



XII - LAKSHYA UNIT TEST (LUT)

Test No.	Physics : AC complete , Ray Optics upto Spherical mirrors	Question Booklet Serial No.
3052381	Chemistry : Chemical Kinetics,P block (16)	091016
	Mathematics : Vetors, 3D Geometry	

Date : 09/10/2016

Maximum Marks : 360

Time Allotted : 3 Hours

Please read the instructions carefully.

1. Immediately fill the particulars on this page of the Test Booklet with Blue/Black ball point pen. Use of pencil is strictly prohibited.
2. The answer sheet is kept inside this test booklet. When you are directed to open the test booklet, take out the answer sheet and fill in the particulars carefully.
3. The test is of 3 hours duration.
4. The test booklet consists of 90 questions. The maximum marks are 360.
5. There are three parts in the question paper A,B,C consisting of physics, chemistry and mathematics having 30 questions in each part of equal weightage. Each question is allotted 4 (four) marks for correct response.
6. Candidates will be awarded marks as stated above in instruction No.5 for correct response of each question. 1/4 (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
7. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 6 above.
8. Use Black Ball Pen only for writing/marking responses on side-1 and side-2 of the Answer sheet. Use of pencil is strictly prohibited.
9. No candidate is allowed to carry any textual material, printed or written, bits of papers, paper, mobile phone, any electronic device, etc. except the admit card inside the examination hall/room.
10. Rough work is to be done on the space provided for this purpose in the test booklet only. This space is given at the bottom of each page.
11. On completion of the test, the candidate must hand over the answer sheet to the invigilator on duty in the room/hall. However, the candidates are allowed to take away this test booklet with them.
12. Do not fold or make any stray marks on the answer sheet.

Advice :

1. It is recommended to select easy questions and optimize your score.
2. Students are advised not to spend too much time on a particular question.

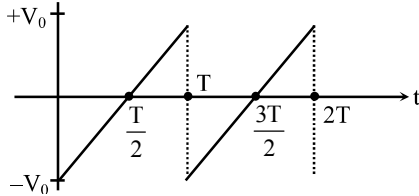
unless instruction is given

Do not open this booklet

PART A - PHYSICS

1. In series LCR circuit voltage drop across resistance is 8 volt and across capacitor is 12 volt. Then :
- Voltage of the source will be leading current in the circuit
 - Voltage drop across each element will be less than the applied voltage
 - power factor of circuit will be $4/3$
 - None of these

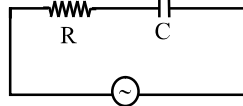
2. Rms value of the saw-tooth voltage of peak value V_0 as shown is -



- $\frac{V_0}{2}$
 - $\frac{V_0}{\sqrt{2}}$
 - $\frac{V_0}{3}$
 - $\frac{V_0}{\sqrt{3}}$
3. A bulb is rated at 100 V, 100 W, it can be treated as a resistor. Find out the inductance of an inductor (called choke coil) that should be connected in series with the bulb to operate the bulb at its rated power with the help of an ac source of 200V and 50 Hz.

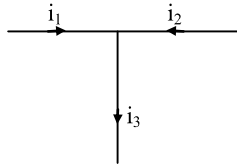
- $\frac{\pi}{\sqrt{3}}$ H
- 100 H
- $\frac{\sqrt{2}}{\pi}$ H
- $\frac{\sqrt{3}}{\pi}$ H

4. A 50 Hz ac source of 20 volts is connected across R and C as shown in figure. The voltage across R is 12 volt. The voltage across C is -

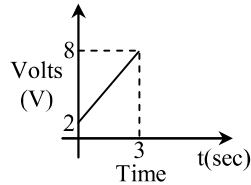


- 8 V
 - 16 V
 - 10 V
 - not possible to determine unless values of R and C are given
5. The e.m.f $E = 4 \cos 1000t$ volts is applied to an L- R circuit containing inductance 3mH and resistance 4Ω . The amplitude of current is -
- $4\sqrt{7}$ A
 - 1.0 A
 - $\frac{4}{7}$ A
 - 0.8 A

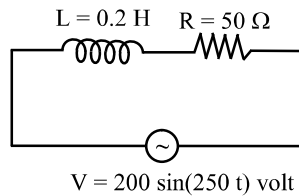
6. If $i_1 = 3 \sin \omega t$ and $i_2 = 4 \cos \omega t$, then i_3 is –



- a) $5 \sin (\omega t + 53^\circ)$
 b) $5 \sin (\omega t + 37^\circ)$
 c) $5 \sin (\omega t + 45^\circ)$
 d) $5 \cos (\omega t + 53^\circ)$
7. A circuit element is placed in a closed box. At time $t = 0$, a constant current generator supplying a current of 1 amp is connected across the box. Potential diff. across the box varies according to graph as shown in the figure. The element in the box is –



- a) a resistance of 2Ω
 b) a battery of emf 6V
 c) an inductance of 2H
 d) a capacitance
8. In the given circuit the average power developed is –



