

Instrumentation & Control

College of Engineering, Pune
Final Year – Instrumentation & Control
IE 415 – Building Automation
End Semester

Timing: 3 hrs
 Max. Marks: 50

Academic Year: 2012- 13

Instructions:

1. All Questions are compulsory & carry equal Marks
2. Assume suitable data
3. Draw neat diagrams wherever necessary
4. Use of non programmable calculators are allowed

| | | Marks | | | | | | | | | | | | | | | |
|--------------------|---|----------|----------|----------|--------------------|-----|----|---------------|----|----|----------------|----|----|-----------------|----|----|----|
| Q. 1 | <p>A corporate company is having office at two different places in the same city. Distance between the two offices will be around 10 km. Design an EPBX and integrated PA system for the facilities with following requirements.</p> <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 35%; text-align: center;">Office 1</th> <th style="width: 35%; text-align: center;">Office 2</th> </tr> </thead> <tbody> <tr> <td>Total extensions :</td> <td style="text-align: center;">100</td> <td style="text-align: center;">80</td> </tr> <tr> <td>Analog sets :</td> <td style="text-align: center;">60</td> <td style="text-align: center;">45</td> </tr> <tr> <td>Digital sets :</td> <td style="text-align: center;">25</td> <td style="text-align: center;">15</td> </tr> <tr> <td>IP based sets :</td> <td style="text-align: center;">15</td> <td style="text-align: center;">20</td> </tr> </tbody> </table> <p>EPBX System should be expandable up-to 300 users. Trunk Interface supported: Analog Trunk lines - 20, ISDN BRI/PRI lines -3, IP trunks lines (H323/SIP) – 2 User Interface supported: Digital Sets, Analog Sets, IP phones (IP Key phones / Soft phones) , SIP Phones (SIP desk phones / soft phones)</p> <p>System should have call forwarding, caller ID, click to dial from user interface, Pop-up of incoming calls with caller ID on ISDN line. List of incoming/outgoing and answered/unanswered calls, MS outlook to dial from Outlook contacts, 8 hours of recording time expandable up-to 200 hours. Should allow notification on mobile and Conference calling</p> <p>PA system should get directly connected to EPBX. Each office requires 25 speakers, 10 microphones and amplifiers as per requirement.</p> <p>List down all required hardware and software design specifications. Prepare a concept diagram.</p> | | Office 1 | Office 2 | Total extensions : | 100 | 80 | Analog sets : | 60 | 45 | Digital sets : | 25 | 15 | IP based sets : | 15 | 20 | 15 |
| | Office 1 | Office 2 | | | | | | | | | | | | | | | |
| Total extensions : | 100 | 80 | | | | | | | | | | | | | | | |
| Analog sets : | 60 | 45 | | | | | | | | | | | | | | | |
| Digital sets : | 25 | 15 | | | | | | | | | | | | | | | |
| IP based sets : | 15 | 20 | | | | | | | | | | | | | | | |
| Q. 2 | <p>A fire and alarm system is to be designed for a hotel. There are total 3 floors each having area of 3500sq ft. Ground floor has reception and waiting lounge of 1500 sq ft. 800 sq ft. kitchen and 1200 sq ft. restaurant. All above floors have 10 rooms and 500 sq ft. corridor.</p> | 10 | | | | | | | | | | | | | | | |

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| | <p>Half of the basement is used for parking vehicles and remaining half is used for storage for food, grains and LPG cylinders.</p> <p>Develop Fire & Alarm system for the hotel with detailed specifications of components like sensors, actuators and control panels.</p> | |
| Q. 3 | <p>In commercial building, there are total 5 floors with parking in ground floor. There are about 15 shops/ offices on each floor and 500 sq ft open corridor on each floor. There are 2 escalators for each floor and 4 lifts.</p> <p>On weekdays, there are total 300 people working 9:30am to 6:30 pm. Daily around 400 visitors to the building at different times. On weekends, 30 visitors and around 50 full time people are expected.</p> <p>Design a surveillance system for the building which has got 2 opening from parking and other 2 from first floor. The building should under surveillance over internet without hampering security.</p> <p>Other systems like HVAC, F&A, lighting control and access control are already in place. Design Energy Management System to make efficient usage of energy for offices or shops. Specify test points, hardware and user interface for EMS to be implemented.</p> | 15 |
| Q.4 | <p>Write short note on</p> <ol style="list-style-type: none"> 1. Compare DAC, MAC and RBAC in access control 2. Typical source and delivery components used in HVAC | 10 |