1.1 Introduction

The primary goal of any library is to provide an effective combination of print, non-print and electronic resources to the users to meet their information requirements thoroughly. It is a fact that the information resources available in libraries be used systematically and thoroughly where in educate the users from time to time is an important activity. Out of all, the electronic resources are playing a vital role in information dissemination in contemporary librarianship. Therefore, there is a need to formulate a separate electronic resources collection development policy to access, interface, technical support and licensing. The growth of electronic resources is also in multifold. The policies would help the librarians to select such electronic resources that would be easily accessible and have no licensing problems etc.

After advent of Dialog in 1960’s the growth of computer based bibliographic resources are being increased and influenced the library collection thoroughly. In 1980’s, the development of online and CD-ROM databases took place. The World Wide Web appeared in the early 1990’s and created a radical change in the use and access of information, later meta database searching, link resolves, open URL standards etc, have emerged. These developments paved the librarians shift from print based to electronic resources in order to meet the information expectations of users. Consequently, the acquisition of electronic resources is increasing and created new challenges in workflow management.
and planning, selection and acquisition procedures, copyright and license negotiation, cataloging practice, public access interfaces and usage statistics. It became imperative to libraries to evaluate, acquire, store and manage the wealth of electronic resources. The proliferation of electronic resource management systems (ERMS) presents an additional challenge for libraries that must now develop in-house resource management solutions or acquire one of a myriad of emerging turn-key solutions and implement them in an evolving organizational setting. Therefore, management of electronic resources became an important aspect in contemporary libraries. The issues involved in acquisition of information resources, cataloguing and processing, shelving and circulation of books and electronic resources are not same. The work flow of management of electronic resources is totally different to traditional resources (Books).

The electronic resources are available in different formats and each format may require different infrastructure to tap the information from them. The planning processes of electronic resources encompass policy making, budgeting and staffing. In electronic resources, the librarians have to go for setting up trails, license negotiations, authentication, trouble shooting, evaluation and renewal. The work flow of electronic resources starts from making the resources available to users to renewal or cancellation of the resources. To make use of the electronic resources thoroughly, the communication technology should also be applied accordingly. Therefore, a kind of awareness on latest communication technologies is necessary to library professionals. In engineering college libraries, the growth of electronic resources is quiet significant for reasons like the
availability of Information communication technology economically and user friendly.

1.2 History and Development of Engineering Education in India

Engineering education in India has seen tremendous growth over the past decade, both in number of students and colleges. The recent growth in Indian engineering education has been overwhelming due to privately funded educational institutions came forward to establish engineering colleges rather than public funded ones. Engineering education started in India during the British era. In India, the first engineering college was established at Roorkee known as Thomson Engineering College in 1847. In early times, emphasis was laid on Civil Engineering.

As per the All India Council for Technical Education (AICTE) 4,01,791 engineers passed out from different engineering institutes or colleges in 2003. The number increased to 4,64,743 in 2004-05. Engineering colleges in India have been growing at 20 per cent per year. Five Indian states Viz., Tamil Nadu, Andhra Pradesh, Maharashtra, Karnataka and Kerala account for 69 per cent of India’s engineers and Uttar Pradesh, Bihar, Gujarat, Rajasthan and Orissa account for only 14 per cent.

India has the potential to be a global technology leader. Indian industry is competing globally in software and even in areas such as automobiles, chemicals and engineering equipment. A critical issue for the future success of Indian industry is the growth of engineering education in India. Since
independence, the initial focus of government policy was to provide the engineering graduates required for the development of economy. The setting up of the Indian Institutes of Technology, the Regional Engineering Colleges (and their subsequent conversion to the National Institutes of Technology) was targeted at achieving this. Indian engineers established their reputation for engineering and design skills. Engineering in India is preferred option for bright students at the 10+2 level. This has resulted in a spurt in engineering colleges, primarily in the private sector. Despite this, industry leaders complain about the absence of quality engineering graduates for their industry. This is accompanied by significant unemployment rates amongst graduating engineers. India awarded about 2.3 lakhs engineering degrees, 20000 engineering masters’ degrees and about 1000 engineering Ph.D’s in 2006. India’s doctorate degrees are less than 1% of graduate engineering degrees. The percentages of doctorate degrees to engineering degrees are much higher for most of the other countries studied (9% USA, 10% UK, 8% Germany, 3% Korea).

A comparison of a few select Indian institutions – an Indian Institute of Technology, a National Institute of Technology and a private engineering college reveals some interesting results. An international comparison shows that most Indian institutions have not effectively evolved from under-graduate teaching institutions for teaching and research institutions. One of the biggest advantages of the top engineering colleges in India is the high selectivity – approximately 2-3% of the applicants are selected. This is much lower than reputed international universities. However the engineering education system has been unable to
attract the best engineering students towards post-graduate studies. The IITs and IISc contribute to less than 1% of the engineering graduates, 20% of the M.Techs and 40% of the Ph.Ds in the country. Only about 1% (or less) of the B.Tech graduates from IIT’s opt for M.Tech in India, while only 2% of the graduating M Tech class opt for Ph.D in India. About 75% of the engineering graduates are taught at the private engineering colleges.

