1. **When 100 *volts* dc is supplied across a solenoid, a current of 1.0 amperes flows in it. When 100 *volts* ac is applied across the same coil, the current drops to 0.5 ampere. If the frequency of ac source is 50 *Hz*, then the impedance and inductance of the solenoid are**

(a) 200 Ω and 0.55 *henry* (b) 100 Ω and 0.86 *henry*

(c) 200 Ω and 1.0 *henry* (d) 100 Ω and 0.93 *henry*

1. **In an *LR*-circuit, the inductive reactance is equal to the resistance *R* of the circuit. An e.m.f.  applied to the circuit. The power consumed in the circuit is**

(a)  (b)  (c)  (d) 

1. **One 10 *V*, 60 *W* bulb is to be connected to 100 *V* line. The required induction coil has self inductance of value **

(a) 0.052 *H* (b) 2.42 *H* (c) 16.2 *mH* (d) 1.62 *mH*

1. **In the circuit given below, what will be the reading of the voltmeter**

(a) 300 *V*

200V, 100 *Hz*

*V*

100*V*

100*V*

(b) 900 *V*

(c) 200 *V*

(d) 400 *V*

1. **In the circuit shown below, what will be the readings of the voltmeter and ammeter**

220 *V*, 50 *Hz*

300 *V*

300 *V*

100 Ω

***A***

***V***

(a) 800 *V*, 2*A* (b) 300 *V*, 2*A*

(c) 220 *V*, 2.2 *A* (d) 100 *V*, 2*A*

1. **A bulb and a capacitor are connected in series to a source of alternating current. If its frequency is increased, while keeping the voltage of the source constant, then**

(a) Bulb will give more intense light

(b) Bulb will give less intense light

(c) Bulb will give light of same intensity as before

(d) Bulb will stop radiating light

1. **An alternating e.m.f. of angular frequency  is applied across an inductance. The instantaneous power developed in the circuit has an angular frequency**

(a)  (b)  (c)  (d) 

1. **The voltage of an ac source varies with time according to the equation  where  is in seconds and *V* is in volts. Then**

(a) The peak voltage of the source is 100 *volts*

(b) The peak voltage of the source is 50 *volts*

(c) The peak voltage of the source is *volts*

(d) The frequency of the source is 50 *Hz*

1. **The diagram shows a capacitor *C* and a resistor *R* connected in series to an ac source.  and  are voltmeters and *A* is an ammeter**

*C*

***V*2**

***V*1**

***A***

*R*

Consider now the following statements

I. Readings in *A* and *V*2 are always in phase

II. Reading in *V*1 is ahead in phase with reading in *V*2

III. Readings in *A* and *V*1 are always in phase which of these statements are/is correct

(a) I only (b) II only

(c) I and II only (d) II and III only

1. **In the circuit shown in figure neglecting source resistance the voltmeter and ammeter reading will respectively, will be**

*R* = 30Ω

*XL* = 25Ω

*XC* = 25Ω

240 *V*

***V***

***A***

(a) 0*V*, 3*A* (b) 150*V*, 3*A*

(c) 150*V*, 6*A* (d) 0*V*, 8*A*

1. **The voltage of an ac supply varies with time  as  The maximum voltage and frequency respectively are**

(a) 120 *volts*, 100 *Hz* (b)  *volts*, 100 *Hz*

(c) 60 *volts*, 200 *Hz* (d) 60 *volts*, 100 *Hz*

1. **In the circuit shown in the figure, the ac source gives a voltage  Neglecting source resistance, the voltmeter and ammeter reading will be**

***V***

***A***

5*mH*

50*μF*

6Ω

4Ω

(a) 0*V*, 0.47*A* (b) 1.68*V*, 0.47*A*

(c) 0*V*, 1.4 *A* (d) 5.6*V*, 1.4 *A*

1. **A telephone wire of length 200 *km* has a capacitance of 0.014 *μF* per *km*. If it carries an ac of frequency 5 *kHz*, what should be the value of an inductor required to be connected in series so that the impedance of the circuit is minimum**

(a) 0.35 *mH* (b) 35 *mH* (c) 3.5 *mH* (d) Zero

1. **In a certain circuit current changes with time according to  *r.m.s.* value of current between  to  will be**

(a)  (b)  (c)  (d) 

