

PYQSide

NEET ALTERNATING CURRENT — PYQS

Max. Marks: 216

Questions: 54

Section A (MCQ)

Q.1 An ac circuit contains a resistance of $1\text{ k}\Omega$, a capacitor of $0.1\text{ }\mu\text{F}$ and an inductor of 1 mH connected in series. The resonance frequency of the circuit is approximately : [NEET (UG) 2026]

- (1) 15.9 kHz (2) 20.7 kHz
(3) 10.1 kHz (4) 13.5 kHz

Scan or tap for the full solution



Q.2 The peak value of an alternating current is 5 A and frequency is 60 Hz . How long will the current, starting from zero, take to reach the peak value ? [NEET (UG) 2026]

- (1) $\frac{1}{120}\text{ s}$ (2) $\frac{1}{240}\text{ s}$ (3) $\frac{1}{30}\text{ s}$ (4) $\frac{1}{60}\text{ s}$

Scan or tap for the full solution



Q.3 An ac voltage $V = 220\sin(2 \times 10^3 t)$ Volt is applied to a series LCR circuit. Then the current amplitude in this circuit is:

(Given : $L = 10\text{ mH}$, $C = 25\text{ }\mu\text{F}$, $R = 100\text{ }\Omega$)

- [RE-NEET (UG) 2026]
(1) 22.0 A (2) 2.2 A (3) 5.5 A (4) 11.0 A

Scan or tap for the full solution



Q.4 To an ac power supply of 220 V at 50 Hz , a resistor of $20\text{ }\Omega$, a capacitor of reactance $25\text{ }\Omega$ and an inductor of reactance $45\text{ }\Omega$ are connected in series. The corresponding current in the circuit and the phase angle between the current and the voltage is, respectively [NEET (UG) 2025]

- (1) 15.6 A and 30° (2) 15.6 A and 45°
(3) 7.8 A and 30° (4) 7.8 A and 45°

Scan or tap for the full solution



Q.5 In an ideal transformer, the turns ratio is $\frac{N_p}{N_s} = \frac{1}{2}$.

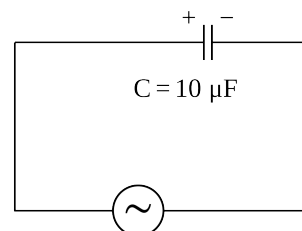
The ratio $V_s : V_p$ is equal to (the symbols carry their usual meaning) : [NEET (UG) 2024]

- (1) $1:2$ (2) $2:1$ (3) $1:1$ (4) $1:4$

Scan or tap for the full solution



Q.6 A $10\text{ }\mu\text{F}$ capacitor is connected to a 210 V , 50 Hz source as shown in figure. The peak current in the circuit is nearly ($\pi = 3.14$) : [NEET (UG) 2024]



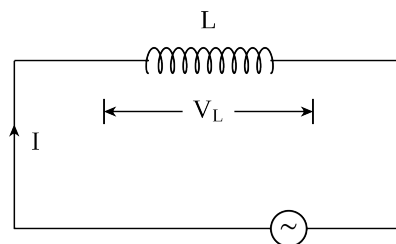
210 V , 50 Hz

- (1) 0.58 A (2) 0.93 A (3) 1.20 A (4) 0.35 A

Scan or tap for the full solution



Q.7 In the circuit shown below, the inductance L is connected to an ac source. The current flowing in the circuit is $I = I_0 \sin \omega t$. The voltage drop (V_L) across L is [RE-NEET (UG) 2024]



ac source

- (1) $\omega L I_0 \sin \omega t$ (2) $\frac{I_0}{\omega L} \sin \omega t$
(3) $\frac{I_0}{\omega L} \cos \omega t$ (4) $\omega L I_0 \cos \omega t$

Scan or tap for the full solution



Q.8 A step up transformer is connected to an ac mains supply of 220 V to operate at 11000 V , 88 watt . The current in the secondary circuit, ignoring the power loss in the transformer, is [RE-NEET (UG) 2024]