There is large number of private engineering colleges in India. More than 90% of the private engineering colleges are affiliated to universities, which have little academic autonomy. The existing administrative structure and nature of private colleges results in very little financial autonomy with regulated fees and salaries accounting for 80% of the budget. A comparison of the Indian engineering colleges with some of the leading institutions of the world shows that it is possible for institutions to have student to faculty ratio of 15:1 or more and yet maintain a significant research output. Most of the Indian institutions are improving their research output but far below the norms attained by some of the best international institutions. The challenge for our engineering education system is to make the transition from primarily teaching institutions to teaching and research institutions. Developed a normative scenario that increases the output of quality engineering graduates from Tier 1 (IITs, IISc) and Tier 2 (NITs) institutions and increases the engineering Ph.D. output to 10,000 per year. This would involve the launch of a National Ph.D. initiative. A series of initiatives are required to attract the brightest students to pursue research. This would need partnerships and commitment from industries, strengthening existing Ph.D
programmes and research facilities and facilitating quality jobs for the doctoral students. One of the biggest constraints for the development of engineering education in the country is the shortage of quality faculty. This is linked to the issue of less number of Ph.D’s, salaries and incentives for engineering educators. There is a need for the industry, government and academia to formulate a strategy for engineering and science education in India.

1.3 Engineering Education in Andhra Pradesh

Andhra Pradesh was formed as a separate state in 1956. The main objective of the education system in the state has been that it should be firmly linked at all the levels to science and technology. The structure of education in the state is 10+2+3 which was recommended by Kothari commission.

In the developing countries like India, the engineering and technological professionals have to play a crucial role in industry and agriculture. It is a well known fact that economic development relies on industrial development which needs engineering and technological manpower. There are three technological universities in Andhra Pradesh. They are located at Hyderabad (JNTU-H) Anantapur (JNTU-A) and Kakinada (JNTU-K) to develop manpower in order to meet the above objectives.

In addition to these, Jawaharlal Nehru Architecture and Fine Arts University were established and located at Hyderabad. Further Sri Venkateswara University- College of Engineering, Andhra University-College of Engineering, Osmania University-College of Engineering, Yogi Vemana University-College of Engineering, Kakatiya University-College of Engineering, Sri Krishnadevaraya
University-College of Engineering, Acharya Nagarjuna University-College of Engineering and Sri Padmavati Mahila Viswavidyalayam-School of Engineering and Technology are also offering undergraduate, postgraduate and doctoral programmes in engineering and related subjects. The private universities namely GITAM University, K L University and Vignan University are also offering undergraduate and postgraduate courses on similar lines. The National Institute of Technology, Warangal and Indian Institute of technology, Hyderabad are offering engineering education at different levels.

The growth of engineering colleges in Andhra Pradesh is quiet significant and ahead of many states of India. In order to attract students to engineering courses and compete at global level, the engineering colleges need to maintain standards. Therefore, in the recent past considerable efforts have been put forth to develop acceptable and maintainable standards for engineering education. In this context, the role played by AICTE is laudable. The AICTE is a constituted a body at national level know as ‘National Board of Accreditation’ (NBA) to provide norms and guidelines for engineering colleges to maintain standards in engineering education.

In total, there are 711 engineering colleges in Andhra Pradesh. The district wise distribution of these colleges is shown in table.
<table>
<thead>
<tr>
<th>S.NO.</th>
<th>DISTRICT</th>
<th>NO OF COLLEGES</th>
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<td>2</td>
<td>Anantapur</td>
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<tr>
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<td>Chittor</td>
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<td>East Godavari</td>
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<td>Guntur</td>
<td>53</td>
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<td>Hyderabad</td>
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<tr>
<td>23</td>
<td>West Godavari</td>
<td>33</td>
</tr>
</tbody>
</table>

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1.4 All India Council for Technical Education (AICTE)

The quality of engineering education was supervised by the Board of the All India Council for Technical Education (AICTE)\(^2\) which was set-up in November 1945 as a national level Apex Advisory Body to conduct survey on the facilities on technical education and to promote development in the country in a coordinated and integrated manner by Government of India. It prescribes standards to be maintained, acts as an authority for planning, formulation and maintenance of norms and standards, quality assurance through accreditation, funding in priority areas, monitoring and evaluation, maintaining parity of certification and awards and ensuring coordinated and integrated development and management of technical education in the country. It has the responsibility for the approval of courses and takes appropriate steps to promote engineering and management education.

The AICTE Bill was introduced in both the Houses of Parliament and passed as the AICTE Act No. 52 of 1987. The Act came into force with effect from March 28, 1988. The statutory All India Council for Technical Education was established on May 12, 1988 with a view to proper planning and coordinated development of technical education system throughout the country, the promotion of qualitative improvement of such education in relation to planned quantitative growth and the regulation. Proper maintenance of norms and standards in the technical education system and for matters connected therewith.

The purview of AICTE covers program of technical education including training and research in Engineering, Technology, Architecture, Town Planning,
Management, Pharmacy, Applied Arts and Crafts, Hotel Management and Catering Technology, etc. at different levels. It approves new courses, new institutions and regularly monitors their operations. To meet the objectives of engineering education the AICTE formed a body known as National Board of Accreditation.

