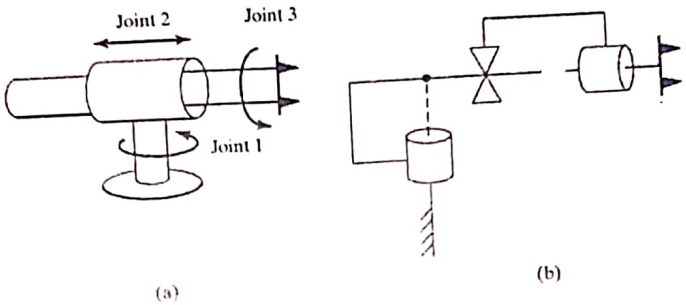
Department of Computer Science and Engineering
Mawlana Bhashani Science and Technology University
Course Code: CSE 3213, **Course Title**: Robotics, **CT-02**
Time: 50 Minutes **Full Marks**: 20

1. Define the term ***"link parameters"*** in terms of the ***"link frames"***. [2]

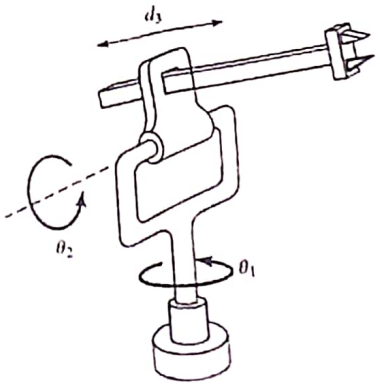
2. **Figure (a)** shows a robot having three degrees of freedom and one prismatic joint. This manipulator can be called an ''**RPR mechanism**,'' in a notation that specifies the type and order of the joints. It is a ''cylindrical'' robot whose first two joints are analogous to polar coordinates when viewed from above. The last joint (joint 3) provides ''roll'' for the hand. **Figure (b)** shows the same manipulator in schematic form. Assign link frames to the mechanism and give the **Denavit–Hartenberg parameters**. [8]



(a) (b)

3. Define subspace. Make a list of factors that might affect the accuracy of a manipulator. [3]

4. Consider the **RRP manipulator** shown in the following figure. Determine how many solutions are possessed by the inverse kinematic equations. [3]



5. Discuss about the algebraic approach to the solution of inverse kinematic problem of a simple planar three-link manipulator. [4]

Dept. of CSE, MBSTU, CSE-3203 STUDENT_ID- CE21004

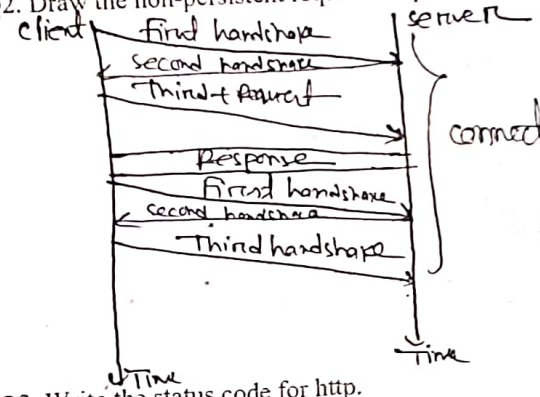
Q1. Explain the procedure to find the socket address for client site/server site.

socket address = IP address + port number — 32 bits + 16 bits

In both client and server site IP address is generated by the own server.

Client side: Ip address generated by client server computer and then requested port Number of the server.

Q2. Draw the non-persistent request- response connection for http.



Q3. Write the status code for http.

100 — Informational
200 — succesfull
300 — Redirectional Message
400 — client response
500 — server response

Q4. Mention the role of control and data connection of FTP.

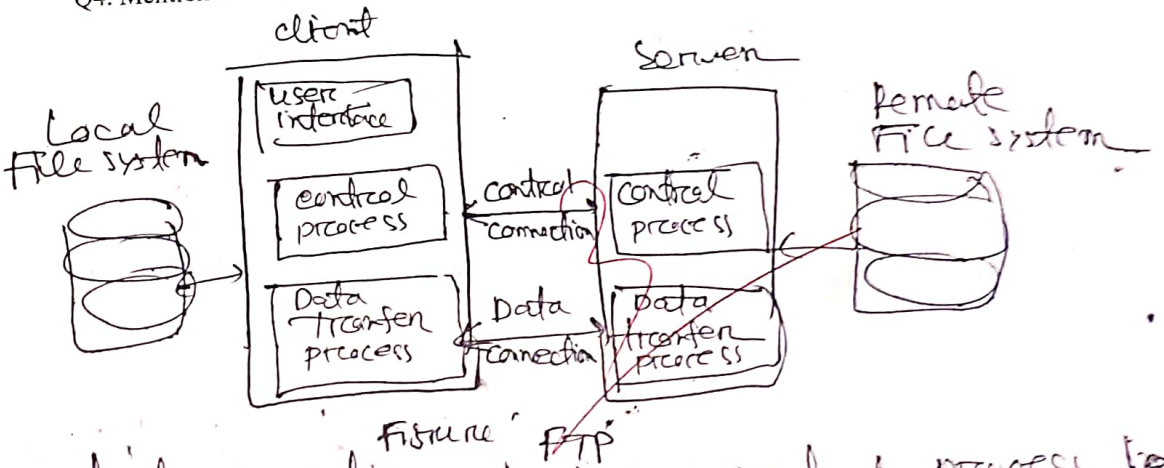


Figure: FTP

control connection used among control process between server and client side. (port 21)

Data connection use among data transfer process between client and server side.