- (1) 8 mA (2) 4 mA (3) 0.4 A (4) 4 A

Scan or tap for the full solution



Q.9 The amplitude of the charge oscillating in a circuit decreases exponentially as $Q = Q_0 e^{-Rt/2L}$, where Q_0 is the charge at $t = 0\text{ s}$. The time at which charge amplitude decreases to $0.50Q_0$ is nearly: [Given that $R = 1.5\text{ }\Omega$, $L = 12\text{ mH}$, $\ln(2) = 0.693$]

[RE-NEET (UG) 2024]

- (1) 19.01 ms (2) 11.09 ms
(3) 19.01 s (4) 11.09 s

Scan or tap for the full solution



Q.10 In a series LCR circuit, the inductance L is 10 mH, capacitance C is $1\ \mu\text{F}$ and resistance R is $100\ \Omega$. The frequency at which resonance occurs is :-

[NEET (UG) 2023]

- (1) 15.9 kHz (2) 1.59 rad/s
(3) 1.59 kHz (4) 15.9 rad/s

Scan or tap for the full solution



Q.11 A 12 V, 60 W lamp is connected to the secondary of a step down transformer, whose primary is connected to ac mains of 220 V. Assuming the transformer to be ideal, what is the current in the primary winding?

[NEET (UG) 2023]

- (1) 2.7 A (2) 3.7 A (3) 0.37 A (4) 0.27 A

Scan or tap for the full solution



Q.12 An ac source is connected to a capacitor C . Due to decrease in its operating frequency :

[NEET (UG) 2023]

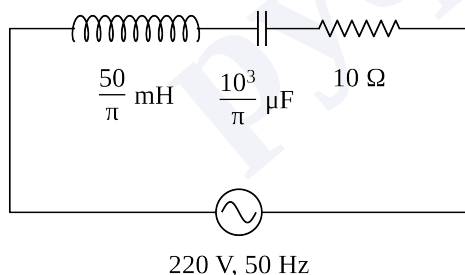
- (1) displacement current increases.
(2) displacement current decreases.
(3) capacitive reactance remains constant.
(4) capacitive reactance decreases.

Scan or tap for the full solution



Q.13 The net impedance of circuit (as shown in figure) will be :

[NEET (UG) 2023]



- (1) $15\ \Omega$ (2) $5\sqrt{5}\ \Omega$
(3) $25\ \Omega$ (4) $10\sqrt{2}\ \Omega$

Scan or tap for the full solution



Q.14 The peak voltage of the ac source is equal to

[NEET (UG) 2022]

- (1) The value of voltage supplied to the circuit
(2) The rms value of the ac source
(3) $\sqrt{2}$ times the rms value of the ac source
(4) $1/\sqrt{2}$ times the rms value of the ac source

Scan or tap for the full solution



Q.15 A series LCR circuit with inductance 10 H, capacitance $10\ \mu\text{F}$, resistance $50\ \Omega$ is connected to an ac source of voltage, $V = 200\sin(100t)$ volt. If the resonant frequency of the LCR circuit is ν_0 and the frequency of the ac source is ν , then

[NEET (UG) 2022]

- (1) $\nu_0 = \nu = 50\ \text{Hz}$
(2) $\nu_0 = \nu = \frac{50}{\pi}\ \text{Hz}$
(3) $\nu_0 = \frac{50}{\pi}\ \text{Hz}$, $\nu = 50\ \text{Hz}$
(4) $\nu = 100\ \text{Hz}$, $\nu_0 = \frac{100}{\pi}\ \text{Hz}$

Scan or tap for the full solution



Q.16 Given below are two statements

Statement-I: In an a.c circuit, the current through a capacitor leads the voltage across it.

Statement-II: In a.c circuit containing pure capacitance only, the phase difference between the current and voltage is π .

In the light of the above statements, choose the most appropriate answer from the options given below

[NEET (UG) 2022 (Phase 2)]

- (1) Statement-I is incorrect but Statement-II is correct
(2) Both Statement-I and Statement-II are correct
(3) Both Statement-I and Statement-II are incorrect
(4) Statement-I is correct but Statement-II is incorrect

Scan or tap for the full solution



Q.17 An inductor of inductance 2 mH is connected to a 220 V, 50 Hz ac source. Let the inductive reactance in the circuit is X_1 . If a 220 V dc source replace the ac source in the circuit, then the inductive reactance in the circuit is X_2 . X_1 and X_2 respectively are :

[NEET (UG) 2022 (Phase 2)]

