

UGC NET 2023 (MARCH) Solved Paper

Paper-I

(Held on 1st March 2023 Shift I)

Note:

- This paper contains Fifty (50) multiple choice questions, each question carrying two (2) marks.
- All questions are compulsory.

DIRECTION (Qs. 1-5): The following table presents the findings of a survey into how people travel to work :

Number of People Travelling to Work by			
Cycle	Car	Bus	Walk
72	18	35	55

Note : (a) 1 in 8 of the people who cycled to work were found to be over 65 years of age.

(b) 1 in 3 of the Cyclists stated that they travelled to work by bus on rainy days.

Based on the above, answer the question :

- How many people cycled to work on a rainy day?
 - 24
 - 48
 - 72
 - 64
- How many respondents indicated that they cycled to work and were over 65 years of age?
 - 12
 - 9
 - 8
 - 7
- Which of the following statements is true?
 - Slightly fewer than twice as many people indicated that they travelled to work by bus than by car
 - Slightly more than twice as many people indicated that they travelled to work by bus than by car
 - Slightly more people indicated that they travelled to work by bus than by car
 - Slightly fewer people indicated that they travelled to work by car than by bus
- The sum of which modes of travelling to work represents half the number of responses represented in the survey?
 - Cycle and Car
 - Bus and Car
 - Walk and Bus
 - Walk and Cycle

Choose the correct answer from the options given below:

 - A and B Only
 - A and C Only
 - B and C Only
 - B and D Only
- How many more people indicated that they cycled to work compared with those who travelled by either bus or car?
 - 72
 - 35
 - 18
 - 19

6. Given below are two statements :

Statement I : Learner centered approach is centered on teacher needs.

Statement II : Learner centered approach is centered on cooperative determination of subject matter.

In the light of the above statements, choose the most appropriate answer from the option given below:

- Both Statement I and Statement II are correct
 - Both Statement I and Statement II are incorrect
 - Statement I is correct but Statement II is incorrect
 - Statement I is incorrect but Statement II is correct
- Which of the following is a technique to provide right kind of support in right amount at right time to increase child's competence?
 - Scaffolding
 - Assistance
 - Accommodation
 - Schemas
 - SWAYAM PRABHA is an education learning platform initiated by DTH channels.
 - Ministry of Human Resource and Development (Now Ministry of Education)
 - University Grants Commission (UGC)
 - Consortium for Educational Communication (CEC)
 - All India Council of Technical Education (AICTE)
 - A learner combines her/his previous schemas or modifies them as per new experiences. The process of combining/modifying existing schemas and to arrive at new schemas is known as
 - Accommodation
 - Assimilation
 - Adaptation
 - Equilibration
 - Which of the following curriculum development models come under Technical-Scientific Model?
 - Open Classroom Model
 - Taba's Model
 - Weinstein and Fantini Model
 - Roger's Model of Interpersonal Relations
 - Survey research is one of the key methods in
 - Physics
 - History
 - Sociology
 - Hermeneutics
 - Methods of social research are directly linked to different visions of
 - Social reality
 - Laboratory experiments
 - Simulations
 - Virtual reality

13. Grand theories of social sciences operate at a
 (a) Lower level (b) Simplistic level
 (c) Categorical level (d) Higher level of abstraction
14. Which of the following are considered major types of qualitative research questions?
 (A) Non-purposive (B) Causes and consequences
 (C) Predictive (D) Evaluative
 (E) Descriptive
 (a) A, B and C only (b) A, C and D only
 (c) A, D and E only (d) B, C, D and E only

15. Given below are two statements :

Statement I: Time and cost are not relevant in determining the sample size.

Statement II: Unit non-response and item non-response do not matter in deciding the sampling error.

In the light of the above statements, choose the correct answer from the options given below.

