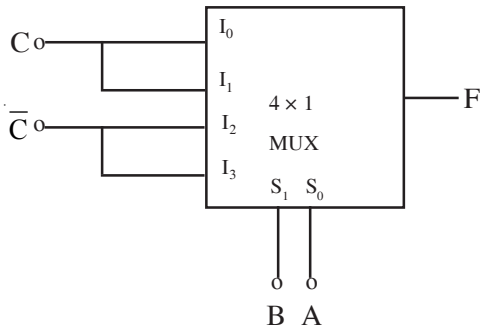
(A) $\dfrac{s + e^{-2\pi s}}{s+1}$

(B) $\dfrac{1 + se^{-2\pi s}}{s+1}$

(C) $\dfrac{1 + se^{-2\pi s}}{s^2+1}$

(D) $\dfrac{e^{-2\pi s}}{s^2+1}$

2. The Boolean function which is realized in the following circuit is



(A) A + C

(B) AB + $\overline{C}$

(C) A ⊕ C

(D) B ⊕ C

3. In an astable multivibrator, the base resistors of the transistors are 2·5 kΩ and the capacitors are 0·01μF. The pulse repetition frequency of the output waveform is

(A) 12500 Hz

(B) 6250 Hz

(C) 5772 Hz

(D) 4250 Hz

4. A counter type A/D converter contains a 4 bit binary ladder and a counter driven by a 3·2 MHz clock. The conversion time is

(A) 12·8 μs

(B) 1·25 μs

(C) 2·5 μs

(D) 5 μs

5. The Boolean function Y = A + $\overline{B}$C can be expressed in the following canonical sum of product (SOP) form:

(A) Y = ∑ (1, 4, 5, 6, 7)

(B) Y = ∑ (1, 2, 6, 7)

(C) Y = ∑ (0, 2, 3, 4)

(D) Y = ∑ (0, 2, 5, 6, 7)

6. A *n* type GaAs Gunn diode operating in the Gunn oscillator mode has a device length of 25 μm. The drift velocity of electrons is $2{\cdot}5 \times 10^5$ m/sec. The transit time oscillation frequency in GHz is

(A) 10

(B) 5

(C) 30

(D) 15

7. What is the output of the following C-program, if presented in proper format?

```
printf ("% ·0 f/n", 3·0/4·0);
printf ("% ·2 f/n", 3·0/4·0);
printf ("% ·1 f/n", 3·0/4·0);
printf ("% ·3 f/n", 3·0/4·0);
```

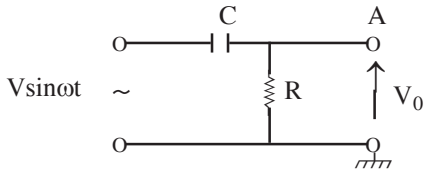
(A) 1, 0·75, 0·8, 0·750

(B) 0, 0·75, 0·5, 0·750

(C) 0, 0·75, 1·0, 0·750

(D) 1, 0·80, 0·8, 0·750

8. The following circuit has parameters such that WCR = 1. The input signal to this circuit is sinusoidal in nature. The output signal at the point A of the following circuit is



(A) $\frac{V}{\sqrt{2}}\sin\left(\omega t-\frac{\pi}{4}\right)$

(B) $\frac{V}{\sqrt{2}}\sin\left(\omega t+\frac{\pi}{4}\right)$

(C) $\frac{V}{\sqrt{2}}\cos\left(\omega t-\frac{\pi}{4}\right)$

(D) $\frac{V}{\sqrt{2}}\cos\left(\omega t+\frac{\pi}{4}\right)$

9. A p-n photodiode, on an average, generates one electron-hole pair per five incident photons at a wavelength of 0·90 μm. Assuming all the photogenerated electrons are collected, what is the quantum efficiency of the diode?