1. **Match the following**

**Currents *r.m.s.* values**

**(1)  (i) *x*0**

**(2)  (ii) **

**(3)  (iii) **

(a) 1. (i), 2. (ii), 3. (iii) (b) 1. (ii), 2. (iii), 3. (i) (c) 1. (i), 2. (iii), 3. (ii) (d) None of these

1. **The reading of ammeter in the circuit shown will be**

***A***

*R* = 55Ω

***V***

*XL* = 5Ω

110 *V*

*XC* = 5Ω

(a) 2*A*

(b) 2.4 *A*

(c) Zero

(d) 1.7 *A*

1. **An ac source of angular frequency *ω* is fed across a resistor *r* and a capacitor *C* in series. The current registered is *I*. If now the frequency of source is changed to *ω*/3 (but maintaining the same voltage), the current in then circuit is found to be halved. Calculate the ratio of reactance to resistance at the original frequency *ω***

(a) (b)  (c)  (d) 

1. **An *LCR* series circuit with a resistance of 100 *ohm* is connected to an ac source of 200 *V* (*r.m.s.*) and angular frequency 300 *rad*/*s*. When only the capacitor is removed, the current lags behind the voltage by . When only the inductor is removed the current leads the voltage by . The average power dissipated is**

(a) 50 *W* (b) 100 *W* (c) 200 *W* (d) 400 *W*

1. **A virtual current of 4*A* and 50 *Hz* flows in an ac circuit containing a coil. The power consumed in the coil is 240 *W*. If the virtual voltage across the coil is 100 *V* its inductance will be**

(a) *H* (b)  (c)  (d) 

1. **For a series *RLC* circuit *R* = *XL* = 2*XC*. The impedance of the circuit and phase difference (between) *V* and *i* will** **be**

(a)  (b)  (c)  (d) 

1. **In the adjoining ac circuit the voltmeter whose reading will be zero at resonance is**

*R*

***V*1**

***V*2**

***V*4**

***V*3**

*C*

*L*

***V*5**

(a) *V*1

(b) *V*2

(c) *V*3

(d) *V*4

1. **In the adjoining figure the impedance of the circuit will be**

*XL* =30 Ω

90 *V*

*XC* =20Ω

(a) 120 *ohm*

(b) 50 *ohm*

(c) 60 *ohm*

(d) 90 *ohm*

1. **If   then *r.m.s.* value of current is**

(a)  (b)  (c)  (d) None of these

15 *A*

5 *A*

10 *A*

1. **Is it possible**

(a) Yes

(b) No

(c) Cannot be predicted

(d) Insufficient data to reply

1. **In a series circuit  and when the current in the circuit is maximum, at that time the ratio of the energies stored in the capacitor and the inductor will be**

(a) 1 : 1 (b) 1 : 2 (c) 2 : 1 (d) 1 : 5

1. **The variation of the instantaneous current (*I*) and the instantaneous emf (*E*) in a circuit is as shown in fig. Which of the following statements is correct**

*π*

*E*

*I*

*O*

*π*/2

3*π*/2

2*π*

*ωt*

(a) The voltage lags behind the current by *π* / 2

(b) The voltage leads the current by *π* / 2

(c) The voltage and the current are in phase

(d) The voltage leads the current by *π*

1. **The *r.m.s*. voltage of the wave form shown is**

0

*t*

+ 10

– 10

*Y*

(a) 10 *V*

(b) 7 *V*

(c) 6.37 *V*

(d) None of these

1. **The output current versus time curve of a rectifier is shown in the figure. The average value of output current in this case is**

Time

*I*0

Current

(a) 0 (b) 

(c)  (d) 

1. **When an ac source of e.m.f.  is connected across a circuit, the phase difference between the e.m.f. *e* and the current *i* in the circuit is observed to be , as shown in the diagram. If the circuit consists possibly only of *RC* or *LC* in series, find the relationship between the two elements**

*φ*

*i* or *e*

*i*

*e*

(a)  (b) 

(c)  (d) 

1. **Two sinusoidal voltages of the same frequency are shown in the diagram. What is the frequency, and the phase relationship between the voltages**

*M*

*N*

*V*

*O*

*ν*

0.2

0.4

0.8

0.6

Frequency in *Hz* Phase lead of *N* over *M* in radians

(a) 0.4 

(b) 2.5 

(c) 2.5 

(d) 2.5 