- (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true
16. The science of studying the feedback systems in humans, animals and machines is described as
 (a) Feedback science
 (b) Experience study
 (c) Message Hermeneutics
 (d) Cybernetics
17. De Saussure labelled language as a
 (a) Technical code (b) Profusion of signs
 (c) Verbalism (d) Macro generaliser
18. Which of the following are the criteria for public service communication?
 (A) Personal bias
 (B) Ideological slant
 (C) Accuracy
 (D) Comprehensiveness
 (E) Separation of opinion and facts
 Choose the correct answer from the options given below:
 (a) A, B, C only (b) B, C, D only
 (c) C, D, E only (d) A, D, E only
19. According to some experts like Marshal McLuhan, the following are considered hot media:
 (A) Telephone (B) Television
 (C) Radio (D) Cinema
 (E) Print
 Choose the correct answer from the options given below:
 (a) A, B, C only (b) B, C, D only
 (c) C, D, E only (d) A, C, E only

20. Given below are two statements :

Statement I : Internet itself is a network and also a model for Cyberspace relations.

Statement II : Global interactive technologies, aided by the Internet, heralded the arrival of the 'second media age' by the end of the twentieth century.

In the light of the above statements, choose the correct answer from the options given below.

- (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true
21. The monthly income of a person in the year 2020 was ₹65,000 and his monthly expenditure was ₹45,000. In the year 2021 his monthly income increased by 15% and his monthly expenditure by 7%. What is the percentage increase in his savings?
 (a) 33% (b) 31%
 (c) 35% (d) 28%
22. $\frac{5}{9}$ of a number is equal to twenty five percent of a second number. Second number is equal to $\frac{1}{4}$ of a third number. The value of the third number is 2960. How much is the 30% of the first number?
 (a) 9.99 (b) 99.9
 (c) 89.9 (d) 88.9
23. A man invested $\frac{1}{3}$ of his retirement gratuity at 6% simple interest: $\frac{1}{4}$ of his gratuity at 7% and the rest at 8% simple interest. If his annual return on these investments is 7012.5, find the total amount of gratuity invested by the man.
 (a) 89,000 (b) 99,000
 (c) 95,000 (d) 1,05,000
24. If in a certain, Coding language, 'Cheater' is coded as 'ejgcvgt', then how 'Preacher' will be coded in that language?
 (a) 'rtgcejgt' (b) 'qsfbdifs'
 (c) 'rtgbdjgt' (d) 'stgbdjgt'
25. What number should replace question mark (?) in the series given below:
 7, 10, 19, 46, 127, ?
 (a) 202 (b) 192
 (c) 173 (d) 370
26. Which fallacy is committed in the following argument?
 "When I called you, you were neither in your class nor in the laboratory. Why are you avoiding me?"
 (a) Circular argument (b) 'Red herring'
 (c) Complex question (d) Slippery slope
27. Which of the following statements are logically equivalent?
 (A) Some animals are birds.
 (B) Some animals are not non-birds.
 (C) Some non-birds are not non-animals.
 (D) Some birds are animals.
 Choose the correct answer from the options given below:
 (a) B and C only (b) B, C, D only
 (c) A, B and D only (d) A, B and C only

28. If the statement “no animals are fishes” is given as false, then which of the following statements can be immediately inferred to be true?
- (A) All fishes are animals.
(B) Some animals are not fishes.
(C) All animals are fishes.
(D) Some animals are fishes.

Choose the correct answer from the options given below:

- (a) B and D only (b) A, C and D only
(c) C and D only (d) D only
29. Which of the following propositions are contrary to each other?
- (A) All fishes are mammals.
(B) Some fishes are mammals.
(C) No fishes are mammals.
(D) Some fishes are not mammals.
- Choose the correct answer from the options given below:
- (a) B and D only (b) A and C only
(c) A and D only (d) B and C only
30. According to Nyaya (Classical Indian School of Logic), which of the following argument involves the fallacy of Anupsamhari (non-exclusive middle term)?
- (a) The hill has smoke because it has fire.
(b) Sound is eternal because it is audible.
(c) All things are non-eternal because they are knowable.
(d) Sound is eternal because it is produced.
31. Consider the following MS-Excel spreadsheet in which the population column represents the city's population in millions of people:

	A	B	C	D	E	F
1.	City	State	Population	Haryana	MP	UP
2.	Patiala	Punjab	8.34			
3.	Sonipat	Haryana	3.86			
4.	Noida	UP	2.71			
5.	Indore	MP	2.16			
6.	Mandi	HP	1.49			
7.	Sagar	MP	1.38			
8.	Panipat	Haryana	1.39			
9.	Gwalior	MP	1.24			

Suppose the formula - IF (\$B2=D\$1, SA2,0) is entered into cell D2 and then the cell D2 is copied and pasted to D2:F9. How many cells in the range D2:F9 contains 0?