Q5. Name the protocols used in e-mail.

Protol used in email : (i) SMPTP (simple mail transfer protocol)
(ii) POP (post office protocol)
(iii) IMAP (Internet mail access protocol)

Q6. For DNS protocol Domain and Zone are same-Justify.

DNS port -53,
Zone is portion of domain controlled by DNS server.
Domain access internet centralized by authority and guidelines.
DNS protocol Domain and Zone are same if there is no subdomain.

Q7. Show the steps for DHCP communication.

Four steps required

step-1: client DHCPDISCOVER server
step-2: client DHCPOFFER server
steps: client DHCPREQUEST server
step4: client DHCPACK server

Q8. Explain BitTorrent protocol.

Bit torrent is p2p protocol used for sharing large file among group of peers.

Content of :
1. Tracker
2. Meta info file
3. Seeders
4. Leechers
5. peers
6. pieces

(1) Tracker: Server keep tracking all peers ajoining in sharing file
(2) Meta Info file: small file contain meta data of sharing resources.
(3) Seedars: peers who have file & and to be shared
(4) Leechers: Peers who have downloaded file but don't have full of file.
(5) Peers: & Of all peers joining in file sharing
(6) pieces: split file into chunks.

Department of Computer Science and Engineering, MBSTU

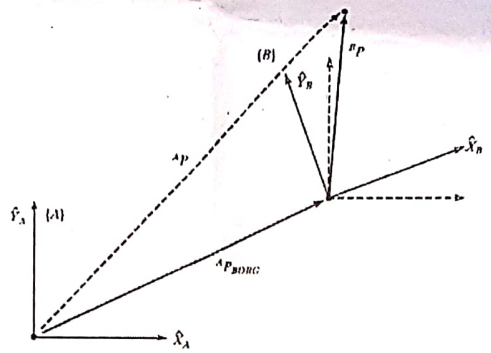
Class Test-02, Year:3rd, Semester:2nd

Course Code: CSE 3205, Course Title: Computer Graphics, Marks: 20, Time: 40 Minutes

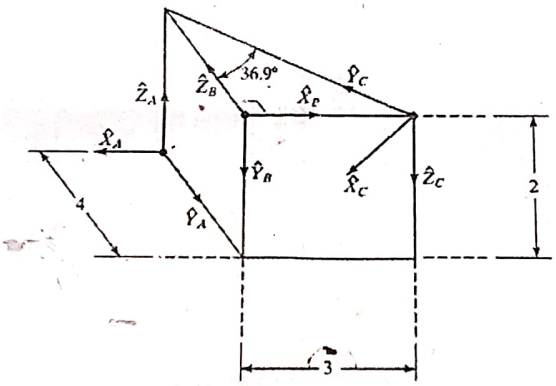
1. Magnify the triangle with vertices $A(0,0)$, $B(1,1)$ and $C(5,2)$ to twice its size by keeping the vertex $C(5,2)$ fixed. *5*
2. Define rotation. Briefly explain *2-D* rotation using appropriate equations, matrices and figures. *4*
3. Specify the steps required for rotation of any object in *3-D* space which is arbitrary to one of the coordinate axes. *3*
4. Define Look and Up Vectors. Briefly explain how we can specify the viewing coordinate system in *3-D* space. *4*
5. Find the perspective projection onto the view plane $z=d$ where the center of projection is the origin $(0,0,0)$. *4*

Department of Computer Science and Engineering, MBSTU
Class Test-01, Year:3rd, Semester:2nd, Course Code: CSE 3213, Course Title: Robotics
Marks: 20, Time: 50 Minutes

1. Define the following terms: [3]
   i. Frames,
   ii. Degrees of Freedom, and
   iii. Workspace and trajectory.
2. The following figure shows a frame{B}, which is rotated relative to frame {A} about $\hat{Z}$ by 30 degrees, translated 10 units in $\hat{X}_A$, and translated 5 units in $\hat{Y}_A$. Find ${}^{A}P$, where ${}^{B}P$= [3.0 7.0 0.0]^{T} [5]



3. From the following figure, derive the transform equation of ${}^{A}_{C}T$. [3]



4. Define roll, pitch, yaw angles. Describe the concept of equivalent angle-axis representation. [4]
5. Another set of three coordinates that can be used to describe a point in space is spherical coordinates. The three coordinates are defined as illustrated in Figure (a). The angles α and β can be thought of as describing azimuth and elevation of a ray projecting into space. The third coordinate r, is the radial distance along that ray to the point being described. Calculate the Cartesian coordinates of the point ${}^{A}P$ in terms of the spherical coordinates α, β, and r. [5]

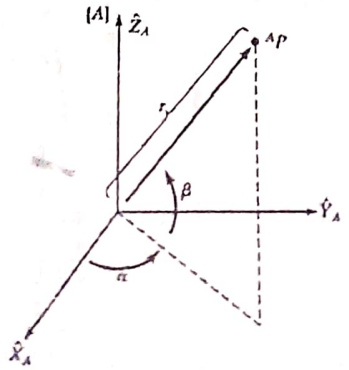


Figure (a): Spherical coordinates