(A) 20%

(B) 30%

(C) 40%

(D) 50%

10. Current I flows through a wire of length L and radius r when a potential difference V is established between its two ends. What is the magnitude of the Poynting vector?

(A) $2\pi rL\ VI$

(B) $\pi r^2\ LVI$

(C) $VI/\pi r^2L$

(D) $\frac{VI}{2\pi rL}$

11. A step-index optical fiber has a core radius of 6·7 μm, with core refractive index $n_1 = 1{\cdot}447$ and cladding refractive index, $n_2 = 1.445$. This fiber

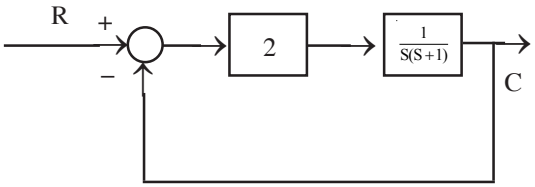
(A) will be a single mode fiber for light of wavelength 1·3 μm.

(B) will be a multimode fiber for light of wavelength 1·55μm.

(C) will have a cut-off wavelength of 1·651μm for single mode fiber for light of wavelength 1·557 μm.

(D) will be a single mode fiber for light of wavelength 1·557 μm.

12. For the unity feedback system shown below,



C/R is found to be:

(A) $\frac{2}{(S^2+S+2)}$

(B) $\frac{S+1}{S^2+S+2}$

(C) $\frac{2}{S(S+1)}$

(D) $\frac{2}{S+1}$

13. The value of measured Q of a circuit is said high, when

(A) $Q < 10$

(B) $Q > 10$

(C) $Q > 100$

(D) $Q > 1000$

14. A full wave bridge rectifier is supplied by input voltage of frequency 50Hz. The lowest ripple frequency will be

(A) 400 Hz

(B) 200 Hz

(C) 100 Hz

(D) 50 Hz

15. The turn on time of an SCR is 5 μsec. Its trigger pulse should have

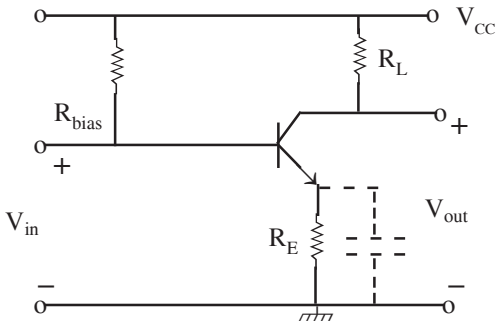
(A) short rise time with pulse width of 2·5 μsec.

(B) long rise time with pulse width of 3 μsec.

(C) short rise time with pulse width of 4 μsec.

(D) long rise time with pulse width of 4 μsec.

16. In a BJT amplifier of the following circuit is forward biased in the active region. Putting a capacitor C_E will



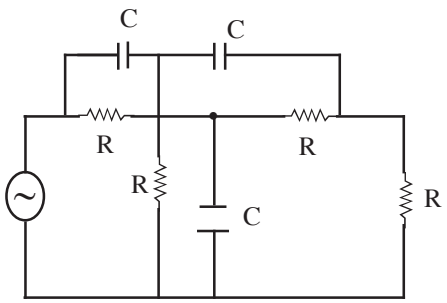
(A) decrease voltage gain and decrease input impedance.

(B) increase voltage gain and decrease input impedance.

(C) decrease voltage gain and increase input impedance.

(D) only decrease voltage gain.

