

TECHNICAL OFFICER (ECE)
Descriptive Test (level-2)

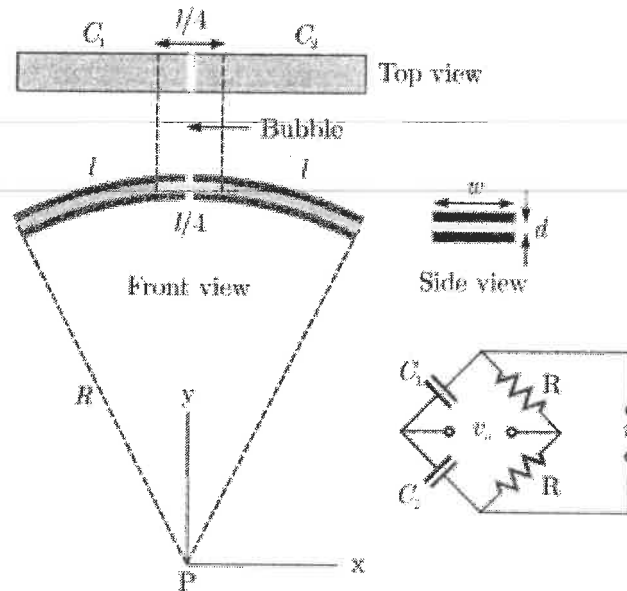
Total Marks: 60
Duration: 120 Minutes

Part A

Answer any 10 Questions (3 Marks each)

1. What is BIOS beep code? Also explain, in AMI BIOS codes what does the following indicate?
 - a. 1 long followed by 2 short beeps
 - b. 1 long followed by 3 short beeps
 - c. 1 long followed by 8 short beeps
2. Comment on Enhanced parallel port/Enhanced Capability port. Which port is used for non-printer peripheral? Also Mention the IEEE Standard of EPP/ECP
3. What do you mean by 100BaseFX? In what way 100Base-FX is different from 100Base-TX
4. What is Ether Type ACL in Cisco ASA Firewall?
5. What is Void Pointer and why is it used in Embedded C? Explain with example
6. How to handle memory fragmentation and garbage collection in embedded systems?
7. What is Null Zero in EIGRP? Explain briefly
8. What is access control list? State the difference between inbound and outbound ACL. What happens if we remove a rule from an Access-list if we are using numbered Access-list?
9. Why does the industry use a 4-20mA standard signal instead of 0-20mA?
10. The figure shows an arrangement for measuring small angular displacements in a vertical plane. A non-conducting tube of length $2l$ and rectangular cross section (width W , height d) is bent along an arc of a circle with radius $R \gg d$, centered at P . Four electrode plates of length l and width W are placed to form two curved parallel plate capacitors C_1 and C_2 with a negligible gap between them. The tube contains water with an air bubble of rectangular cross section (width W , height d) and length $\frac{1}{4}$ the

capacitors are connected in a bridge circuit as shown in the figure, where the bridge has ac excitation V_i . Angular displacement $\Delta\theta$ occurs about the point P.



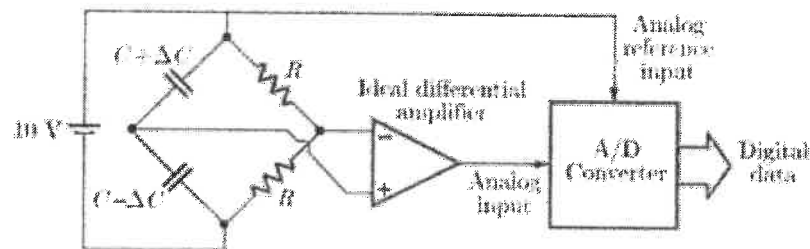
(i) The range of angular displacement (in radians) this system can measure is

- (a) $-\frac{l}{8R} \theta + \frac{l}{8R}$
- (b) $-\frac{l}{4R} \theta + \frac{l}{4R}$
- (c) $-\frac{3l}{4R} \theta + \frac{l}{4R}$
- (d) $-\frac{l}{R} \theta + \frac{l}{R}$

(ii) The sensitivity $\frac{V_o/V_i}{\Delta\theta}$ is

- (a) Inversely proportional to R and I
- (b) Inversely proportional to R and directly proportional to I
- (c) Directly proportional to R and I
- (d) Directly proportional to R and inversely proportional to I