- (1) $0.628\ \Omega$, infinity (2) $6.28\ \Omega$, zero
(3) $6.28\ \Omega$, infinity (4) $0.628\ \Omega$, zero

Scan or tap for the full solution



- Q.18** A standard filament lamp consumes 100 W when connected to 200 V ac mains supply. The peak current through the bulb will be :

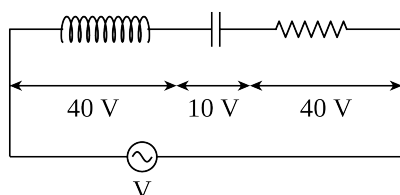
[NEET (UG) 2022 (Phase 2)]

- (1) 2 A (2) 0.707 A (3) 1 A (4) 1.414 A

Scan or tap for the full solution



- Q.19** An inductor of inductance L , a capacitor of capacitance C and a resistor of resistance ' R ' are connected in series to an ac source of potential difference ' V ' volts as shown in figure. Potential difference across L , C and R is 40 V, 10 V and 40 V, respectively. The amplitude of current flowing through LCR series circuit is $10\sqrt{2}$ A. The impedance of the circuit is : [NEET (UG) 2021]



- (1) 5 Ω (2) $4\sqrt{2}$ Ω
(3) $5/\sqrt{2}$ Ω (4) 4 Ω

Scan or tap for the full solution



- Q.20** A step down transformer connected to an ac mains supply of 220 V is made to operate at 11 V, 44 W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit ?

[NEET (UG) 2021]

- (1) 4 A (2) 0.2 A (3) 0.4 A (4) 2 A

Scan or tap for the full solution



- Q.21** A series LCR circuit containing 5.0 H inductor, 80 μF capacitor and 40 Ω resistor is connected to 230 V variable frequency ac source. The angular frequencies of the source at which power transferred to the circuit is half the power at the resonant angular frequency are likely to be :

[NEET (UG) 2021]

- (1) 42 rad/s and 58 rad/s (2) 25 rad/s and 75 rad/s
(3) 50 rad/s and 25 rad/s (4) 46 rad/s and 54 rad/s

Scan or tap for the full solution



- Q.22** A 40 μF capacitor is connected to a 200 V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly :

[NEET (UG) 2020]

- (1) 2.05 A (2) 2.5 A (3) 25.1 A (4) 1.7 A

Scan or tap for the full solution



- Q.23** A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage is $\frac{\pi}{3}$.

If instead C is removed from the circuit, the phase difference is again $\frac{\pi}{3}$ between current and voltage.

The power factor of the circuit is :

[NEET (UG) 2020]

- (1) 0.5 (2) 1.0 (3) -1.0 (4) zero

Scan or tap for the full solution



- Q.24** An inductor 20 mH, a capacitor 100 μF and a resistor 50 Ω are connected in series across a source of emf, $V = 10\sin 314t$. The power loss in the circuit is [NEET 2018]

- (1) 0.79 W (2) 0.43 W (3) 2.74 W (4) 1.13 W

Scan or tap for the full solution



- Q.25** An inductor 20 mH, a capacitor 50 μF and a resistor 40 Ω are connected in series across a source of emf $V = 10\sin 340t$. The power loss in A.C. circuit is

[NEET 2016 (Phase 1)]

- (1) 0.76 W (2) 0.89 W (3) 0.46 W (4) 0.67 W

Scan or tap for the full solution



- Q.26** A small signal voltage $V(t) = V_0 \sin \omega t$ is applied across an ideal capacitor C [NEET 2016 (Phase 1)]

- (1) Current $I(t)$ is in phase with voltage $V(t)$.
(2) Current $I(t)$ leads voltage $V(t)$ by 180°
(3) Current $I(t)$ lags voltage $V(t)$ by 90° .
(4) Over a full cycle the capacitor C does not consume any energy from the voltage source.