17. The minimum number of equations required to analyze the following circuit is



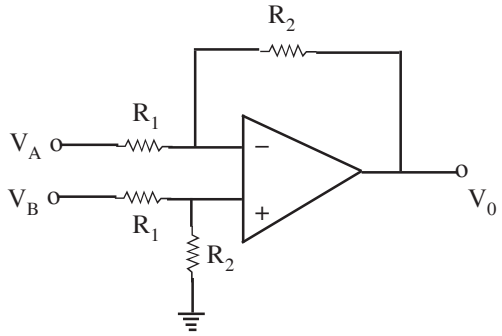
(A) 3

(B) 4

(C) 6

(D) 7

18. The output of the following circuit is



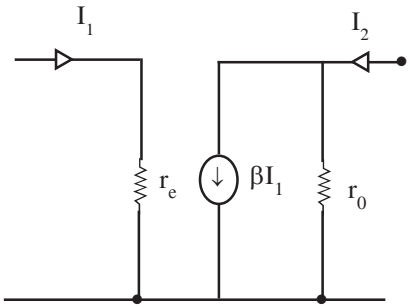
(A) $\frac{R_1}{R_2}(V_A + V_B)$

(B) $\frac{R_2}{R_1}(V_A + V_B)$

(C) $\frac{R_1}{R_2}(V_B - V_A)$

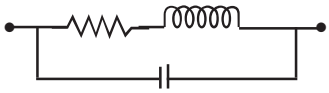
(D) $\frac{R_2}{R_1}(V_B - V_A)$

19. In the following two port network, Z_{12} and Z_{21} are written as



(A) r_e and βr_0
(B) 0 and $-\beta r_0$
(C) 0 and βr_0
(D) r_e and $-\beta r_0$

20. The resonant frequency of the following circuit is written as



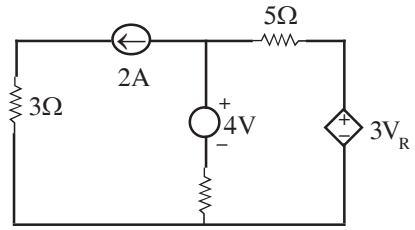
(A) $\frac{1}{\sqrt{LC}}$

(B) $\frac{1}{\sqrt{LC}}\sqrt{1-\frac{R^2C}{L}}$

(C) $\frac{1}{\sqrt{LC}}\sqrt{1-\frac{R^2L}{C}}$

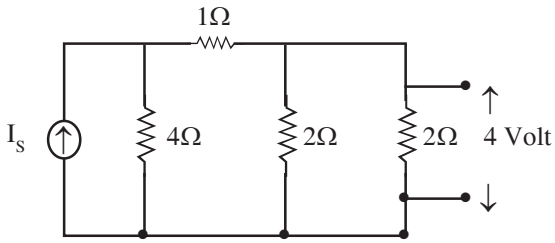
(D) $\frac{1}{\sqrt{LC}\left(1-\frac{R^2L}{C}\right)}$

21. The current I flowing in the branch is



(A) – 12Amp
(B) 12 Amp
(C) 3 Amp
(D) – 3 Amp

22. The value of I_S in the following circuit is given by



(A) 6 Amp
(B) 5/2 Amp
(C) 12 Amp
(D) 10 Amp

23. If 10 V is the peak voltage across the secondary of the transformer in a half wave rectifier (without any filter circuit), then the maximum voltage on the reverse biased diode will be

(A) 20 V
(B) 14·14 V
(C) 10 V
(D) 7·8 V

24. What is the maximum wall plug efficiency for a laser with a power supply that is 70% efficient and energy deposition efficiency of 25% in which the laser transition represents 60% of the excitation energy and half the excited atoms emit laser light?

(A) 1%
(B) 5·25%
(C) 10%
(D) 25%

25. Which of the following is not an interrupt line in 8085?

(A) TRAP
(B) RST 5·5
(C) RST 7·5
(D) RST 9·5

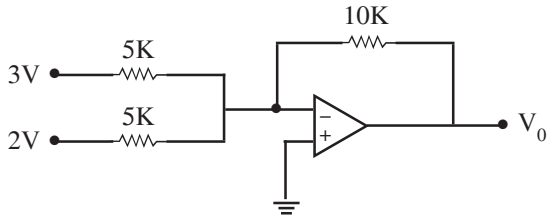
26. To install a link 40 km long with a fiber having a loss of 0·5 dB/km, the system designer uses a receiver with sensivity –39 dBm. There are four splices with the loss at each splice being 0·5 dB and two connectors with a loss of 1 dB each. Assuming a margin of 5 dB, the source power must exceed