11. A push-pull capacitive displacement transducer is interfaced to a differential amplifier and an ADC shown in the figure below



Note that the bridge supply and the analog reference input for the ADC are derived from the same 10 V DC source

(i) The change in capacitance for full-scale displacement is $\pm 5\%$ for the capacitors. The gain of the differential amplifier for the utilization of the full range of the ADC (which is ± 10 V) is

- (a) 10
- (b) 20
- (c) 30
- (d) 40

- (ii) If the supply voltage to the bridge decreases by 5%, the sensitivity of the measurement system
- (a) Decreases by 5%
 - (b) Does not change
 - (c) Increases by 5%
 - (d) Increases by 200%

12. A 500 A/ 5 A, 50 Hz current transformer has a bar primary. The secondary burden is a pure resistance of 1 ohm and it draws a current of 5A. If the magnetic core requires 250 AT for magnetization, the percentage ratio error is
- (a) 10.56
 - (b) -10.56
 - (c) 11.80
 - (d) -11.80

Part B

Answer any 6 Questions (5 Marks each)

1. The piezometric head in a static liquid is
- a. Remains constant only in a horizontal plane
 - b. Remains constant at all points in the liquid
 - c. Decreases linearly with depth below a free surface
 - d. Increases linearly with depth below a free surface

With relevant expressions and diagrams Justify

2. A resistive strain gauge with a gauge factor of 2.1 is fastened to a steel subjected to stress of 1500 kg/cm^2 . The modulus of elasticity is $2.1 \times 10^6 \text{ kg/cm}^2$. Find strain in the axial direction using Hooke's law
- (a) 7.14×10^{-4}
 - (b) 1.14×10^{-4}
 - (c) 7.14×10^4
 - (d) 7.4×10^{-4}
3. Referring to the commands shown, what command must next be used on the branch router prior to traffic being sent to the router?

```
Hostname: Branch Hostname: Remote
PH# 123-6000, 123-6001 PH# 123-8000, 123-8001
SPID1: 32055512360001 SPID1: 32055512380001
SPID2: 32055512360002 SPID2: 32055512380002
ISDN switch-type basic ni
```

```
username Remote password cisco
interface bri0
IP address 10.1.1.1 255.255.255.0
encapsulation PPP
PPP authentication chap
ISDN spid1 41055512360001
ISDN spid2 41055512360002
dialer map IP 10.1.1.2 name Remote 1238001
dialer-list 1 protocol IP permit
```

4. **Why Port numbers is required? Comment on TCP and UDP protocol.** Also, Mention the **Port numbers** of TCP and UDP Protocol listed below

TCP

- File Transfer Protocol (FTP) --- ?
- Hypertext Transfer Protocol (HTTP) --- ?
- Hypertext Transfer Protocol Secure (HTTPS) --- ?
- Secure Shell --- ?
- Telnet --- ?
- Simple Network Management Protocol (SNMP) --- ?
- SMTP --- ?
- DNS --- ?
- Internet Message Access Protocol (IMAP) --- ?
- Border Gateway Protocol (BGP) --- ?

UDP

- Domain Name System (DNS) --- ?
- Dynamic Host Configuration Protocol (DHCP) --- ?
- Trivial File Transfer Protocol (TFTP) --- ?
- Network Time Protocol (NTP) --- ?
- Simple Network Management Protocol (SNMP) --- ?

5. Can you explain the difference between Cat5e, Cat6, and Cat7 cabling?
6. How to apply data validation in MS Excel? What are functions of VLOOKUP(), HLOOKUP(), IF() in Excel?
7. **(i) Consider the following statements about process state transitions for a system using preemptive scheduling.**
- I. A running process can move to a ready state
 - II. A ready process can move to a ready state
 - III. A blocked process can move to a running state
 - IV. A blocked process can move to a ready state

Which of the above statements is TRUE?

- (A) I, II, and III only
- (B) II and III only
- (C) I, II, and IV only
- (D) I, II, III, and IV

(ii) A process executes the code

```
fork ();
```

```
fork ();
```

```
fork ();
```

The total number of child processes created is -----

(A) 3

(B) 4

(C) 7

(D) 8

8. Explain IEEE 802.11 wireless standard in detail. Also mention which standard specifies WLAN security.