1.5 National Board of Accreditation

The engineering education in India is developing at considerable speed in order to develop manpower in engineering and technology areas. Subsequently, a number of engineering institutions are established to meet their endeavors. Along with the development of engineering institutions, there is a need to maintain minimum and acceptable standards in order to offer a qualitative engineering education. Unless these steps are taken, the developed engineering product would not get due recognition at National and International level. Subsequently, the AICTE (All India Council for Technical Education) a body responsible for development of engineering and technical education in India, thought of developing guidelines and norms for qualitative engineering education. This idea gave birth to establishment of NBA (National Board Accreditation). Though the accreditation is not mandatory for engineering colleges but many engineering colleges in Andhra Pradesh are preferring to get NBA for obvious reasons like credibility, employment for their products and financial benefits, etc. So the accreditation is a finishing touch of the quality assurance system in meeting high quality standards, implementing a continuous process and ensuing
Accreditation helps the institution to attract the student at National and International level.

According to NBA the accreditation means “a process of quality assurance, giving credit where it is due for some clearly visible and demonstrable strategies of academic activities and objectives of the institutions, known to be honestly pursued and efficiently achieved by the resources currently available with a potential for continuous improvement in quality for effective growth”.

The objectives of National Board of Accreditation

- To assist all the stakeholders in technical education (like parents, students, teachers, educational institutions, professional societies, potential employers, government agencies) in identifying those institutions and their specific programmes which meet the norms, standards and other quality indicators specified from time to time.

- To provide guidelines to the technical institutions for the desirable upgradation of existing programmes and for the development of new programmes.

- To encourage the maintenance of a standard of excellence and to stimulate the process of continual improvements in technical education in the country. NBA aims to recognize and acknowledge the value addition in transforming the admitted raw student into a capable engineer having sound knowledge of fundamentals and acceptable level of professional and personal competence for ready employability in responsible engineering assignments.
The NBA accredited professional institutions offering the following subject areas.

- Engineering and Technology
- Management
- Architecture
- Pharmacy
- Hotel management
- Town and country planning
- Applied Art and Crafts.

The NBA is playing a very vital role in development of engineering college libraries too. Due to NBA norms, the engineering college libraries can provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the lifelong learning needed for successful professional career.

1.6 Engineering College Libraries

The library is regarded as the ‘nerve centre of knowledge’, the centre of intellectual life and the heart and soul of the academic institution. This means that discoveries and developments are actually made in the library and subsequently tested in the laboratory. It occupies an important place in the modern education system and maintains the expensive educational resources of the academic institutions. It is the responsibility of the staff of engineering and technical libraries to provide right information at the right time to right user to save the time of the user. The libraries are primarily responsible for the selection and collection of material suitable for libraries, preservation and organization of
the collection and dissemination of the material or the information, which it contains. Libraries as centre of learning are playing an important role in sustaining and satisfying the information requirements of parent institutions. For the efficient, effective and scientific development of information resources and services, the libraries need to be designed and developed systematically.

Engineering college libraries like any other college libraries are affiliated to the institutions that contribute primarily to the teaching and learning process by providing various kinds of information and learning resources to the clientele for their successful persuasion of the course programs offered by the institution. AICTE has framed elaborate norms for libraries of the engineering colleges offering different technical courses. For an institution, offering P.G.courses, the position of librarian is placed under the technical support staff. It further prescribes that the library should be provided with necessary staff to enable to provide services to staff and students for at least 12 hours in a day. It also suggests that the library should consist of one librarian, one assistant librarian and four library assistants for minimum strength of 240 intake. AICTE has also recommended that the central library of the institution for admission of 240 students per year should have a carpet area of 400 sqm. There shall be a seating capacity for 25% of the total students admitted in the institute. At the time of establishing an engineering institute with three branches, there should be a minimum of 4000 volumes in library, i.e. each branch should have 250 titles with four multiple copies. It further requires that in subjects like Mathematics, Humanities, Physics and Chemistry etc., there should be total of 1000 volumes.
The library should have facility of at least two computers offering digital contents with networking and multimedia facilities. Apart from this, there should be a minimum of 9 technical journals (6 Indian and 3 international) for each branch of engineering.

1.6.1 Objectives of Engineering College Libraries

A library plays a pivotal role in ensuring the success of higher degree of Engineering and Technology. The important activities of engineering college libraries include the Collection Development, Reference Service, Circulation, Document Delivery, User Education, Access to Electronic Resources, etc. Engineering college libraries are expected to provide cost effective and reliable access to information using the state-of-the art information technology tools. The basic objective of the Engineering college library is to be a dynamic instrument for explaining the expanding horizons of knowledge. The library endeavors to make the legitimate needs and demands of the patrons, from the senior academics engaged in advance research to the fresh entrant stimulate and encourage students to develop the lifelong habits of good reading, study and research and to be the centre of Engineering college for educational and scholarly pursuit. The engineering college libraries are established with the following objectives:

- Conservation of knowledge amassed from times immemorial,
- Dissemination of this knowledge through teaching and publication.
- Extension of the bounds of knowledge through Technological work by students and teachers, and
- Helping the students and the taught to achieve their technical degree.
An Engineering college library is no longer a part of an ivory tower. It is a potential service oriented institution, accountable for every aspect of its performances. The fundamental role of the library is to support the education to which it is attached. It should not be operated as a mere storehouse of books attached to a reading room, but as a dynamic instrument of education.