Scan or tap for the full solution



- Q.27** Which of the following combinations should be selected for better tuning of an L-C-R circuit used for communication? [NEET 2016 (Phase 2)]

- (1) $R = 20 \Omega$, $L = 1.5 \text{ H}$, $C = 35 \mu\text{F}$
(2) $R = 25 \Omega$, $L = 2.5 \text{ H}$, $C = 45 \mu\text{F}$
(3) $R = 15 \Omega$, $L = 3.5 \text{ H}$, $C = 30 \mu\text{F}$
(4) $R = 25 \Omega$, $L = 1.5 \text{ H}$, $C = 45 \mu\text{F}$

Scan or tap for the full solution



- Q.28** The potential differences across the resistance, capacitance and inductance are 80 V, 40 V and 100 V respectively in an L-C-R circuit. The power factor of this circuit is [NEET 2016 (Phase 2)]

- (1) 0.4 (2) 0.5 (3) 0.8 (4) 1.0

Scan or tap for the full solution



Q.29 A series R-C circuit is connected to an alternating voltage source. Consider two situations :

- (a) When capacitor is air filled.
(b) When capacitor is mica filled.

Current through resistor is i and voltage across capacitor is V then [AIPMT 2015]

- (1) $i_a > i_b$ (2) $V_a = V_b$ (3) $V_a < V_b$ (4) $V_a > V_b$

Scan or tap for the full solution



Q.30 A resistance 'R' draws power 'P' when connected to an AC source. If an inductance is now placed in series with the resistance, such that the impedance of the circuit becomes 'Z', the power drawn will be

[AIPMT 2015 (Cancelled)]

- (1) $P\left(\frac{R}{Z}\right)$ (2) P (3) $P\left(\frac{R}{Z}\right)^2$ (4) $P\sqrt{\frac{R}{Z}}$

Scan or tap for the full solution



Q.31 A transformer having efficiency of 90% is working on 200 V and 3 kW power supply. If the current in the secondary coil is 6 A, the voltage across the secondary coil and the current in the primary coil respectively are [AIPMT 2014]

- (1) 300 V, 15 A (2) 450 V, 15 A
(3) 450 V, 13.5 A (4) 600 V, 15 A

Scan or tap for the full solution



Q.32 A coil of self-inductance L is connected in series with a bulb B and an AC source. Brightness of the bulb decreases when [NEET 2013]

- (1) a capacitance of reactance $X_C = X_L$ is included in the same circuit.
(2) an iron rod is inserted in the coil.
(3) frequency of the AC source is decreased.
(4) number of turns in the coil is reduced.

Scan or tap for the full solution



Q.33 The primary of a transformer when connected to a dc battery of 10 Volt draws a current of 1 mA. The number of turns of the primary and secondary windings are 50 and 100 respectively. The voltage in the secondary and the current drawn by the circuit in the secondary are respectively

[NEET 2013 (Karnataka)]

- (1) 20 V and 2.0 mA
(2) 10 V and 0.5 mA
(3) Zero volt and therefore no current
(4) 20 V and 0.5 mA

Scan or tap for the full solution



Q.34 The instantaneous values of alternating current and voltage in a circuit are given as

$$i = \frac{1}{\sqrt{2}} \sin(100\pi t) \text{ ampere}$$

$$e = \frac{1}{\sqrt{2}} \sin\left(100\pi t + \frac{\pi}{3}\right) \text{ Volt}$$

The average power in watts consumed in the circuit is [AIPMT 2012 (Mains)]

- (1) $\frac{1}{4}$ (2) $\frac{\sqrt{3}}{4}$ (3) $\frac{1}{2}$ (4) $\frac{1}{8}$

Scan or tap for the full solution



Q.35 In an electrical circuit R, L, C and a.c. voltage source are all connected in series. When L is removed from the circuit, the phase difference between the voltage and the current in the circuit is $\frac{\pi}{3}$. If instead, C is removed from the circuit, the

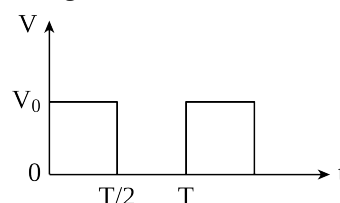
phase difference is again $\frac{\pi}{3}$. The power factor of the circuit is [AIPMT 2012 (Prelims)]

- (1) $\frac{1}{2}$ (2) $\frac{1}{\sqrt{2}}$ (3) 1 (4) $\frac{\sqrt{3}}{2}$

Scan or tap for the full solution



Q.36 The r.m.s. value of potential difference V shown in the figure is [AIPMT 2011 (Mains)]