- (a) 0 (b) 6
(c) 12 (d) 18
32. Which of the following statements about email security best describes email encryption?
- (a) This is a self-replicating program that can spread by email.
(b) This disguises the content of email messages in order to protect sensitive information.

- (c) This consists of sending numerous duplicate mails to the same email address.
(d) The email header is changed so that the message appears to have come from someone else.

33. Give below are two statements about music files:

Statement I : A music clip stored in MP3 format would take up more memory than the same clip stored in WAV format.

Statement II : Music files stored in MP3 format are of better quality than files stored in WAV format.

In the light of the above statements, choose the correct answer from the option given below.

- (a) Both Statement I and Statement II are true.
(b) Both Statement I and Statement II are false.
(c) Statement I is true but Statement II is false.
(d) Statement I is false but Statement II is true.
34. Which of the following statements are accurate?
- (A) Web 2.0 is a simple static website without any interaction with its users.
(B) Web 2.0 brings people closer together with information using machines.
(C) Web 3.0 brings machines closer together using information.

Choose the correct answer from the options given below:

- (a) A only (b) B only
(c) B and C only (d) D only
35. Match List I with List II

LIST I (Output Device)		LIST II (Description)	
A)	Inkjet printer	I.	Flat panel display that uses the light modulating properties of liquid crystals.
B)	LCD screen	II.	Flat panel display that uses an array of light-emitting diodes as pixels.
C)	LED screen	III.	Droplets of ink are propelled onto paper.
D)	Laser Printer	IV.	Electrically charged powdered ink is transferred onto paper.

Choose the correct answer from the options given below:

- (a) A-IV, B-I, C-II, D-III (b) A-IV, B-II, C-I, D-III
(c) A-II, B-I, C-III, D-IV (d) A-III, B-I, C-II, D-IV
36. Atmospheric haze is mainly caused by?
- (a) Ultra fine size particulate matters
(b) Oxides of nitrogen and Sulphur
(c) Ozone
(d) Carbon dioxide and Carbon monoxide
37. Given below are two statements :

Statement I : Nano scale metallic and bimetallic particles can efficiently remove common water pollutants such as Poly Chloro Benzenes (PCB), Organo chlorine pesticides and halogenated organic solvents.

Statement II : Nano scale metallic and bimetallic particles cannot reduce heavy metals such as nickel, arsenic, mercury etc.

In the light of above statements, choose the most appropriate answer from the options given below.

- (a) Both Statement I and Statement II are correct.
 (b) Both Statement I and Statement II are incorrect.
 (c) Statement I is correct but Statement II is incorrect.
 (d) Statement I is incorrect but Statement II is correct.
38. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.
Assertion A : The change in sea level at any coastal location depends on the sum of global, regional and local factors.
Reason R : Therefore, the global mean sea level rise translates into an uniform rise in sea level around the world.
 In the light of the above statements, choose the most appropriate answer from the options given below.
 (a) Both A and R are correct and R is the correct explanation of A.
 (b) Both A and R are correct but R is NOT the correct explanation of A.
 (c) A is correct but R is not correct.
 (d) A is not correct but R is correct.
39. Oxygen demanding wastes
 (a) Decrease the oxygen level in water.
 (b) Increase the oxygen level in water.
 (c) Do not change the oxygen level in water.
 (d) Increase the temperature of water.
40. Match List I and List II

LIST I (Sustainable Development Goal (SDG) number)		LIST II (Goal)	
(A)	SDG 2	I.	Sustainable cities and communities
(B)	SDG 3	II.	Zero hunger
(C)	SDG 6	III.	Good health and well being
(D)	SDG 11	IV.	Clean water and Sanitation

Choose the correct answer from the options given below:

- (a) A-I, B-III, C-II, D-IV (b) A-III, B-II, C-I, D-IV
 (c) A-II, B-III, C-IV, D-I (d) A-II, B-III, C-I, D-IV
41. What is the full form of 'SPARC'?
- (a) Standard for Profession of Assessment and Research Communication
 (b) Scheme for Promotion of Academic and Research Collaboration
 (c) School for Promotion of Assessment and Right to commitment
 (d) Social Protection of Advancement and Relationship Complex

