1. **What is educational technology? Discuss the scope of educational technology.**

Ans: MEANING OF EDUCATIONAL TECHNOLOGY:

Educational technology is the development, application and evaluation of systems, techniques and aids to improve the process of human learning. It is the effective use of technological .tools in learning. Educational technology is based on theoritical knowledge drawn from different disciplines (communication, education, psychology, sociology, philosophy, computer science etc) along with experimental knowledge drawn from educational practice. It is a systematic, interactive process of designing instruction or training used to improve performance.

Educational technology is that science of strategies and techniques which leads to the educational goals. It is a systematic integration of materials, communication system and psychology of learning. Educational technology forces the designers to think, analyse and evaluate all instructional activities. It demands a functional and purposive utilisation of all resources available and of the instructional time. Educational technology implies the use of all educational resources-Men, Materials, Methods and Techniques, Means and Media in a integrated and systematic manner for optimized learning. It is

systematic way of designing, carrying out and evaluation of the total process of learning and teaching in terms of specific objectives based on research in human learning and communication.

SCOPE OF EDUCATIONAL TECHNOLOGY :

Educational technology is not limited to teaching - learning process and theories. Some of the aspects and areas that cover under educational technology are described in below.

a) Analysis of the process of teaching and learning : Educational technology *ties* to discuss the concept of teaching, analysis of the teaching process, variables of teaching, phases of teaching, levels of teaching, theories of teaching, principles and maxims of teaching, the concept of learning, the relevance of the theories of learning, the relationship between teaching and learning, the integration of the theories and principles of teaching as well as learning for attaining optimum educational purposes.

b) Determining educational goals or objectives : Educational technology tries to discuss the topics such as identification of educational needs and aspirations of the community, survey of the resources available for the satisfaction of these needs and aspirations, spelling out the broad educational objectives, analysis of the broad objectives in terms of the specific classroom objectives of teaching and learning, specifications of these objectives in behavioural terms etc.

c) Designing of the curriculum : This aspect of educational technology is Concerned with the designing of a suitable curriculum for the achievement of the stipulated objectives. It

may describe the ways and means for the selection of suitable learning experiences or contents, organization of these contents in a suitable framework in order *to* bring out more effective instruction and thus analyse the suitability of the curriculum in relation to the objectives, means and materials, and devices of evaluation.

d) **Innovation of teaching-learning material:** This area of educational technology is concerned with the production and development of the suitable teaching-learning material in view of the stipulated objectives, designed curriculum and available resource Here educational technology tries to discuss the essential techniques of developing software and instructional material like programmed learning material, computer assisted learning material, mass media instruction material, personalized system of instructional planning for teaching and learning and preparation of lesson plans, etc.

e) **Teacher preparation or teacher-learning material:** Teacher is a key figure in any process of teaching and learning. Educational technology, therefore, takes care of the proper preparation of teachers for exercising their complex responsibilities. For this purpose, educational technology includes topics like models of student teaching micro-teaching, stimulated teaching, team-teaching, teacher effectiveness, modification of teacher-behaviour, classroom interaction, T-group training and interaction analysis.

f) **Deciding and selection of the teaching-learning strategies and tactics:** Educational technology tries to describe the ways and means of discovering selecting and development suitable strategies and tactics of teaching in terms

of the optimum learning and available teaching-learning resources the availability of the different types of teaching methods, devices and models of teaching along with-their appropriate selection and use for the optimum results.

g) Selection and use of the appropriate audio-visual aids : Teaching-learning is greatly influenced and benefitted by the use of appropriate audio-visual aid Educational technology covers this aspect by discussing various types of audio-visual aids used for the educational purpose, their proper selection suiting to a particular teaching-learning situation, their development and production in view of the available resources.It also helps in presentation and dissemination of information, their proper storage and retrieval, and consideration about their cost-effectiveness and effective utilization.

2. **Discuss the different types of educational technology.**

Ans: TYPES OF EDUCATIONAL TECHNOLOGY :

The types of educational Technology can be categorised into two major approaches like-

1. Three-tier Approach to Educational Technology.
2. Types Approach to Educational Technology.

According to A. A. Lumsdeine (1964), there are three distinct types or approaches of educational Technology. These are-

a) Educational Technology I or Hardware Approach
b) Educational Technology II or Software Approach
c) Educational Technology III or System Approach.

a) Educational Technology I or Hardware Approach : Direct application o machines in the teaching-learning process or education is called hardware technology, like-audio-visual

aids, tape-recorder, films, television, computers, video, tape-recorder etc. This approach also utilize the gadgets or the illustrative aids such as Map, charts Models, drawing, painting etc. It is nothing but mechanization of education to make the process easy, interesting, speedy, accurate and extensive.