1.6.2 Functions of the Engineering College Library

- To acquire, process, organize and make available varied types of reading materials for meeting the needs of different levels of user;

- To guide students and provide them the resources useful for enhancement of technical projects;

- To keep the faculty members informed of the latest amount of resources in their fields of specialization;

- To establish an information centre in library and render reader advisory services as to enable them to make use of library resources;

- To adopt new technology, e.g. computerization in certain areas with a view to provide purposeful service in minimizing possible time; and

- To keep the authorities informed of the achievement and literary output of the institute, while to seek support and financial assistance.

Information technology has revolutionized the information handling activities in the engineering college libraries during the past few years. The information society demands that all the relevant technologies, that are involved in information processing, consolidation, repackaging and retrieval be merged so as to evolve an integrated system and capable of providing diversified services. In this direction, the automation of individual engineering college libraries is a first step rather a pre-requisite for the development of such an integrated engineering college library and information system. The promising trend in the development
of information services with effective networking of these libraries will facilitate the optimum utilization of information resources.

1.7 Resources in Engineering College Libraries

The resources in any engineering college library can be broadly grouped into two i.e. print and electronic formats. The following are the some of the examples of Print Form-Books, Hardcopies of Periodicals, Back Volumes of Periodicals, Question Papers, Reports, Directories, Project Reports, Newspapers, Newsletters, etc.,

For various reasons, the engineering college libraries are acquiring and subscribing electronic resources besides print versions. Due the availability of information and communication technology, the librarians could think for electronic resources to satisfy the information requirements of users. Now the concept of information provision to users is shifted from information availability to information access. Therefore, there is no option left to library professionals except going for electronic resources. The electronic resources have a variety of advantages which provoked the library professionals to incorporate them in library collections. The following are the some of the resources in electronic format; E-Databases, E-Journals, E-Magazines, E-Books, E-Lectures, E-Audios, E-Music, E-News, E-Images, E-Subject Guides, E-Newsletter, E-Conference Proceedings, E-Reports, E-Studies, E-Interesting Development and E-Directories.
1.8 History and Development Electronic Resources

Over the past few years, a number of techniques about related standards have been developed which allow documents to be created and distributed in electronic form. The e-resources on magnetic and optical media has a vast impact on the collections of engineering college libraries. Electronic publishing has lead to new era of communications and information sharing. It creates opportunities for users as well as authors and publishers. Many of the electronic books or electronic publisher’s web site freely permit and encourage the readers to provide feedback on works, often directly to the author rather to the publisher. Nevertheless, users may establish their own accounts, charge services to credit cards or to pay by pre-arranged method and have requested to deliver material directly to them by fax, e-mail, etc. Today, libraries of all kinds have been spending larger and larger shares of their budgets to adopt or gain access to electronic resources from publishers and vendors. This is the fact that e-resources have enabled libraries to improve services in a variety of ways. First, most e-resources come equipped with powerful search and retrieval tools that allow users to perform literature searches more effectively and efficiently. Moreover, since most relevant e-resources are now available through the web, users can have desktop access to them, 24 hours a day. There are several forms and types of electronic resources which are available on the internet, some of the popular ones that are gaining ground are the electronic journals, standards, technical specifications, reports, patents, full text articles, trade reports and hosts of other document sources. Also the printed editions of scholarly journals are
available on the web. The publishers of journals are themselves providing services like contents, abstracts of articles, full text, before the actual printed edition is put on the stands. Majority of this kind of service providers are those publishers who have several journal publications to their credit.

1.9 Concept of Electronic Resources

Due to the developments taking place in information and communication technology, a variety of information sources are appearing besides print media. In contemporary librarianship the acquisition and subscription of electronic resources became important and unavoidable. These resources have advantages over print format which encourages the libraries to move towards digital and electronic sources. The library professionals too accepted and recognized the importance of potential use of these resources for which computers and computer technology is mandatory. The beginnings of electronic resources can be traced back to 1960’s with the development of Machine Readable Catalogue format. Almost, at the same time the bibliographic databases became available. The development of computers also encouraged the use of electronic resources in libraries. In 1990, the World Wide Web was created by Tim Berners Lee, this facility encouraged the use of electronic resources in libraries. Consequently web based electronic resources and their use begins in the mid 1990’s. Libraries offered Web-based catalogues, bibliographic and full-text databases, electronic journals and eventually electronic books through the Web. Patrons no longer had to go to the library to do a significant amount of their research. To satisfy the five laws, as enunciated by
Ranganathan, the use of electronic resources through which a variety of information services should be offered. The developments of technology during 20th century are convenient, economical and user friendly. As a result the libraries are coming forward to move towards electronic resources.

1.10 Definitions of Electronic Resources

An electronic resource is defined as a resource which requires computer access or any electronic product that delivers a collection of data, be it text referring to full text bases, electronic journals, image collections, other multimedia products and numerical, graphical or time based, as a commercially available title that has been published with an aim to being marketed. These may be delivered on CD-Rom, on tape, via internet and so on.

According to AACR2, 2005 Update, an electronic resource is: "Material (data and/or program(s)) encoded for manipulation by a computerized device. This material may require the use of a peripheral directly connected to a computerized device (e.g., CD-ROM drive) or a connection to a computer network (e.g., the Internet)." This definition does not include electronic resources that do not require the use of a computer, for example, music compact discs and videodiscs.