- (1) $\frac{V_0}{\sqrt{3}}$ (2) V_0 (3) $\frac{V_0}{\sqrt{2}}$ (4) $\frac{V_0}{2}$

Scan or tap for the full solution



Q.37 A coil has resistance 30 ohm and inductive reactance 20 ohm at 50 Hz frequency. If an ac source, of 200 volt, 100 Hz, is connected across the coil, the current in the coil will be

[AIPMT 2011 (Mains)]

- (1) 2.0 A (2) 4.0 A (3) 8.0 A (4) $\frac{20}{\sqrt{13}}$ A

Scan or tap for the full solution



Q.38 An ac voltage is applied to a resistance R and an inductor L in series. If R and the inductive reactance are both equal to $3\ \Omega$, the phase difference between the applied voltage and the current in the circuit is

[AIPMT 2011 (Prelims)]

- (1) $\pi/6$ (2) $\pi/4$ (3) $\pi/2$ (4) zero

Scan or tap for the full solution



Q.39 In the ac circuit an alternating voltage $e = 200\sqrt{2} \sin 100t$ volts is connected to a capacitor of capacity $1 \mu\text{F}$. The r.m.s. value of the current in the circuit is [AIPMT 2011 (Prelims)]

- (1) 10 mA (2) 100 mA (3) 200 mA (4) 20 mA

Scan or tap for the full solution



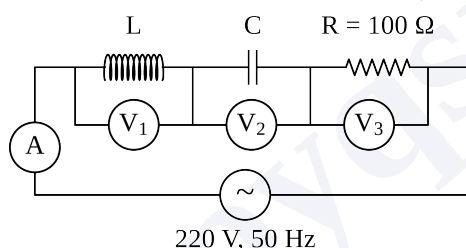
Q.40 A condenser of capacity C is charged to a potential difference of V_1 . The plates of the condenser are then connected to an ideal inductor of inductance L . The current through the inductor when the potential difference across the condenser reduces to V_2 is [AIPMT 2010 (Mains)]

- (1) $\left(\frac{C(V_1 - V_2)^2}{L}\right)^{\frac{1}{2}}$ (2) $\frac{C(V_1^2 - V_2^2)}{L}$
 (3) $\frac{C(V_1^2 + V_2^2)}{L}$ (4) $\left(\frac{C(V_1^2 - V_2^2)}{L}\right)^{\frac{1}{2}}$

Scan or tap for the full solution



Q.41 In the given circuit the readings of voltmeters V_1 and V_2 are 300 volts each. The readings of the voltmeter V_3 and ammeter A are respectively [AIPMT 2010 (Prelims)]



- (1) 150 V, 2.2 A (2) 220 V, 2.2 A
 (3) 220 V, 2.0 A (4) 100 V, 2.0 A

Scan or tap for the full solution



Q.42 A 220 volt input is supplied to a transformer. The output circuit draws a current of 2.0 ampere at 440 volts. If the efficiency of the transformer is 80%, the current drawn by the primary windings of the transformer is [AIPMT 2010 (Prelims)]

- (1) 3.6 ampere (2) 2.8 ampere
 (3) 2.5 ampere (4) 5.0 ampere

Scan or tap for the full solution



Q.43 Power dissipated in an LCR series circuit connected to an A.C. source of emf ϵ is [AIPMT 2009]

- (1) $\frac{\epsilon^2 \left[R^2 + \left(L\omega - \frac{1}{C\omega} \right)^2 \right]}{R}$
 (2) $\frac{\epsilon^2 \sqrt{R^2 + \left(L\omega - \frac{1}{C\omega} \right)^2}}{R}$
 (3) $\frac{\epsilon^2 R}{\sqrt{R^2 + \left(L\omega - \frac{1}{C\omega} \right)^2}}$
 (4) $\frac{\epsilon^2 R}{\left[R^2 + \left(L\omega - \frac{1}{C\omega} \right)^2 \right]}$

Scan or tap for the full solution



Q.44 In an a.c. circuit the e.m.f. (ϵ) and the current (i) at any instant are given respectively by

$$\epsilon = E_0 \sin \omega t, \quad i = I_0 \sin(\omega t - \phi)$$

The average power in the circuit over one cycle of a.c. is [AIPMT 2008]