The origin of this Educational Technology was in physical sciences and engineering sciences. It implies the use of mechanical material and equipment in the field of education. This approach has brought about a mechanical and technical revolution in the field of education. According to Davis, the hardware approach was based on the application, of physical sciences to education and training system which mechanizes the process: of teaching generally so that teachers would be able to deal with more students, resulting lowering in the costs by effective economics of scale. This approach of educational; technology is a bi-product of the scientific and technological developments of the 20th century. This Technology is called "Technology in Education."

b) Educational Technology II or Software Approach : This approach lies in the use of behavioural sciences in teaching and learning. Arthur Melton has opined that software teaching technology is directly related to the psychology of learning. Psychology of learning provides solid technology for bringing desirable behavioural changes in the students. As a result, theories and laws of learning are applied in the field of education. Techniques of motivation and reinforcement are used to make teaching effective and learning more meaningful. This technology tries to adopt a process-oriented technique for the production and utilization of software techniques and

material in terms of learning material, teaching-learning strategies, tools of evaluation and other devices. It is the application of behavioural science or principles of psychology, philosophy and sociology compled with the general laws and principles of natural science. Thus, this technology Js related to the mental aspect of the task and it deals with writing educational objectives in behavioural terms, selecting suitable strategies for the presentation of subject matter, proper use of reinforcement devices and evaluation of educational outcomes,

c) **Educational Technology III or System Approach** : This approach is known is Management Technology. It was developed after World War II. System approach if educational technology stands for a systematic way to design, carry out and evaluated he total process of education in terms of specific objectives. It is the latest approach in technology of education. It has provided a scientific basis to the decision-making regarding the problems associated with administration, management, commerce, industry etc. It also help to study the problems of educational administration and management in a scientific and systematic way.

3. **What is hardware and software approach? Distinguish between hardware and software.**

Ans: The hardware approach is based on the application of engineering principles for developing electro-mechanical equipment for instructional purpose. Motion picture, tape rtf recorders, television, teaching, machines, computers are called educational hardware. Hardware approach mechanises the process of teaching so that teachers would be able to deal with more students with less expenditures in educating them.

The Software approach used the principles of psychology for building in the learners complex repertory of knowledge or modifying his behaviour. It originates from behavioural science and their applied aspects concerning psychology of learning, psychology of learning provides solid technology for bringing desirable behavioural changes in the pupils and thus serves the cause of education of laying down definite instructional procedure, teaching behaviour and behaviour modification devices,

There are some differences between hardware and software approach of educational technology and these are stated in below-

Hardware Approach	Software Approach
1) Hardware approach has physical science and applied engineering as its basis.	1) In software approach, the basis of all thinking and working is behavioural is science and psychology of learning.
2) Hardware approach have been developed which are used for instructional purposes.	2) Software approach uses the principles of psychology for the purpose of behaviour modification.
3) This approach is based on the principles for developing electromechanical equipments.	3) This approach is originated from the behavioural sciences and their applied aspects concerned psychology of learning.
4) This approach of educational technology is a by-product of the scientific and technological developments of the 20th century.	4) It originated from the pioneering efforts of Skinner and other behaviourists.

5) Audio-visual aids like charts, models, film-strips, slides, sophisticated equipments and gadgets like films, projectors, radio, tape recorder, television, computer etc come under the category of hardware.	5) Likewise in software we try to make us« of psychology of learning, teaching-learning strategies, learning materials, tools of evaluation, task analysis, reinforcement etc.
6) It is a product-oriented approach.	6) It is a process oriented approach.
7) Hardware technology utilizes the products of software tech. for its functioning.	7) Software technology does not require an; aid from the hardware technology for its delivery.
8) Hardware technology has the potential to hand over the educational benefits to the mass with greater case and economy.	8) Software technology does not have mass appeal as compared to Hardware technology.
9) Here we are more concerned with the production and utilization of audio Visual aid material and so-phisticated instruments and mass media for helping teacher and learners in their task.	9) Here we try to make use of psychology of learning for the production and utilization of software techniques and materials in terms of learning strategies and other devices for smoothening the task of teaching learning.