(A) – 18 dBm
(B) – 19 dBm
(C) – 10 dBm
(D) – 20 dBm

27. What kind of instruction usually affects the Program Counter?

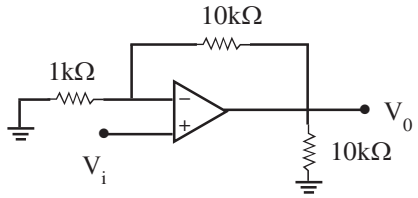
(A) Call & Jump
(B) Call & Return
(C) Push & Pop
(D) Return & Jump

28. In the following OP-Amp circuit, V_0 = ?



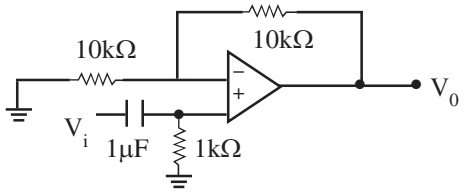
(A) 10V
(B) – 10V
(C) 5V
(D) – 5V

29. In the following circuit, V_i = 10mV dc maximum. The maximum possible dc output offset voltage is



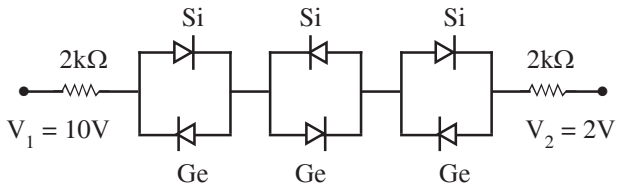
(A) 60 mV dc
(B) 110 mV dc
(C) 130 mV dc
(D) 150 mV dc

30. The following Op Amp circuit, is a filter. The type of filter and its cut off frequency are



(A) High pass, 1000 rad/sec
(B) Low pass, 100 rad/sec
(C) High pass, 10,000 rad/sec
(D) Low pass, 10,000 rad/sec

31. The current in the following network is



(A) 1·575 mA
(B) 1·675 mA
(C) 1·557 mA
(D) 1·235 mA

32. The multiple access technique that suffers from the disadvantage of likelihood of intermodulation distortion is

(A) Time Division Multiple Access (TDMA)
(B) Frequency Division Multiple Access (FDMA)
(C) Code Division Multiple Access (CDMA)
(D) Packet Access

33. If $f(s) = L\{F(t)\}$ in Laplace transform theory, what will be the value of $L\left\{\int_0^t F(x)dx\right\}$?

(A) $f(s)$
(B) $sf(s)$
(C) $\frac{f(s)}{s}$
(D) $s^2f(s)$

34. For a function $f(x)$ to be real, its Fourier transform $g(w)$ has to satisfy the following condition :

(A) $g(-w) = g^*(w)$
(B) $g(w) = g^*(w)$
(C) $g(-w) = g^*(-w)$
(D) $g(-w) = -g^*(w)$

35. The contents of an accumulator at the end of the following program will be

```
MVIA, OOH
MVIA  53H
CMA
```

(A) OACH
(B) 53H
(C) OADH
(D) 54H

36. The following program of 8085 does what?

```
MVIA, OOH
LXIH, OEAOFG
VLDAZ, ADI  0005H
```

(A) Adds decimal number to contents of the memory.
(B) Subtracts decimal number 5 from contents of the memory.
(C) Subtracts decimal number 15 from contents of the memory.
(D) Adds decimal number 15 to contents of the memory.