1.11 Features of Electronic Resources

E-resources have some distinct features which differentiate them from traditional resources. E-resources on the Internet are further distinct by the nature of the information on the net itself.

(a) High compact storage;
(b) Ease of reproduction, multiplication, manipulation and transmutation;
(c) Contents can be very easily detached from its media or container;
(d) Ease of migration of contents from one medium to another;
(e) Ease of transmission, communication and storage;
(f) Hypertext and multimedia;
(g) Seamless integration of print and electronic resources;
(h) Sophisticated and multipronged searches through keywords, free text, Boolean operators, less numbers and natural languages processing;
(i) Wall less libraries leading to the vision of multimedia global virtual library (MGVL) inaugurating an era of “Death of distance”; and
(j) Convergence of technology, which is getting more powerful each day.

1.12 Advantages of Electronic Resources

For the following advantages the E-Resources are procured:

- Easy usability,
- Readability,
- Budgetary aspects and speedy accessibility,
- Easy back file access.

In addition to the above, the following are the added advantages of e-resources:

- Multi-access: A networked product can provide multiple points of access (in the campus) at multiple points in time (24X7X365) and to multiple simultaneous users.
- Speedy retrieval: An e-resource is lot quicker to browse, to extract and to integrate the information into other material and to cross refer between various publications.
- Functional aspects: E-resources will allow the users to approach the publication in order to analyze its content in various new ways and techniques by click of the mouse on search button.
- Content analysis: The E-resources contain a vast amount of information, but more importantly in a mixed format mode i.e. images, video, audio and animation which could not be replicated in print.
• Consortia mode: The E-resources can be subscribed in a consortia format too, thus cutting down the costs but reaping the same benefits. eg. INDEST Consortia for Engineering College Libraries.

• Interactivity: Articles/issues/chapters can be read, commented by the readers, amended quickly and greater feedback can be given through the web.

• Hypertext: Format can be used and links to related articles, or other web sites, & URLs for individual articles and email alerts when latest issue/edition is Uploaded can be got.

• Virtual reality: Advantages taken on the web is to add value by using animation, virtual reality and interactive physical & mathematical charts.

• Flexibility: Resources are evolved quickly i.e. they are not bound to any format, printer, and distribution network.

1.13 Sources of Electronic Resources

The following are the sources for accessing E-Resources in engineering college libraries:

• Online Catalogue.
• Machine readable catalogue.
• Online Public access catalogue.
• Web-Based catalogue.
• Bibliographic databases.
• CD-Rom databases.
• Web based databases.
• On-line databases.
• Electronic serials/Journals.
• Electronic books/thesis.
• E-Learning resources (Video lectures)
• Consortia
1.14 Open Access Electronic Resources

Open access resources can be defined as resources that use a funding model that does not charge readers or their institutions for access. According to Budapest Open Access Initiative (BOAI), the term ‘open access’ refers to its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, link to the full texts of these articles, use them for indexing, pass them as data to software, use them for any other lawful purpose, without financial, legal or technical barriers. The only constraint on reproduction and distribution and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

Some popular Open access journal sites:

1. Directory of Open Access Journals (DOAJ)
(http://www.doaj.org/doaj?func=loadTempl&templ=about&uiLanguage=en)

The Directory of Open Access Journal is a one stop shop for users to access several scientific and scholarly journals and known for its visibility and ease of use.

2. HighWire Press
(http://highwire.stanford.edu/lists/freeart.dtl)

HighWire Press is the largest archive of free full-text science articles. This is assisting in the online publication of 2,120,047 free full-text articles and 6,730,410 total articles. There are 18 sites with free trial periods, and 49
completely free sites. 282 sites have free back issues, and 1271 sites have pay per view facility.

3. First Monday
(http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/index)

First Monday is one of the first openly accessible, peer-reviewed e-journal web site. Since its start in May 1996, First Monday has published 1,119 papers in 179 issues, written by 1,437 different authors and also nine special issues. First Monday is indexed in Communication Abstracts, Computer & Communications Security Abstracts, DoIS, eGranary Digital Library, INSPEC, Information Science & Technology Abstracts, LISA, PAIS and other services.

4. MERLOT Journal of Online Learning and Teaching
(http://jolt.merlot.org/)

MERLOT is a free and open resource, designed primarily for faculty and students of higher education. The MERLOT Journal of Online Learning and Teaching (JOLT) is a peer-reviewed, open access, online publication addressing the scholarly use of multimedia resources in online education. JOLT is published quarterly in March, June, September, and December. JOLT welcomes papers on all aspects of online learning and teaching. Topics may include learning theory and the use of multimedia to improve online learning, instructional design theory and application, online learning and teaching initiatives, etc.

5. Google Scholar
(http://scholar.google.com/intl/en/scholar/about.html)
Google Scholar is a source for scholarly literature which facilitates searching across many disciplines and sources of articles, theses, books, abstracts and court opinions from academic publishers, professional societies, online repositories, universities and other web sites.

6. Directory of ABC Chemistry:
(http://www.abc.chemistry.bsu.by/current/fulltext.htm)

This web site offers free full-text peer-reviewed journals in Chemistry, some for free of cost and others by payment. It also provides extensive free supplements to printed versions of papers, chemistry-related subject articles, English language versions of other language articles.

