

**AMIETE – ET (Current & New Scheme)**

Time: 3 Hours

**JUNE 2016**

Max. Marks: 100

*PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.*

**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

a. A null type of instrument as compared to a deflection type instrument has \_\_\_\_\_

- (A) higher accuracy                      (B) lower sensitivity  
(C) faster response                      (D) all of these

b. The value of capacitance of a capacitor is specified as  $1\mu\text{F} \pm 5\%$ . The guaranteed value of the capacitance is \_\_\_\_\_

- (A)  $0.95\mu\text{F}$                               (B)  $1.05\mu\text{F}$   
(C) between  $0.95\mu\text{F}$  to  $1.05\mu\text{F}$       (D) None of these

c. Kelvin's bridge is used to measure \_\_\_\_\_

- (A) low resistance                      (B) medium resistance  
(C) high resistance                      (D) All of these

d. Maxwell's bridge is used to measure Q factor in the range \_\_\_\_\_

- (A) 1 – 10                                  (B) 30 – 50  
(C) 50 – 75                                  (D) 75 – 100

e. AC measurement is achieved by connecting a / an \_\_\_\_\_ in series with a PMMC.

- (A) resistor                                  (B) diode  
(C) inductor                                  (D) capacitor

f. An integrator contains a  $100\text{K}\Omega$  and  $1\mu\text{F}$  capacitor. If the voltage applied to the integrator input is 1 V, the output voltage after 1 second is \_\_\_\_\_

- (A) 2 V                                      (B) 5 V  
(C) 1 V                                      (D) 10 V

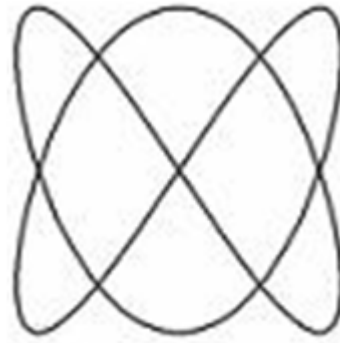
g. Which of the following is correct relation for Lissajous pattern shown in Fig.1

(A)  $f_v = 3f_h$

(B)  $f_v = \frac{3}{2}f_h$

(C)  $f_v = \frac{2}{3}f_h$

(D)  $f_v = 2f_h$



**Fig.1**

h. Wave analyzers are used to measure \_\_\_\_\_

(A) amplitude & phase

(B) phase & frequency

(C) amplitude & frequency

(D) frequency band

i. A circular chart uses principle of \_\_\_\_\_

(A) electrostatics

(B) galvanometer

(C) indicating

(D) self balancing potentiometer

j. Rotameter is a flowmeter based on \_\_\_\_\_

(A) variable area

(B) variable length

(C) variable pressure

(D) variable volume

**Answer any FIVE Questions out of EIGHT Questions.**

**Each question carries 16 marks.**

**Q.2** a. Classify and discuss various types of static errors. **(10)**

b. Explain dynamic characteristics of measuring instruments. **(6)**

**Q.3** a. Draw the circuit of Wheatstone's bridge and derive an equation for the balanced bridge. **(8)**

b. The arms of an AC Maxwell's bridge are arranged as follows:

AB & BC are non-reactive resistors ( $R_3$  &  $R_4$ ) of  $100\Omega$  each, DA a standard variable reactor  $L_1$  of resistance  $32.7\Omega$  and CD consists of a standard variable resistor  $R$  in series with a coil of unknown impedance  $Z$ . Balance was found with  $L_1 = 50\text{mH}$  and  $R_2 = 1.36 \Omega$ . **(8)**

Find (i) resistance  $R$  of the coil and  
(ii) Inductance  $L$  of the coil

- Q.4** a. A 1 mA meter movement having an internal resistance of  $100\Omega$  is used to convert into a multi-range ammeter having the range 0 – 10 mA, 0 – 20 mA & 0 – 50 mA. Determine the value of the shunt resistance required. (8)
- b. Draw and explain the block diagram of True RMS Voltmeter. Give its applications. (8)
- Q.5** Draw block diagram of the following and explain their working. List out their applications.  
(i) Universal Counter.  
(ii) Digital frequency meter. (2×8 = 16)
- Q.6** a. Draw block diagram of Cathode Ray Oscilloscope and explain the function of its various components. (8)
- b. Draw and explain block diagram of a pulse generator. (8)
- Q.7** a. With the help of a neat block diagram, discuss the working of a frequency selective wave analyzer. (8)
- b. Explain measurement of large amount of RF power with suitable diagrams. (8)
- Q.8** Discuss working and applications of the following using block diagram  
(i) Circular Chart Recorder  
(ii) X-Y Recorder (2×8 = 16)
- Q.9** a. What is semiconductor strain gauge? Explain its working principle with a neat diagram. Write its advantages and disadvantages. (9)
- b. Discuss the working of a multichannel analog multiplexed system. (7)