37. The contents of F register in 8085 are 01010001. This means

(A) S = 0, Z = 1, AC = 1, P = 0 and CY = 1
(B) S = 1, Z = 1, AC = 1, P = 0 and CY = 1
(C) S = 1, Z = 0, AC = 1, P = 0 and CY = 1
(D) S = 1, Z = 0, AC = 0, P = 0 and CY = 1

38. A series RL circuit has $Z(S) = \frac{1}{S+4}$. If a voltage 4 sin(4t) is applied, the steady state current will be

(A) $4\sin(4t - 45°)$
(B) $\frac{1}{\sqrt{2}}\sin(4t - 45°)$
(C) $\frac{1}{\sqrt{2}}\sin(4t)$
(D) $\frac{1}{2}\sin(4t - 45°)$

39. If E is energy of electron and T = 0 and $E > E_F$, then

(A) the probability of finding an occupied quantum state of energy higher than E_F is zero.

(B) all quantum states with energies greater than E_F are occupied.

(C) some quantum states with energies greater than E_1 are occupied.

(D) majority of quantum states with energies greater than E_F are occupied.

40. The relationship between the phase velocity v_p and group velocity v_g in a metallic waveguide is

(A) $v_p = v_g$

(B) $v_p \cdot v_g = c^2/2$

(C) $v_p \cdot v_g = c^2$

(D) $v_p \cdot v_g = c$

41. It P_C represents the carrier power of a 100% modulated AM signal, the total AM signal power (P_T) is

(A) $P_T = P_C$

(B) $P_T = 2P_C$

(C) $P_T = \frac{5}{2} P_C$

(D) $P_T = \frac{3}{2} P_C$

42. An AM broadcast transmitter transmits 1 kW power whose carrier power is 800 Watts. The modulation index is

(A) $1/8$

(B) 0·8

(C) $1/4$

(D) $1/\sqrt{2}$

43. In an FM signal, the total power is P_T while the unmodulated carrier power is P_C. The relation between P_T and P_C is

(A) $P_T = P_C$

(B) $P_C < P_T$

(C) $P_C > P_T$

(D) $P_T = 2P_C$

44. Which of the followings has a voltage controlled capacitance?

(A) Zener diode

(B) Diode

(C) Varactor diode

(D) LED

45. In degenerate p-type semiconductor, the Fermi level

(A) is in the valence band.

(B) is in conduction band.

(C) is at the center in between valence and conduction band.

(D) is very near conduction band.

46. In order to satisfy the Barkhausen criterion, a Wien-Bridge oscillator uses

(A) 3 R-C sections as the feedback network.

(B) one CE amplifier and one R-C section in the circuit.

(C) two CE amplifiers which produce a total phase shift of 360°.

(D) a purely resistive bridge and one CE amplifier in the circuit.

47. A transistorized phase shift oscillator using voltage shunt feedback requires

(A) two R-C sections in feedback network.

(B) three R-C sections in feedback network failing which oscillation will not be possible.

(C) at least three R-C sections in feedback network.

(D) only one R-C section in the feedback network.

48. An IMPATT diode has the following parameters; carrier drift velocity is 10^5m/s; length of drift space is 5μm, maximum operating current and voltage are 180 mA and 80 Volt respectively. Efficiency of the diode is 10%. The power output and frequency of oscillations are

(A) 1·2 W and 10 GHz

(B) 1·0 W and 9·0 GHz

(C) 1·5 W and 8·0 GHz

(D) 1·0 W and 12 GHz

49. If phase angle of open loop transfer function $G(jw_1)$ becomes $-180°$ at frequency w_1, then gain margin is equal to

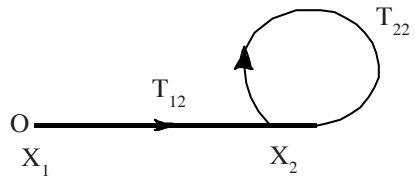
(A) $|G(jw_1)|$

(B) $\dfrac{1}{|G(jw_1)|}$

(C) $1+|G(jw_1)|$

(D) $\dfrac{1}{1+|G(jw_1)|}$

50. The transfer function of signal flow graph shown in the following figure is



(A) $\dfrac{T_{12}}{1-T_{22}}$

(B) $\dfrac{T_{22}}{1-T_{12}}$

(C) $\dfrac{T_{12}}{1+T_{22}}$

(D) $\dfrac{T_{22}}{1+T_{12}}$

51. For a lossy transmission line, the characteristic impedance does not depend on

(A) the operating frequency of the line.