7. Bentham Open Access
(http://www.benthamscience.com/open/?gclid=CNOvi-Wb_KkCFUZ76wodUSeXw)

Bentham Open Access publishes 230 peer-reviewed open access journals. These free-to-view online journals cover all major disciplines of science, technology, medicine and social sciences.

1.15 Consortia

Sharing resources among libraries is necessary for reasons like budget constraints, space problem and to provide uninterrupted information access. This concept has originated from library co-operation. The member libraries of any consortia are to share their information resources under a legal agreement. Therefore, access to information among participated libraries in consortia is easy and possible. Another reason to develop library consortia is the developments
taking place in information communication technology and the availability of information in electronic digital form. Information in electronic form can be accessed among the participating libraries with minimum infrastructure facilities. In library consortia, distance between participated libraries is no matter, as in library networks. This is also another reason for development of consortia concept in libraries. In contemporary libraries, the consortia are developed to share e-journals, e-databases, e-books, etc.

The phrase “library consortia” has been used to mean co-operation, co-ordination and collaboration between and amongst libraries with an intention to share information resources, particularly e-resources. Library consortium is “a generic term to indicate any group of libraries that are working together towards a common goal, whether to expand co-operation on traditional library services such as collection development or electronic information services. It is now used perhaps too broadly, encompasses everything from formal legal entities to information groups that come together solely to achieve better pricing for purchasing electronic information.”

Library consortium evolved from library co-operation, inter-library-loan (ILL), document delivery, library networks, etc. The real drive for library consortia was seen after 1980, when more and more libraries started getting automated and used computers for bibliographic processing activities and database searching. Library consortia facilitates the end-users with benefits of more resources than would be available through one library and library staff can customize the systems to meet their individual library’s needs. The historic quest
for the great comprehensive collection has been superseded by the need to provide access to collective scholarly resources that no single library can afford. Library consortia creates an opportunity to provide enhanced library services by making use of electronic resources, bibliographic databases and services offered through internet and World Wide Web (WWW).

Developments in ICT have contributed for accelerating the process of library automation and become responsible for development of mega-consortia in true sense. For example, in 1970s, Online Computer Library Centre (OCLC) became the mega-consortia in the US along with the Research Library Group (RLG) and the Washington Library Network (WLN). Within a short period of time, newer consortia came into existence, viz., Cape’s CALICO, Georgea’s, GALILEO, Missouri’s MIRACL, Ohio’s, OhilLINK, Pennsylvania’s PALCIm Texa’s, TexShare, Virginia’s VIVA, Washington’s WRLC and SURRY Connect, etc.,

The developments taking place in consortia led to the formation of consortium of consortia. For eg., New York Consortium of Consortia is comprising of 14 members consortia and it in turn belongs to larger groups such as the International Coalition of Library Consortia (ICOLC), formerly named as OhioLINK. There are other signs of the recent growth of library consortia. There is a journal entitled ‘Library Consortia Management and International Journal’ that has started its publication since 1999. Also, MCB Press operates online Web Forum for discussion and querying regarding library consortia.

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Indian academic, research and technical libraries have started to provide shared web-based resources since the turn of the 20th century. Some initiatives include FORSA Library Consortia, CSIR Consortia, HELINET Consortia, ICAST Consortia and UGC-Info net Digital Library Consortia.

A Consortia could be described as a group of organizations who come together to fulfill a combined objective that usefully requires co-operation and the sharing of resources and need to have a clear mutual goal in order to ensure their success. The aim should be to deliver “more than the sum of the individual parts”. A library Consortia formation can be local, regional, state, national and International level.

**Advantages of Consortia**

Some of the important advantages of the proposed library consortia are as follows:

1. Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost;
2. Optimum utilization of funds;
3. Facilities to build up digital libraries;
4. Helpful to provide better library services like CAS and SDI;
5. Cost Sharing for Technical and training support;
6. Electronic Journals demand neither library space nor selling cost nor can they be stolen from the library;
7. The consortium have been offered better terms of licenses for use, archival access and preservation of subscribed electronic resources, which would not have been possible for any single institution;
8. Available 24 hours a day, 7 days a week; and
9. Economy in maintain.
Disadvantages of Consortia

1. Absence of a printed copies of journals
2. Require training of staff in handling electronic documents etc.
3. Consortia require high initial investments in licenses and information Communication technology.
4. Copyright problems.
5. Unreliable telecommunication links and insufficient bandwidth.
7. Internet Access ID necessary and
8. Users are not accepting e-journals on par with the printed Journals in India.

INDEST 6

The Consortium operated through its head quarters at IIT Delhi. A National Review Committee was with an overall responsibility for making policies, monitoring the progress and coordinating with UGC and AICTE for promoting the activities of the INDEST Consortia. The Consortium Headquarters managed subscription of electronic resources from 38 centrally funded institutions and 60 Government/Government-aided institutions.

Membership of the consortia was open to all private or Government funded engineering / Technical / educational institutions / universities for one or more electronic resources. The new members were required to sign an MoU with the INDEST as well as with the publishers of electronic resources that they wish to subscribe. The facilities in this consortia were used under certain terms and conditions.
The consortium provided technical help and arranges for in-house training for optimal use of subscribed e-resources. The INDEST consortium is no more functional and AICTE took the responsibility to offer consortia to engineering and technical institutions.