- (1) $\frac{E_0 I_0}{2} \cos \phi$ (2) $E_0 I_0$
 (3) $\frac{E_0 I_0}{2}$ (4) $\frac{E_0 I_0}{2} \sin \phi$

Scan or tap for the full solution



Q.45 The primary and secondary coils of a transformer have 50 and 1500 turns respectively. If the magnetic flux ϕ linked with the primary coil is given by $\phi = \phi_0 + 4t$, where ϕ is in webers, t is time in seconds and ϕ_0 is a constant, the output voltage across the secondary coil is [AIPMT 2007]

- (1) 120 volt (2) 220 volts
 (3) 30 volts (4) 90 volts

Scan or tap for the full solution



Q.46 A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0.5 amp, the efficiency of the transformer is approximately [AIPMT 2007]

- (1) 50% (2) 90% (3) 10% (4) 30%

Scan or tap for the full solution



Q.47 What is the value of inductance L for which the current is maximum in a series LCR circuit with $C = 10 \mu\text{F}$ and $\omega = 1000 \text{ s}^{-1}$? [AIPMT 2007]

- (1) 1 mH
 (2) cannot be calculated unless R is known
 (3) 10 mH
 (4) 100 mH

Scan or tap for the full solution



Q.48 A coil of inductive reactance $31\ \Omega$ has a resistance of $8\ \Omega$. It is placed in series with a condenser of capacitive reactance $25\ \Omega$. The combination is connected to an a.c. source of 110 V . The power factor of the circuit is [AIPMT 2006]

- (1) 0.33 (2) 0.56 (3) 0.64 (4) 0.80

Scan or tap for the full solution



Q.49 The core of a transformer is laminated because [AIPMT 2006]

- (1) ratio of voltage in primary and secondary may be increased
 (2) energy losses due to eddy currents may be minimised
 (3) the weight of the transformer may be reduced
 (4) rusting of the core may be prevented.

Scan or tap for the full solution



Q.50 A transistor-oscillator using a resonant circuit with an inductor L (of negligible resistance) and a capacitor C in series produces oscillations of frequency f . If L is doubled and C is changed to $4C$, the frequency will be [AIPMT 2006]

- (1) $f/2$ (2) $f/4$ (3) $8f$ (4) $f/2\sqrt{2}$

Scan or tap for the full solution



Q.51 In a circuit L , C and R are connected in series with an alternating voltage source of frequency f . The current leads the voltage by 45° . The value of C is [AIPMT 2005]

- (1) $\frac{1}{\pi f(2\pi fL - R)}$ (2) $\frac{1}{2\pi f(2\pi fL - R)}$
 (3) $\frac{1}{\pi f(2\pi fL + R)}$ (4) $\frac{1}{2\pi f(2\pi fL + R)}$

Scan or tap for the full solution



Q.52 For a series LCR circuit the power loss at resonance is [AIPMT 2002]

- (1) $\frac{V^2}{\left[\omega L - \frac{1}{\omega C}\right]}$ (2) $I^2 L \omega$
 (3) $I^2 R$ (4) $\frac{V^2}{C \omega}$

Scan or tap for the full solution



Q.53 A capacitor of capacity C has reactance X . If capacitance and frequency become double then reactance will be [AIPMT 2001]

- (1) $4X$ (2) $X/2$ (3) $X/4$ (4) $2X$

Scan or tap for the full solution



Q.54 The value of quality factor is [AIPMT 2001]

- (1) $\frac{\omega L}{R}$ (2) $\frac{1}{\omega RC}$ (3) $\sqrt{LC}$ (4) L/R

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	1	2	2	4	2	2	4
Ques.	8	9	10	11	12	13	14
Ans.	1	2	3	4	2	2	3
Ques.	15	16	17	18	19	20	21
Ans.	2	4	4	2	1	2	4
Ques.	22	23	24	25	26	27	28
Ans.	2	2	1	3	4	3	3
Ques.	29	30	31	32	33	34	35
Ans.	4	3	2	2	3	4	3
Ques.	36	37	38	39	40	41	42
Ans.	3	2	2	4	4	2	4
Ques.	43	44	45	46	47	48	49
Ans.	4	1	1	2	4	4	2
Ques.	50	51	52	53	54		
Ans.	4	4	3	3	1, 2		