(B) the length of the line.

(C) the conductivity of the conductors.

(D) the conductivity of the dielectric separating the conductors.

52. When the electric field is at its maximum value, the magnetic energy of a cavity with dimensions 10cm × 10cm × 20cm is

(A) at its maximum value.

(B) at $\sqrt{2}$ of its maximum value.

(C) at $\dfrac{1}{\sqrt{2}}$ of its maximum value.

(D) zero.

53. 24 telephone channels are frequency division multiplexed using an SSB modulation. Assuming 3kHz per channel, the required bandwidth is

(A) 8 kHz

(B) 27 kHz

(C) 21 kHz

(D) 72 kHz

54. Eber Moll equation for a bipolar transistor in CE configuration of a transistor is

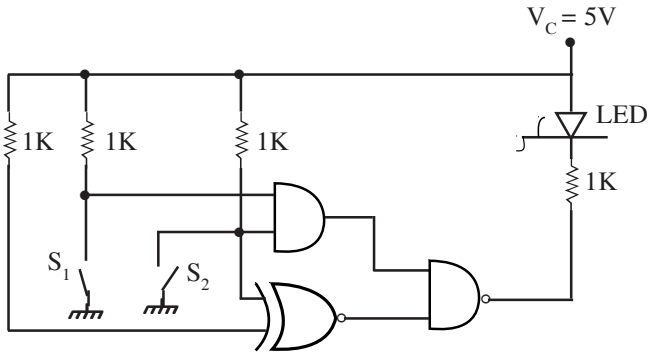
(A) $I_C = \alpha I_E + I_{CBO}$

(B) $I_C = \beta I_B + I_{CBO}$

(C) $I_C = \alpha I_E + (1 + \alpha)I_{CBO}$

(D) $I_C = \beta I_B + (1 + \beta)I_{CBO}$

55. The LED, in the following circuit,



(A) emits light when both S_1 and S_2 are closed.

(B) emits light when both S_1 and S_2 are open.

(C) emits light when only S_1 or S_2 is closed.

(D) does not emit light, irrespective of the switch position.

56. A channel has SNR of 7 and BW 4kHz. Keeping channel capacity same, the BW is reduced to accommodate more channels. The SNR

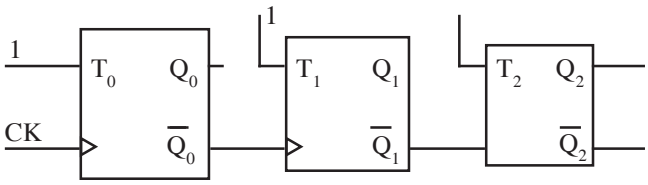
(A) decreases

(B) increases

(C) remains same

(D) partially affected

57. Figure shows a ripple counter using positive edge triggered F/F:



If the present state of counter is $Q_2Q_1Q_0 = 011$, then its next state ($Q_2Q_1Q_0$) will be

(A) 010

(B) 100

(C) 111

(D) 101

58. A AM signal having a carrier frequency of 550 kHz and a bandwidth of 10 kHz is to be amplified by a single tuned amplifier. The quality factor of the tuned circuit is

(A) 10

(B) 25

(C) 40

(D) 55

59. The output of the following program will be

```
# include < stdio.h >
main ( )
{ int x, y;
  for (x = 1; x < = 3; ++ x)  {
    printf ("\n");
  for (y = 1; y < = 4; ++ y)  {
    printf ("ϕ") ;
      }
    }
  }
```