- **ABI / Inform Complete (ProQuest)**
  (http://www.il.proquest.com/pgdauto)

  ABI Inform complete is a world-renowned database of full text journals on business, economy and management providing a comprehensive coverage on various micro as well as macroeconomic aspects of various economies of the world. It covers nearly 4,000 journals in business, management and social sciences with around 3,000 of them in full text and remaining 1,000 at the abstract level with coverage dating back to 1923. Among new sources added to ABI / Inform complete includes EIU Newswire, Going Global Career Guides, 14,000 Dissertations. Publications from world famous publishers like Sage, Kluwer, McMillan, Oxford University Press, Wiley, Emerald, MIT Sloan, Springer, Blackwell, Taylor & Francis, etc.

- **ACM Digital Library:**
  (http://portal.acm.org/portal.cfm)

  The ACM Digital Library incorporates digital versions of works published by ACM since its inception. The major components of the resource is an enhanced version of the ACM Digital Library plus an extended bibliographic database, consisting initially of more than a quarter-million citations of core works in
computing. These works are of all types (journals, proceedings, books, technical reports, theses, etc) and from all the major publishers in the discipline.

- **American Society of Civil Engineers**
  

  American Society of Civil Engineers (ASCE) represents more than 137,500 members of the civil engineering profession worldwide, is America's oldest national engineering society. It publishes 30 journals, periodicals and transactions that cover a comprehensive range of the civil engineering profession. ASCE journals are highly cited and are most relevant to the civil engineers for exchanging technical and professional knowledge. Information published in the journals of ASCE forms archival records not only of the technical advances of the ASCE but of the civil engineering profession as a whole.

- **American Society of Mechanical Engineers**
  

  American Society of Mechanical Engineers (ASME) is a 120,000-member professional organization focused on technical, educational and research issues of the engineering and technology community. It facilitates the development, dissemination and application of engineering knowledge through its publication of 34 journals. It conducts one of the world’s largest technical publishing operations, holds numerous technical conferences worldwide and offers hundreds of professional development courses each year.
• **ASTM International Standards and Journals**
  (http://enterprise.astm.org Journals: http://journalsip.astm.org/)

  ASTM International, originally known as the American Society for Testing and Materials (ASTM) is one of the largest voluntary standards development organizations in the world and trusted source for technical standards for materials, products, systems and services. ASTM plays a leadership role in addressing the standardization needs of the global marketplace.

• **DEL**
  (www.digitalengineeringlibrary.com)

  Digital Engineering Library is a collection of more than 4,000 articles from renowned reference books published by McGraw-Hill including classic reference works such as Marks’ Standard Handbook for Mechanical Engineers (10th ed.), Perry’s Chemical Engineers Handbook (7th ed.), Standard Handbook for Electrical Engineers (14th ed.), Roark’s Formulae for Stress and Strain (7th ed.), and many more.

• **Emerald Management Xtra**
  (http://iris.emeraldinsight.com/)

  Emerald Management Xtra is a combination of Emerald Full text database and management reviews from leading 300 world’s best management & business Journals. It provides access to full-text of 95 to 150 journals depending on option you choose. Its value added features includes: Case study collection, Book
review collection, Literature reviews, Guru Interviews & Key management readings.

- **Ei Compendex Plus (Engineering Village 2)**
  
  (http://www.engineeringvillage2.org/)

  The Ei Compendex provides summaries of technical reports, journal articles, and conference papers & proceedings. Ei Compendex is the world's only fully interdisciplinary engineering indexing and abstracting service, spanning 175 engineering disciplines. It covers over 5,000 international engineering journals, conference proceedings and technical reports. Each year, 500,000 new abstracts are added within the broad applied engineering areas.

- **INSPEC on ei Village**
  
  (http://www.ei.org/ev2/home)

  INSPEC, from the Institute of Electrical Engineers (IEE) is the world's leading bibliographic database providing coverage of scientific and technical literature in the fields of physics, electronics, electrical engineering and computer science. Primary coverage is of journal articles and papers presented at conferences, although significant books, technical reports and dissertations are also included in the database consisting of 8 million records. Sources include more than 3,000 journals and more than 2,000 conference proceedings, books and reports.
• **IEEE / IEE Electronic Library Online (IEL)**

(https://ieeexplore.ieee.org)

The IEEE/IEE Electronic Library (IEL) is industry’s most powerful engineering reference resource. It provides unparalleled full-text access to publications from Institute of Electrical and Electronics Engineers (IEEE) and the Institution of Electrical Engineers (IEE). It includes 126 journals from IEEE, 21 journals from IEE, magazines, transactions and more than 600 conference proceedings as well as active IEEE standards – over 1 million documents in all. More than 25,000 new pages are added per month. It provides access to more than 1,200,000 full-text documents and more than two million full-page PDF images from back files from 1988 onwards and selected titles from 1950 onwards including all original charts, graphs, diagrams, photographs and illustrative material.