42. According to NEP 2020, India will be promoted as a global study destination providing premium education at affordable costs thereby helping to restore its role as
 (a) Economic power (b) Knowledge Economy
 (c) Vishwa Guru (d) Shiksha Guru
43. What is the full form of 'NCIVE'?
- (a) Non-Governmental course for the Initiation of Vocational Enhancement
 (b) National Committee for the Integration of Vocational Education
 (c) Non-Governmental Council for the Integration of Veterinary Education
 (d) National Commission for the Information of Veterinary Education
44. The Government of India created Department of Science and Technology in the year :
 (a) 1990 (b) 1985
 (c) 1978 (d) 1971
45. The ancient system of education in India included education of which of the following ancient texts?
 (A) Vedas (B) Brahmanas
 (C) Upanishads (D) Dharma sutras
 Choose the most appropriate answer from the options given below :
 (a) A and C only (b) B and D only
 (c) A, C and D only (d) A, B, C and D

DIRECTION (Qs. 46-50): Read the following passage and answer the questions given below :

Around the age of 2 children have a sense of intention, at least of their own intentions. They will announce, "I wanna peanut butter sandwich". As children develop a theory of mind, they also can understand that other people have intentions of their own. Older pre-schoolers who get along well with their peers can separate intentional from unintentional actions and react accordingly. For example, they will not get angry when another child accidentally knocks over their block tower. But aggressive children have more trouble assessing intention. They are likely to attack anyone who topples their tower, even accidentally. As children mature, they are more able to assess and consider the intentions of others.

With a developing theory of mind, children are increasingly able to understand that other people have different feelings and experiences and therefore may have a different viewpoint or perspective. This perspective-taking ability develops over time until it is quite sophisticated in adults. Being able to understand how others might think and feel is important in fostering cooperation and moral development, reducing prejudice, resolving conflicts, and encouraging positive social behaviours in general. Some coaching in perspective taking from the teacher might help if children mistreat peers and the mistreatment is not part of a deeper emotional and behavioural disorder.

46. Children of which of the following ages would generally have the best perspective taking ability?
(a) 3 years (b) 8 years
(c) 13 years (d) 18 years
47. Given below are two statements :
Statement I : Aggressive children can assess intention of others with ease.
Statement II : Different persons may have different viewpoints.
In the light of the above statements, choose the most appropriate answer from the options given below :
(a) Both Statement I and Statement II are correct.
(b) Both Statement I and Statement II are incorrect.
(c) Statement I is correct but Statement II is incorrect.
(d) Statement I is incorrect but Statement II is correct.
48. Understanding how others feel is important in
(A) Developing empathy
(B) Reducing prejudice
(C) Conflict resolution
(D) Encouraging Selfishness
(E) Enhancing cooperation
Choose the most appropriate answer from the options given below :
(a) A, B, C and D only (b) A, B, C and E only
(c) B, C, D and E only (d) A, B, D and E only
49. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R.
Assertion A : Older pre-schoolers have better chances of getting along well with their peers as compared to young pre-schoolers.
Reason R : Older pre-schoolers generally have a better understanding of the intentions of others.
In the light of the above statements, choose the most appropriate answer from the options given below.
(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is NOT the correct explanation of A.
(c) A is correct but R is not correct.
(d) A is not correct but R is correct.
50. Given below are two statements :
Statement I : A 2 years old child is likely to have a better understanding of his own intentions than those of others.
Statement II : It is always helpful to coach a child in perspective-taking if the child has the habit of mistreating others because of some behavioural disorder.
In the light of the above statements, choose the most appropriate answer from the options given below.
(a) Both Statement I and Statement II are correct.
(b) Both Statement I and Statement II are incorrect.
(c) Statement I is correct but Statement II is incorrect.
(d) Statement I is incorrect but Statement II is correct.