(A) ϕ ϕ ϕ ϕ
ϕ ϕ ϕ ϕ
ϕ ϕ ϕ ϕ

(B) ϕ ϕ ϕ
ϕ ϕ ϕ
ϕ ϕ ϕ
ϕ ϕ ϕ

(C) ϕ ϕ ϕ ϕ
ϕ ϕ ϕ ϕ

(D) ϕ ϕ ϕ ϕ

60. The Maxwell's equation for $\vec{E}$ of the EM wave for an isotropic, linear, nonconducting, nonmagnetic and inhomogeneous medium when $\vec{D}=\epsilon\vec{E}=\epsilon_0\, n^2\vec{E}$, the symbols having usual meanings, is

(A) $\nabla^2\vec{E}+\vec{\nabla}\left(\frac{1}{n^2}\vec{\nabla}n^2\cdot\vec{E}\right)=\epsilon_0\,\mu_0 n^2\frac{\delta^2\vec{E}}{\delta t^2}$

(B) $\nabla^2\vec{E}+\frac{1}{n^2}\vec{\nabla}n^2\cdot\vec{E}=\epsilon_0\,\mu_0 n^2\frac{\delta^2\vec{E}}{\delta t^2}$

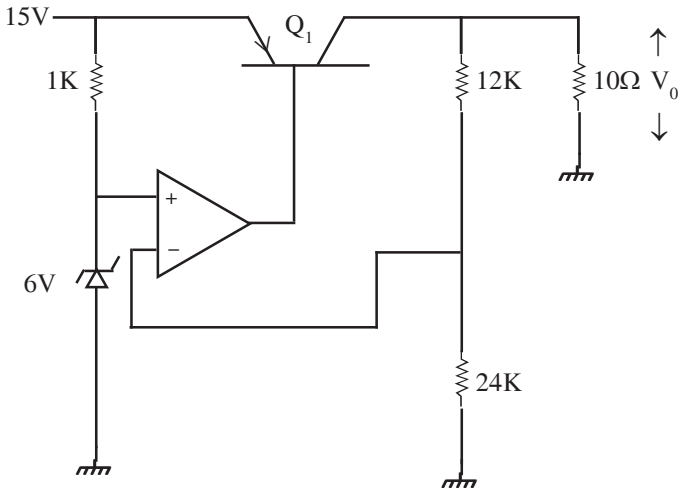
(C) $\nabla^2\vec{E}=\epsilon_0\,\mu_0 n^2\frac{\delta^2\vec{E}}{\delta t^2}$

(D) $\vec{\nabla}\vec{E}+\epsilon_0\,\mu_0 n^2\frac{\delta^2\vec{E}}{\delta t^2}=\frac{\delta}{\delta t}\left(\vec{\nabla}n^2\cdot\vec{E}\right)$

61. In a CE amplifier with voltage series feedback, the feedback circuit has a feedback factor equals to 0·0025. The open-loop voltage gain of the CE amplifier has a magnitude of 100. The closed loop gain of the feedback amplifier has a magnitude equal to

(A) 80
(B) 40
(C) 75
(D) 55

62. Regulated power supply shown below has an unregulated input voltage of 15 volts and generates a regulated output voltage V_0. The power dissipation across the transistor Q_1 is



(A) 4·8 Watts
(B) 5·0 Watts
(C) 5·4 Watts
(D) 6·0 Watts

63. The number of programmable interconnections in a PLA device with four input variables, 32 AND gates and four OR gates is

(A) 1024

(B) 512

(C) 384

(D) 256

64. When signal pulses in communication travel through a dispersive and lossy channel, the pulse height(h) and pulse width(w) suffer the following change