• **J-Gate Custom Content for Consortia (JCCC)**

(https://jccc-indest.informindia.co.in/)

The JCCC is a virtual library of journal literature created as customized e-journals access gateway and database solution for the INDEST-AICTE Consortia. It acts as one-point access to more than 4,500 subscribed currently by all the IITs and IISc and available online. The service offers the following facilities and benefits to users:

a) **Table of Contents Browsing**: Users can select journals of their choice by searching by journal title words and/or subject categories and browse the table of contents for the latest issues of the journals.
b) **Database Searching**: JCCC@INDEST acts as a comprehensive database of journal articles published in the journals subscribed by all IITs, IISc and IIMs (about 4,500 articles). The articles are indexed with subject keywords and are searchable by – author, title words, abstract words, subject keywords, institutional name or city to which the author belongs to.

c) **MyTOC**: Users can select journals of their choice and create their own alert profiles. JCCC@INDEST sends e-mail notice to the users, every week and as and when their favourite journals are published, to facilitate browsing TOC of the latest issues.

d) **Full-text Online**: J-Gate provides link to full-text for online journals of the publishers for which the INDEST-AICTE Consortia has obtained online rights for accessing or the individual library has separately obtained online access rights for journals.

e) **Resource Sharing**: This is the unique benefit of JCCC@INDEST. When a user finds an article of his interest, he can get it off-line, if the Consortia or one of the participating libraries has online rights of access to the corresponding journal.

- **Nature**:

  [http://www.nature.com/](http://www.nature.com/)

  Nature Publishing Group (NPG) is committed to publishing high-quality, rigorously peer-reviewed research, review and reference material; timely news and essential career and recruitment information in print and online. A leading publisher of scientific information, the NPG portfolio combines the excellence of
Nature, its associated primary research journals, the recently launched Nature Reviews journals, 30 leading international scientific and medical journals and reference titles. The Nature Methods is the most recent journal that was launched in October 2004. The publisher has launched a new product called news@nature.com, with its focus on science news accessible to all readers, regardless of their background and training. After the successful launch of nature archives from 1987 to 1996 in August 2003, NPG has also digitalized its archives back to 1950 to provide online access to original papers previously available in print only.

- **Proquest Science Journals (Formerly Applied Science & Technology Plus)** ([http://www.il.proquest.com/pqdauto](http://www.il.proquest.com/pqdauto))

  Proquest Science Journals (Formerly “Applied Science & Technology Plus”) is a comprehensive full-text database of applied and general science subject area, which provides detailed, in-depth coverage and powerful searching of the leading scholarly journals and trade publications in the field. Proquest Science Journals is a growing collection which currently offers 420 titles including more than 320 titles in full-text and 420 titles in abstract and index form with coverage dating back to 1986.

- **Science Direct** ([http://www.sciencedirect.com](http://www.sciencedirect.com))

  Science Direct is the web-based interface to the full-text database of Elsevier Science journals and Academic Press (Ideal), one of the world’s largest providers of scientific, technical and medical (STM) literature, the Science Direct offers a rich electronic environment for research journals, bibliographic
databases and reference works. The database offers more than 1900 scientific, technical and medical peer-reviewed journals, over 59 million abstracts, over 7 million full-text scientific journal articles, an expanding suite of bibliographic databases and linking to another one million full-text articles via Cross Reference to other publishers platforms. Science Direct is offered under the following options:

- **Springer Link**
  (http://www.springerlink.com)

  Springer Link is one of the world's leading interactive databases for high-quality STM journals, book series, online reference works, e-books and the online archives collection. Springer Link is a powerful central access point for researchers and scientists. The Springer Link Online Journal collection includes more than 1,200 peer-reviewed journals, comprising of more than 600,000 individual documents. Titles include access to complete back issues from 1996 onwards, with digital conversion of all back issues under way, making every title available from Volume I, Issue I onwards. Contents in Springer Link are organized by subject into 12 online libraries including medicine and the sciences, behavioral science, biomedical and life sciences, business and economics, chemistry and materials science, Chinese Library of Science, computer science, earth and environmental science, engineering, humanities, social sciences and law, mathematics, medicine and physics and astronomy. The INDEST-AICTE Consortium subscribes to 520 non-medical journals available in Springer Link.

  Engineering college libraries have really understood that consortia based subscriptions is cost effective and also avoids redundant expenses and duplicate
subscriptions. The effort of UGC-INFONET, INDEST–AICTE and AICTE ASPP package Consortium are appreciable and will definitely strengthen engineering education system in India free and or highly subsidized access to scholarly E-resources will help engineering institutions in fulfill their mission into reality. In the long run, consortia approach will be much more popular in user community and that day is not so far behind when consortia approach will expand the country’s information base. It is evident from the above discussion that the engineering college libraries are using a variety of electronic resources offered by and available by various agencies. It is constructive direction for development of engineering college libraries where the user be provided with latest information available in electronic resources.

It is understood that engineering education is developing significantly in Andhra Pradesh and the libraries attached to these colleges have to go for E-Resources to educate the student’s suitable to within India and out side India. Therefore acquiring E-Resources became an essential part of the library system. Subsequently, a series of management aspects be taken care of to maintain and use the E-Resources in libraries.
REFERENCES


3. NBA (National Board of Accreditation) website. www.nbaind.org/


6. INDEST Consortium Website. http://www.library.iitb.ac.in/indest