Answers & Explanations

1. (b) $\frac{2}{3}$ people cycled to work on a rainy day.
 $\therefore 72 \times \frac{2}{3} = 48$ people cycled to work on a rainy day.
2. (b) People cycled to work and were over 65 years of age
 $\text{are} = 72 \times \frac{1}{8} = 9$
3. (a) Travelled by car = 18
 Travelled by bus = $18 \times 2 - 1 = 35$ (True)
4. (b) Total number of responses represented in the survey
 $= 72 + 18 + 35 + 55 = 180$
 \therefore (A) Cycle + Car = $72 + 18 = \frac{180}{2} = 90$
 (C) Walk + Bus = $35 + 55 = \frac{180}{2} = 90$
5. (d) Travelled by either bus or car = $18 + 35 = 53$
 Travelled by cycle = 72
 Hence, more people = $72 - 53 = 19$
6. (d) In the traditional approach to college teaching, most class time is spent with the professor lecturing and the students watching and listening. The students work individually on assignments, and cooperation is discouraged. Learner-centered teaching methods shift the focus of activity from the teacher to the learners. Active learning, in which students solve problems, answer questions, formulate questions of their own, discuss, explain, debate, or brainstorm during class. Cooperative learning, in which students work in teams on problems and projects under conditions that assure both positive interdependence and individual accountability.
7. (a) Scaffolding is a classroom teaching technique in which instructors deliver lessons in distinct segments, providing less and less support as students master new concepts or material.
 In the process of scaffolding, the teacher helps the student master a task or concept that the student is initially unable to grasp independently. The teacher offers assistance with only those skills that are beyond the student's capability. Bruner's theory of scaffolding emerged around 1976 as a part of social constructivist theory, and was particularly influenced by the work of Russian psychologist Lev Vygotsky. Vygotsky's scaffolding is a theory that focuses on a student's ability to learn information through the help of a more informed individual. When used effectively, scaffolding can help a student learn content they wouldn't have been able to process on their own.
8. (a) The SWAYAM PRABHA is a group of 22 DTH channels devoted to telecasting of high-quality educational

programmes on 24X7 basis using the GSAT-15 satellite. Every day, there will be new content for at least (4) hours which would be repeated 5 more times in a day, allowing the students to choose the time of their convenience. The channels are uplinked from BISAG-N, Gandhinagar. The contents are provided by NPTEL, IITs, UGC, CEC, IGNOU. The INFLIBNET Centre maintains the web portal.

9. (a) Accommodation is imperative because it is how people will continue to interpret new concepts, schemas, frameworks, and more. Piaget believed that the human brain has been programmed through evolution to bring equilibrium, which is what he believed ultimately influences structures by the internal and external processes through assimilation and accommodation.
 Assimilation in which new experiences are reinterpreted to fit into, or assimilate with, old ideas. It occurs when humans are faced with new or unfamiliar information and refer to previously learned information in order to make sense of it. In contrast, accommodation is the process of taking new information in one's environment and altering pre-existing schemas in order to fit in the new information. This happens when the existing schema (knowledge) does not work, and needs to be changed to deal with a new object or situation.
10. (b) Hilda Taba (1902 – 1967) was an architect, a curriculum theorist, a curriculum reformer, and a teacher educator. She wrote many books, especially in education, including *The Dynamic of Education* (1932), *Adolescent Character and Personality* (1949), *School Culture: Studies of Participation and Leadership* (1955), *Action Research: A case study* (1957), *Curriculum Development and Practice* (1962), *Thinking in Elementary School Children* (1964) etc.
 The Taba model promotes the organization of content into learning experiences, which promotes the selection and organization of content considering planned learning objectives.
 After the educator has identified the needs of students that require attention, the teacher specifies the objectives that needs be fulfilled. This involves setting specific goals or objectives for the lesson or identifying the key concepts or skills that students should be able to demonstrate by the end of the lesson.
 Strengths of using the Taba Model in the classroom:
 - Gifted students begin thinking of a concept, and then dive deeper into that concept.
 - Focuses on open-ended questions rather than right/wrong questions.
 - The open-endedness requires more abstract thinking, a benefit to our gifted students.

- 11 (c) The survey is the most widely used scientific research method in sociology. The standard survey format allows individuals a level of anonymity in which they can express personal ideas. Surveys might seem innocuous.

The survey is the most widely used scientific research method in sociology. The standard survey format allows individuals a level of anonymity in which they can express personal ideas. Surveys might seem innocuous. However, as with all types of sociological research, sociologists must obtain approval from a review board (sometimes called an Internal Review Board or IRB) before they commence any type of sociological survey if it is to be used for research purposes. If a professor asks students to complete a survey that asks about previous experience in an online class for the purpose of understanding students' prior knowledge, that would not be considered research and would not require IRB approval.