4.   **Mention the objectives of educational technology. Discuss the nature of educational technology.**

Ans: **R. A. Sharma** has presented the following objectives of the educational technology:

a) To determine the goals and formulate the objectives in behavioural terms.

b) To analyse the characteristics of the learner.

c) To organize the content in logical sequence.

d) To evaluate the learners performance in terms of achieving educational objectives.

e) To mediate between content and resource of presentation

d) To provide feedback among other components for the modification of learner. According to **Y. K. Sharma**, the main objectives of educational technology are as follows-

a) To modernize the learning methods and techniques after systemetising them so that these may be turned effective according to the needs of the changing era for the unknown future.

b) To bring desirable modifications in the behaviours of the teachers and pupils by improving the teaching, teaming and evaluation conditions.

c) To make the classrooms teaching easy, clear, interesting, effective, understandable, objective and scientific.

To help in increasing various facilities by solving the most complicated problems of human life so that the human life may carry on its progress continuously.

NATURE OF EDUCATION TECHNOLOGY :

Educational Technology widely accepted as the application of system approach in the systematic design of a learning system to bring about improvement in teaching learning evaluation process. Hence, there are some significant nature of it and it can be state as -

1. Educational Technology is based on the application of the scientific knowledge

2. Educational Technology is a continuous, dynamic, progressive and effect producing process.

3. It lay emphasises on the organization of learning situations for the effective realization of the goals of education.
4. It involves input, output and process aspect of education.
5. Educational Technology encourages learning by controlling the environment.
6. Educational Technology defines educational objectives in terms of behavioural objectives.
7. It tries to make the whole teaching learning process more and more meaningful for both the teachers and the learners.
8. It modifies teacher's method of teaching and learners behaviour for the their own, betterment and for the betterment of the mankind.
9. Educational Technology is seen both as a means as well as service to effect and facilitate better and more productive learning systems.
10. It is a communication process resulting from the adaptation of the scientific method to the behavioural science of teaching / learning.
11. New concepts are possible only due to educational technology. Such as

    programmed learning, micro-,teaching, simulated teaching, interaction analysis, projector, computer etc.'
12. Educational Technology is more a practical discipline and less a theoritical one.
13. It is a fast growing modem discipline.
14. It brings learners, teachers and technical means together in an effective way.
15. Education Technology cannot solve each and every problem of education. It can be used successfully in teaching and instructional system only.

5. **Discuss the role of educational technology in distance mode of education.**

Ans: A distinguishing feature of distance education system is its multi-media instruction system which combines different forms of media depending on need It is leaner bas In this system teachers are absent and learners are independent and mostly learn 1 themselves with the help of multi-media instructional packages. Although technology an integral part of Distance Education, any successful program must program must focus on the instructional needs of the students, rather than on the technology itself.

Open University normally uses distance education method for teaching and learning In this method, there is more emphasis on self-study of learner himself. Substantial self-study is exported from all students at their convenient place and time. Distance education is remarkably different from correspondence education. Much more additional academic inputs are provided in distance education system. Latest computer communication, audio-video and Internet technology dramatically improves the effectiveness of distance education. Distance learning is one of the most dramatic technology-based recent changes that occur in education. Communication technology enables students to receive instruction despite geographic and/or time separation, which makes traditional classroom learning impossible.

Distance Education is method of instruction that utilize different communication technologies to provide information, interaction, evaluation and feedback. Thus, it facilitates or enhances self-learning by students at different places. Distance education

enable students and teachers to interact with each other by means of computers, man-made satellites, telephones, radio or television broadcasting or other technologies like web. Distance education increasingly uses combinations of different communications technologies to enhance the abilities of teachers and students to interact and communicate with each other. Distance education also makes use of the World Wide Web, where teachers and students present text, pictures, audio, and occasionally video. A conferencing method known as 'one-way video/two-way audio uses television pictures that are transmitted to particular sites, where people can reply to the broadcasters with an audio link. Television pictures can also be simultaneously transmitted in two directions, so that teachers and students in one place can see and hear teachers and I students in other places. This is called video-conferencing. Each media of communication carries certain advantages over the other. The most effective distance education employs several media together so that students can harness benefits and strengths of the appropriate media. But, geographic and/or time separation of the student and the teacher is a fundamental characteristic of distance education.