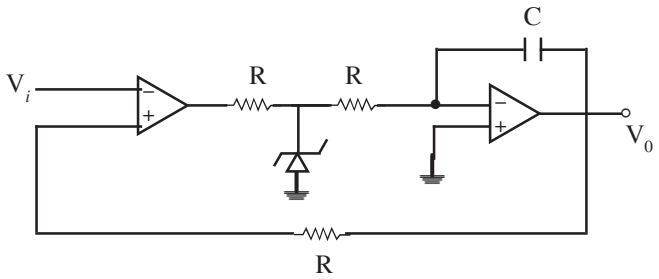
(A) h decreases, w increases

(B) h decreases, w decreases

(C) h increases, w increases

(D) h increases, w decreases

65. In order to obtain triangular pulses at the output of the circuit shown in the figure, the input should be



(A) grounded

(B) a square wave

(C) Trangular wave

(D) Trigger

66. A piezoelectric force transducer has a charge sensitivity of 20 pc/N. It is connected to a charge amplifier and overall gain is 50 mv/N. The gain of the amplifier is

(A) 1 mv/pc

(B) 1·5 mv/pc

(C) 2·5 mv/pc

(D) 4·0 mv/pc

67. The junction capacitance of a one-sided abrupt p^+n junction is proportional to

(A) square root of total junction voltage.

(B) (total junction voltage)$^{-1/2}$.

(C) total junction voltage.

(D) square of the total junction voltage.

68. A JFET operates in the ohmic region when

(A) $V_{GS} = 0$

(B) V_{GS} is less than pinch-off voltage

(C) V_{GS} is positive

(D) $V_{GS} = V_{DS}$

69. An oscilloscope has an input impedance consisting of 1 MΩ and 20 pF in parallel. A high impedance probe connected to input of this oscilloscope has a 10 MΩ series resistance. This 10 MΩ series resistance

(A) may not be shunted.

(B) should be shunted by 2 pF capacitor.

(C) should be shunted by 20 pF capacitor.

(D) should be shunted by 200 pF capacitor.

70. Capacitive transducer is superior to inductive type for measurement of capacitance because of

(A) absence of non-linearity

(B) high frequency response

(C) small size

(D) high accuracy

71. With proper beginning and ending in C program, what will be the output of the following program?

```
{ int counter;
  for(counter = 10;counter > = 1; - -counter) {
    printf ("*");
    printf ("%d, counter) ;
  }
```

(A) 10 9 8 7 6 5 4 3 2 1

(B) * 10 * 9 * 8 * 7 * 6 * 5 * 4 * 3 * 2 * 1

(C) 1 2 3 4 5 6 7 8 9 10

(D) * 1 * 2 * 3 * 4 * 5 * 6 * 7 * 8 * 9 * 10

72. The C-program is given below:

```
# include < stdio.h >
  float bs, gs, ha;
  If bs < 5000
    {
      ha = bs * 2071000;
        }
      else
      {
        ha = 500;
        }
        gs = bs + ha
```

If bs = 7000, the output will be

(A) 7000·0

(B) 8400·0

(C) 7500·0

(D) 8000·0

73. With proper beginning and ending in C-program and using while loop and scanf statement to enter a number which is 4 introduced though printf statement, what will be the output of this printf program?

```
{ int number;
  long int factorial = 1;
  while (number > 1)
  factorial = factorial * number - - ;
  printf("\n The factorial is %ld",
factorial);
}
```

(A) The factorial is 120

(B) The factorial is 12

(C) The factorial is 24

(D) 12

74. If we consider a bare fiber consisting of a core of refractive index 1·48 and having air ($n_2 = 1$) as cladding, what is the maximum incident angle up to which light can be guided?

(A) 90°

(B) 60°

(C) 30°

(D) 45°

75. A resistance is measured by voltmeter-ammeter method. The voltmeter is 0–250V, ± 1% accuracy and ammeter is 0·5 Amp ± 1% accuracy. The readings of voltmeter and ammeter are 100V and 2 Amp respectively. The error in the measured resistance can be

(A) ± 1%

(B) ± 2%

(C) ± 5%

(D) ± 10%

ROUGH WORK

ROUGH WORK