- 12 (a) The term social construction of reality refers to the theory that the way we present ourselves to other people is shaped partly by our interactions with others, as well as by our life experiences. Social reality is the shared meanings, practices and experiences of groups such as a society or culture. This can be contrasted with scientific theory in areas such as biology and personal realities such as an individual's private thoughts.
- 13 (d) Grand theory is a term coined by the American sociologist C. Wright Mills. Sociological Imagination to refer to the form of highly abstract theorizing in which the formal organization and arrangement of concepts takes priority over understanding the social reality. In his view, grand theory is more or less separate from concrete concerns of everyday life and its variety in time and space. Grand theories incorporate highly abstract concepts that often lack operational definitions. Therefore, the propositions are not considered to be accessible to testing. However, there is evidence that grand theories are used as frameworks for nursing research.
- 14 (d) Qualitative questions concern broad areas or more specific areas of research. However, unlike quantitative questions, qualitative research questions are adaptable, non-directional and more flexible. Qualitative research question focus on discovering, explaining, elucidating, and exploring.

i. Exploratory Questions

This form of question looks to understand something without influencing the results. The objective of exploratory questions is to learn more about a topic without attributing bias or preconceived notions to it.

ii. Predictive Questions

Predictive research questions are defined as survey questions that automatically predict the best possible response options based on text of the question. Moreover, these questions seek to understand the intent or future outcome surrounding a topic.

iii. Interpretive Questions

This type of research question allows the study of people in the natural setting. The questions help understand how a group makes sense of shared experiences with regards to various phenomena. These studies gather feedback on a group's behavior without affecting the outcome.

- 15 (b) Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. In practice, the sample size used in a study is usually determined based on the cost, time, or convenience of collecting the data, and the need for it to offer sufficient statistical power.

Total non response error occurs when all or almost all data for a sampling unit are missing. This can happen if the respondent is unavailable or temporarily absent, the respondent is unable to participate or refuses to participate in the survey, or if the dwelling is vacant.

A non-sampling error is a statistical term that refers to an error those results during data collection, causing the data to differ from the true values.

- 16 (d) Norbert Wiener defined cybernetics in 1948 as "the scientific study of control and communication in the animal and the machine." In other words, it is the scientific study of how humans, animals and machines control and communicate with each other.

The feedback mechanism is triggered when the system undergoes a change that causes an output. The biochemical control system in living beings is made up of a variety of components, including chemicals, genes, and their regulatory connections.

When the activation of one component leads to the activation of another, the interaction between the components is said to be positive. If the activation of one component results in the inactivation of another, it is labeled as negative.

- 17 (d) Due to his theories on the structure of language, the Swiss linguist, Ferdinand de Saussure (1857–1913) is often known as the founder of modern linguistics.

In order to understand Saussure's linguistic theories, you have to be able to grasp the basics of his psycho-linguistic terminology and his explanation of the nature of language units. Understanding the basic concepts of his linguistic theory is not only essential for linguistic students, but for anyone studying semiotics, or the use of various types of signs to communicate. Semiotics is also a basic element in film theory studies.

- 18 (c)

- An administrator would undertake an administrative action on the basis of honesty and not use his power, position and discretion to serve his personal interest and the illegitimate interests of other individuals or groups.
- Spirit of service and sacrifice is an essential ingredient of

public services and public officials should feel inspired that they are working for a national cause. An attitude of dedication to the set goals of organizations should be an indispensable trait of the public officials.

- An administrator will make decisions and implement them in a transparent manner so that those affected by the decisions and wish to evaluate their rationale, will be able to understand the reasons behind such decisions.
- An administrator would not hesitate to accept responsibility for his decisions and actions. He would hold himself morally responsible for his actions and for the use of his discretion while making decisions. Moreover, he would be willing to be held accountable to higher authorities of governance and even to the people who are the ultimate beneficiaries of his decisions and actions.
- Those responsible for formulation and execution of policies and decisions of governance would ensure that respect is shown to the principles of equality, equity, fairness, impartiality and objectivity and no special favours are doled out on the criteria of status position, power, gender, class, caste and wealth.

- 19 (c) Hot media usually provides complete involvement without considerable stimulus. For example, print occupies visual space, uses visual senses, but can immerse its reader. Hot media favour analytical precision, quantitative analysis and sequential ordering, as they are usually sequential, linear and logical. They emphasize one sense (for example, of sight or sound) over the others. For this reason, hot media also include radio, as well as film, the lecture and photography.