Multimedia instruction with web, video systems, or television may be used to connect the local classroom to students at a distance. Satellite, compressed video, and fiber--optic systems are increasingly used for same-time, different-place education. This approach is also called synchronous distance learning. Students can also learn at different times and in different places. This approach is called asynchronous distance learning Distance education programs require teams of media

producers, teaching specialists, and expert in academic subjects to design effective teaching strategies. Other specialists plan and facilitate interaction and communication with students. Because such programs can be expensive to produce, institutions usually design distance education courses for relatively large audiences and wide geographic areas. Distance education is much flexible and student centered in approach. The practice of distance education has dramatically changed since the early 1990s. Educators are using technology to increase the distant student's access to the local classroom, to improve access of all students to resources, and to make the experience of the remote students comparable to that of the local student. Distance education no longer relies as heavily as it used to on delivery of print and broadcast media technologies. Recent innovations in hardware, software, and Internet technologies have made web-based distance education systems more available, easier to use, and less costly.

6. **What is hardware and software approach? Write briefly the significance of hardware and software in education.**

Or

Short note "significance of hardware and software"

Ans: The Hardware Approach

The "hardware approach"[1] implies the use of mechanical materials and equipment in the domain of education. Audiovisual aids like charts, models, filmstrips, slides, audio cassettes and sophisticated equipment and gadgets like films, projectors, radio, tape recorder, record player, television, video, teaching machines, computers, etc., fall in the category of hardware. The hardware approach is based on the application of principles of physical sciences and

engineering to education and training. In this system, the teaching process is being mechanized gradually so that maximum pupils may be educated in minimum time and at low costs. This approach is a by-product of the scientific and technological developments of the 20th century.

The Software Approach

The software approach or software technology of education owes its origin to behavioural sciences and their applied aspects concerned with the psychology of learning. It originated from the engineering efforts of Skinner and other behaviourists. According to Arthur Melton (1959), software teaching is directly related to psychology of learning, which comprises behavioural changes resulting from experience. This view of educational technology is associated with modem principles and theory of teaching, models of teaching, theory of instruction, and theory of teacher-behaviour and principles of programmed learning. The components of software technology are closely associated with the modem principles of programmed learning, such as:

- Task analysis.
- Writing objectives in behavioural terms.
- Selection of appropriate instructional strategies.
- Reinforcement of correct responses.
- Constant evaluation.

Significance of software and hardware

- The significance of software and hardware in education are as follows:
- They cater to individual differences of students.
- They contribute to the economy of time, energy and resources of teachers and students.

- They bring clarity and vividness to the subject matter.
- They help to motivate students.
- Their help in developing and sustaining the interest of the students.
- They make the subject matter interesting, attractive, inspirational and effective.
- They provide for active participation of students.

7. **Short note "need/role of educational technology in India."**

Ans: Educational technology has great importance in a thickly populated and recently developing country like India where mass education is in great demand with limited resources. Educational technology is a major requisite for formal, informal as well as for non-formal mode of teaching-learning in India. Below we discuss some of the areas where educational technology is contributing a lot as a mass instructional media.

1. Radio as a media of educational technology broadcasts educational programme throughout the country. Education programme includes local needs, adult education etc.

2. Next useful contribution of educational technology in the field of education is television. This media of education telecasts different lessons and educational programme related to formal and non-formal education in the country. Various types of scientific innovations, discoveries, strangers of wildlife and various fields of knowledge are generally bringing forward to the masses through television. Satellite service and various activities of different planets and the advantages of satellite services all are now within easy reach for the Indian masses although they are in a remote, rural and developing areas.

3. Thirdly educational technology is concerned with the high demand of training and retraining the school and college teachers both economically and effectively. Educational technology serves the purpose of in-service teacher training course through mass-media. The multi-media package developed by the Centre for Educational Technology of NCERT remove the barriers of in-service teacher training problem and led it to progress. It helps the teacher to recognise the courses and to prepare himself/herself for effective teaching through learning of some new practice, new things and methods in the process of teaching.

4. The distance education method of our country mostly follows the technique of educational technology. It uses the collaboration of media for instructional purpose. It provides the facilities at any time and at any place and for all persons.

5. Systematically developed and well planned correspondence courses provided by a number of Universities in our country are the products of educational technology. Some of the courses of intermediate or higher secondary level can also be imparted through correspondence course. The media used for this purpose are instructional material, student response sheets, personal contact programmes and radio or telecast instructions.