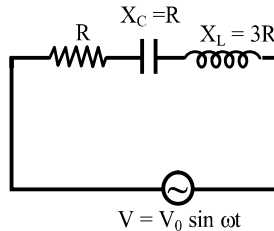
- a) $50\sqrt{2}$ watt
 b) 200 watt
 c) $150\sqrt{2}$ watt
 d) $200\sqrt{2}$ watt
9. In a series LCR circuit with an AC source $R = 300 \Omega$, $C = 20 \mu\text{F}$, $L = 1 \text{ H}$, $E_{\text{rms}} = 50 \text{ V}$ and $\nu = \frac{50}{\pi} \text{ Hz}$. The potential difference across the capacitor is –

- a) 50 V
 b) $\frac{50}{\sqrt{2}}$ V
 c) 40 V
 d) $\frac{40}{\sqrt{2}}$ V

16. The tuning circuit of a radio receiver has a resistance of $50\ \Omega$, an inductor of $10\ \text{mH}$ and a variable capacitor. $1\ \text{MHz}$ radio wave produces a potential difference of $0.1\ \text{mV}$. The values of the capacitor to produce resonance is (Take $\pi^2 = 10$)

- a) $2.5\ \text{pF}$
- b) $5.0\ \text{pF}$
- c) $25\ \text{pF}$
- d) $50\ \text{pF}$

17. The power dissipated in the adjacent circuit is –

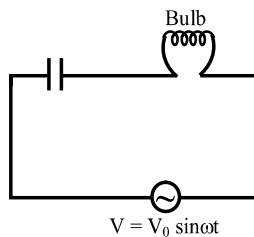


- a) $\frac{V_0^2}{R}$
- b) $\frac{V_0^2}{5R}$
- c) $\frac{V_0^2}{\sqrt{5}R}$
- d) $\frac{V_0^2}{10R}$

18. In a transformer $N_p = 500$, $N_s = 5000$. Input voltage is 20V and frequency is 50Hz . What are the output voltage and frequency -

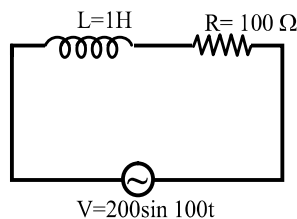
- a) $200\ \text{V}, 40\ \text{Hz}$
- b) $100\ \text{V}, 50\ \text{Hz}$
- c) $200\ \text{V}, 50\ \text{Hz}$
- d) $150\ \text{V}, 40\ \text{Hz}$

19. In given circuit, when a dielectric slab is introduced between the plates of the capacitor, intensity of bulb -



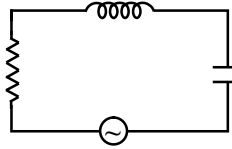
- a) increases
- b) decreases
- c) may increase or decrease
- d) can't say

20. In adjacent circuit the instantaneous current equation is –

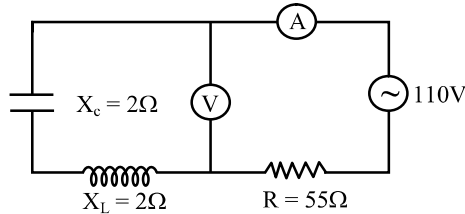


- a) $2 \sin \left(100t - \frac{\pi}{4} \right)$
- b) $\sqrt{2} \sin \left(100t - \frac{\pi}{4} \right)$
- c) $\sqrt{2} \sin \left(200t - \frac{\pi}{4} \right)$
- d) $\sqrt{2} \left(100t + \frac{\pi}{4} \right)$

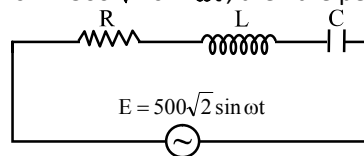
21. An alternating voltage $E = 6 \sin 20t + 8 \cos 20t$ is applied to a series resonant circuit as shown. The correct statements are -



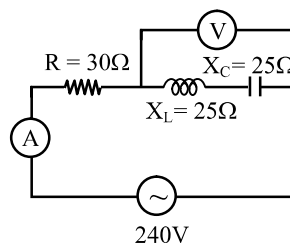
- a) The capacitance C is 12.5 mF
 b) The resonant current in the circuit is 3 A
 c) Power dissipated in the circuit is 20 watt
 d) Quality factor of the current is 0.9
22. The reading of the ammeter and voltmeters are (Both the instruments are ac meters and measures rms value) -



- a) $2 \text{ A}, 110 \text{ V}$
 b) $2 \text{ A}, 0 \text{ V}$
 c) $2 \text{ A}, 55 \text{ V}$
 d) $1 \text{ A}, 0 \text{ V}$
23. In series $R - L - C$ circuit, the rms voltage across the resistor and inductor are respectively 400 V and 700 V . If the Equation for the applied voltage is $E = 500\sqrt{2} \sin \omega t$, then the peak voltage across the capacitor is -