A distinction made by McLuhan between media such as print, photographs, radio, and movies (hot media) and media such as speech, cartoons, the telephone, and television (cool media). Hot media are 'high definition' because they are rich in sensory data. Cool media are 'low definition' because they provide less sensory data and consequently demand more participation or 'completion' by the audience (a useful mnemonic is to imagine that hot media are too hot to touch).

- 20 (a) While cyberspace should not be confused with the Internet, the term is often used to refer to objects and identities that exist largely within the communication network it, so that a website, for example, might be metaphorically said to "exist in cyberspace".

Technology and the media are interwoven, and neither can be separated from contemporary society in most core and semi-peripheral nations. Media is a term that refers to all print, digital, and electronic means of communication. From the time the printing press was created (and even before), technology has influenced how and where information is shared. Today, it is impossible to discuss media and the ways societies communicate without addressing the fast-moving pace of technology change.

21. (a) Saving = 65000 – 45000 = Rs. 20,000

$$\text{New saving} = 65000 \times \frac{115}{100} - 45000 \times \frac{107}{100} = \text{Rs } 26600$$

$$\text{Hence, increase percentage in saving} = \frac{6600}{20000} \times 100 = 33\%$$

22. (b) Third number = 2960

$$\text{Second number} = \frac{2960}{4} = 740$$

Let the first number is x.

$$\therefore x \times \frac{5}{9} = 740 \times \frac{25}{100}$$

$$\Rightarrow x = \frac{185 \times 9}{5} = 333$$

$$\text{Hence, 30\% of the first number} = 333 \times \frac{30}{100} = 99.9$$

23. (b) Let his retirement gratuity is x.

$$\text{Rest gratuity} = x - \frac{x}{3} - \frac{x}{4} = \frac{5x}{12}$$

According to question,

$$\frac{x \times 6}{300} + \frac{x \times 7}{400} + \frac{5x \times 8}{1200} = 7012.5$$

$$\Rightarrow \frac{24x + 21x + 40x}{1200} = 7012.5$$

$$\Rightarrow \frac{85x}{1200} = 7012.5$$

$$\Rightarrow x = \frac{7012.5 \times 1200}{85} = \text{Rs. } 99,000$$

24. (a) As,

$$\begin{array}{ccccccc} C & H & E & A & T & E & R \\ +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow \\ E & J & G & C & V & G & T \end{array}$$

Similarly,

$$\begin{array}{ccccccc} P & R & E & A & C & E & R \\ +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow & +2 \downarrow \\ R & T & G & C & E & J & G & T \end{array}$$

25. (d) Pattern of the series is-

$$\begin{array}{ccccccc} 7 & 10 & 19 & 46 & 127 & 370 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\ +3^1 & +3^2 & +3^3 & +3^4 & +3^5 & \end{array}$$

- 26 (b) A red herring in literature is a piece of false information designed to mislead the reader. It is a literary device often used in mystery stories to distract the reader from important information, send them down the wrong path, or lead them to draw a false conclusion, making the ending a surprise.

27. (c) 28. (d) 29. (b)

- 30 (c) Anupasamhari: It occurs when the middle term is non exclusive, so, the minor term is all inclusive and leaves nothing by the way of sapaksa or vipaksa. For example- all things are non eternal, because they are knowable.

31. (d)

32. (b) Email encryption is an authentication process that prevents messages from being read by an unintended or unauthorized individual. It scrambles the original sent message and converts it into an unreadable or undecipherable format. Email encryption is necessary when sharing sensitive information via email.

33. (b) 34.(c)

35. (c)

Ink jet printer

An inkjet printer is a computer peripheral that produces hard copies of a text document or photo by spraying droplets of ink onto paper. A typical inkjet printer can produce color printing copies with a resolution of 1200 x 1440 dpi.

LCD screen

Liquid Crystal Display (LCD), electronic display device that operates by applying a varying electric voltage to a layer of liquid crystal, thereby inducing changes in its optical properties. LCDs are commonly used for portable electronic games, as viewfinders for digital cameras and camcorders, in video projection systems, for electronic billboards, as monitors for computers, and in flat-panel televisions.