6. Audio-visual aids are considered effective media for teaching and learning. These are the products of educational technology and are getting much importance in India now. As these are mechanical devices they need preparation, development and skillful utilization. The sophisticated machinery devices requires careful handling. There is a department of teaching aids in NCERT who is producing

material and testing the effectiveness of these materials by conducting survey research and evaluation. This department also provides guidance and service to the educational institutions regarding the use and appliances of these teaching aids.

7. Educational Technology renders immense help in the teaching and learning of languages. Present audio-cassette, audio CD etc. help in improving pronunciation and removal of errors in voice. Devices like linguaphone, DVD are giving training for spoken languages. Thus educational technology contributes a lot to the functioning of the language laboratories to teach Indian and any other foreign languages like English. French. German. Russian etc

8. **What are the function of educational technology? Mention some advantages of educational technology.**

Ans: FUNCTIONS OF EDUCATIONAL TECHNOLOGY

The main function of educational technology may be described as some steps to be followed while programming any content for teaching-learning purpose.

1. In the first step education technology analyses all the relevant elements to be learned to achieve the desired educational goal. It converts behavioural objective to be attained by the learner into learning conditions as educational objectives.

2. In the second step it analyses the characteristics of thelearners to take it as the basis for their instructional design.

3. In the third step educational technology organises the contents.

4. In this step it formulates or constructs the media through which content may be presented to the learner.
5. In the fifth step it evaluates the performance of the learner in terms of appropriateness of different activities and achievement of educational objectives.
6. In the sixth step it gives emphasis on giving reinforcement in the form of feedback on the basis of the result of evaluation. This naturally helps in modifying the behaviour of the pupils, guide the teacher to modify his teaching strategies for achieving the optimal desired objectives.

ADVANTAGES OF EDUCATIONAL TECHNOLOGY

1. **It possess great potential for teaching learning process**: It makes curriculum construction and selection of teaching-learning strategies easy and also makes teaching-learning more effective.
2. **Improvement in the quality of teaching**: Educational Technology helps in improving quality of teaching by providing varied types of programmes through TV and other media.
3. **Educational Technology motivates children for learning**: It arouses motivation among the learner to learn by using various new machines such as video, computer, tape-recorder, TV, and other different types projected aids.
4. **Eliminating the problem of Mass Education**: Educational technology is almost eliminating the obstacles of mass instruction. Different types of programmes developed by different experts for a large population of students can be easily communicated.
5. **Educational opportunities accessible for all**: It breaks the barriers of all classes of learners, irrespective of

economic, social or geographical status and makes education available for all. For example, through mass media, TV Radio, Film etc., it makes education easily available for all. It also serves as a distance mode of learning.

6. **Provides continuous and life-long education:** By arranging TV lesson, sending self instructional programmed material to the learners or to the in-service personnel and vocational workers, educational technology helps to keep themselves aware of the innovative thinking of the ever changing society.

7. **Provides equal opportunities for all types of children:** Educational Technology makes provision for self-instructional materials, which provides opportunities *c both the gifted and backward children to proceed at his/her own rate of speed in the learning process.

9. **State in brief the objectives of educational technology at both macro and micro levels of educational process.**

Ans: Educational technology is a very and comprehensive term having wider and narrow objectives. Both micro and levels of objectives are outlines below.

The Objectives of Educational technology in view of the specific classroom teaching or objective at Micro-level.

(1) To recognise the characteristics of the pupils and analysis the educational needs accordingly.

(2) To decide after observation the specific classroom objectives and state them in bahavioural term.

(3) To analysis the content to be taught an arrange them in order of sequence.

(4) To find out the teaching-learning material and resources which are easily available.

(5) To point out .the nature of interaction among the students, teachers, teaching material, content of instruction and the teaching method.

(6) ft plan the series of maneuvers to be taught to the student and to use the available material resources for achieving the definite classroom objectives.

(7) To evaluate the effectiveness of the classroom teaching by testing the pupil's performance or by observing the changes in bahavioural pattern.

(8) To give proper feedback to the pupil as well as to the teacher.

Objectives of educational technology iii. view of the hoard educational goals or objective at the Macro-level.

1. To identify educational needs and intellectual aspiration of the community.

2. To find out definitely the aim of education and broad strategies and structure of education for obtaining these particular goals.

3. To develop a suitable curriculum with interaction of science, art and human values.

4. To develop some teaching-learning models to improve the process of educating the child.

5. To select and to develop the appropriate aids and equipments to meet the desired goals or purpose.

6. To identify major objectives and to find out ways and means to overcome them.

7. To provide educational opportunities to the masses especially to the neglected sectors of community.