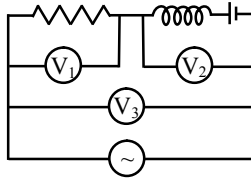


- a) 1200 V
 b) $1200\sqrt{2} \text{ V}$
 c) 400 V
 d) $400\sqrt{2} \text{ V}$
24. In an LCR circuit the capacitance is made $1/4$ th then what should be the change in inductance that the circuit remains in resonance again?
- a) 8 times
 b) $1/4$ times
 c) 2 times
 d) 4 times
25. A resistance of 20 ohm is connected to a source of an alternating potential $V = 220 \sin (100 \pi t)$. The time taken by the current to change from its peak value to rms value is -
- a) 0.2 sec
 b) 0.25 sec
 c) $25 \times 10^{-3} \text{ sec}$
 d) $2.5 \times 10^{-3} \text{ sec}$
26. In the following circuit the readings of AC voltmeters and ammeters will be respectively -

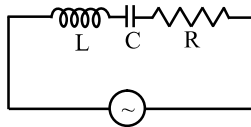


- a) $0 \text{ V}, 3 \text{ A}$
 b) $150 \text{ V}, 3 \text{ A}$
 c) $150 \text{ V}, 6 \text{ A}$
 d) $0 \text{ V}, 8 \text{ A}$

27. A resistors R, an inductor L, a capacitor C and voltmeter V_1 , V_2 and V_3 are connected to an oscillator in the circuit as shown in the adjoining diagram, when the frequency of oscillator increases, then at resonant frequency the reading of voltmeter V_3 is equal to –



- a) that of voltmeter V_1
 b) that of voltmeter V_2
 c) both the voltmeter V_1 & V_2
 d) none of these
28. In a series LCR circuit the frequency of a 10 V AC voltage source is adjusted in such a fashion that the reactance of the inductor measures $15\ \Omega$ and that of the capacitor $11\ \Omega$. If $R = 3\ \Omega$, the potential difference across the series combination of L and C will be -
- a) 8 V
 b) 10 V
 c) 22 V
 d) 52 V
29. A 100 V, AC source of frequency 500 Hz is connected to an LCR circuit with $L = 8.1\ \text{mH}$, $C = 12.5\ \mu\text{F}$, $R = 10\ \Omega$ all connected in series as shown in figure. What is the quality factor of circuit?



- a) 2.02
 b) 2.5434
 c) 50.54
 d) 200.54
30. In a series LCR circuit, the voltage across resistance, capacitance and inductance is 10 V each. If the capacitor is removed, the voltage across the inductance will be -
- a) 10 V
 b) $10\sqrt{2}\text{V}$
 c) $\frac{10}{\sqrt{2}}\text{V}$
 d) 20 V

46. Which of the following hydrides has lowest boiling point ?
a) H_2O b) H_2S
c) H_2Se d) H_2Te
47. Which one of the following oxoanions does not contain S – S bond?
a) $\text{S}_2\text{O}_3^{2-}$ b) $\text{S}_2\text{O}_4^{2-}$
c) $\text{S}_2\text{O}_5^{2-}$ d) $\text{S}_2\text{O}_7^{2-}$
48. Which of the following compound gives a foul odour when damp:
a) Al_2S_3 b) Na_2NO_3
c) NH_4Cl d) AlCl_3
49. Which compound on heating alone does not form O_2 :
a) KClO_4 b) KMnO_4
c) KNO_3 d) NH_4NO_2
50. The number of S – S bonds in sulphur trioxide trimer (S_3O_9) is:
a) 3 b) 2
c) 1 d) 0
51. Aqueous solution of $\text{Na}_2\text{S}_2\text{O}_3$ on reaction with Cl_2 gives -
a) $\text{Na}_2\text{S}_4\text{O}_6$ b) NaHSO_4
c) NaCl d) NaOH
52. Which of the following statements regarding sulphur is incorrect?
a) S_2 molecule is paramagnetic
b) The vapour at 200°C consists mostly of S_8 rings.
c) At 600°C the gas mainly consists of S_2 molecules.
d) The oxidation state of sulphur is never less than +4 in its compounds.
53. Which one of the following on heating will give mixture of SO_2 and SO_3 ?
a) ZnSO_3 b) CuSO_4
c) Na_2SO_4 d) FeSO_4
54. Copper turnings when heated with concentrated sulphuric acid will give—
a) SO_2 b) SO_3
c) H_2S d) O_2
55. Sodium thiosulphate is prepared by—
a) reducing Na_2SO_4 solution with H_2S
b) boiling Na_2SO_3 solution with S in alkaline medium
c) neutralising $\text{H}_2\text{S}_2\text{O}_3$ solution with NaOH
d) boiling Na_2SO_3 solution with S in acidic medium
56. Two substances A ($t_{1/2} = 5\text{min}$) and B ($t_{1/2} = 15\text{min}$) are taken in such a way that initially $[\text{A}] = 4[\text{B}]$. The time after which both the concentration will be equal is (assuming reactions are of 1^{st} order) :
a) 5 min b) 15 min
c) 20 min d) concentration can never be equal