LED screen

A LED display is a flat panel display that uses an array of light-emitting diodes as pixels for a video display. Their brightness allows them to be used outdoors where they are visible in the sun for store signs and billboards.

LASER printer

Laser printing is an electrostatic digital printing process. It produces high-quality text and graphics (and moderate-quality photographs) by repeatedly passing a laser beam back and forth over a negatively charged cylinder called a "drum" to define a differentially charged image. The drum then selectively collects electrically charged powdered ink (toner), and transfers the image to paper, which is then heated to permanently fuse the text, imagery, or both, to the paper.

36. (a) Haze is caused by particulate matter from many sources including smoke, road dust, and other particles emitted directly into the atmosphere, as well as particulate matter formed when gaseous pollutants react in the atmosphere. These particles often grow in size as humidity increases, further impairing visibility.
37. (c) As an emerging technology, nanotechnology has been gaining increasing interest and many nanomaterials have been developed to remove heavy metals from polluted water, due to their excellent features resulting from the nanometer effect. In this work, novel nanomaterials, including carbon-based nanomaterials, zero-valent metal, metal-oxide based nanomaterials, and nanocomposites, and their applications for the removal of heavy metal ions from wastewater were systematically reviewed.
- This review article describes various applications of nanomaterial in removing different types of impurities from polluted water. There are various kinds of nanomaterials, which carried huge potential to treat polluted water

(containing metal toxin substance, different organic and inorganic impurities) very effectively due to their unique properties like greater surface area, able to work at low concentration, etc. The nanostructured catalytic membranes, nanosorbents and nanophotocatalyst based approaches to remove pollutants from wastewater are eco-friendly and efficient, but they require more energy, more investment in order to purify the wastewater. There are many challenges and issues of wastewater treatment. Some precautions are also required to keep away from ecological and health issues. New modern equipment for wastewater treatment should be flexible, low cost and efficient for the commercialization purpose.

38. (c) Burning fossil fuels, cutting down forests and farming livestock are increasingly influencing the climate and the earth's temperature. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming.

Global-mean sea-level rise which is an increase in the global volume of the ocean. In the 20th/21st Century, this is primarily due to thermal expansion of Upper Ocean as it warms and the melting of small ice caps due to human-induced global warming. The contribution of Greenland is less certain, and Antarctica is expected to grow in size producing a sea-level fall, offsetting any positive contribution from Greenland. Direct human influence is also possible due to modifications to the hydrological cycle (e.g., increased terrestrial storage of water (causing sea-level fall), versus increased groundwater mining (causing sea-level rise)), although this balance is most uncertain.

39. (a) Major sources of oxygen demanding wastes are: The Biodegradable organic substances which are found in municipal wastewater, which is mainly human waste and food Residue and Industrial wastewater such as from tannery, textile, paper & pulp and food processing industries. Water pollutants are oxygen-demanding wastes; that can be decomposed by oxygen-requiring bacteria. When large populations of decomposing bacteria are converting these wastes it can deplete oxygen levels in the water. This causes other organisms in the water, such as fish, to die.

40. (c) The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are---

1. No poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities

12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice and strong institutions
17. Partnerships for the goals
- 41 (b) In October 2018, HRD ministry launched a scheme known as SPARC. The full form of SPARC is Scheme for Promotion of Academic and Research Collaboration. SPARC is a non-profit advocacy organization that supports systems for research and education that are open by default and equitable by design. We believe everyone should be able to access and contribute to the knowledge that shapes our world.
- 42 (c) India will be promoted as a global study destination providing premium education at affordable costs thereby helping to restore its role as a Vishwa Guru. An International Students Office at each HEI hosting foreign students will be set up to coordinate all matters relating to welcoming and supporting students arriving from abroad. Research/teaching collaborations and faculty/student exchanges with high quality foreign institutions will be facilitated, and relevant mutually beneficial MOUs with foreign countries will be signed. High performing Indian universities will be encouraged to set up campuses in other countries, and similarly, selected universities e.g., those from among the top 100 universities in the world will be facilitated to operate in India.
- 43 (b) National Council for Integration of vocational education (NCIVE) will regulate the functioning of entities engaged in vocational education and training, both long & short-term, and establish minimum standards for the functioning of such entities. The National Education Policy (NEP) 2020 has also given special emphasis on vocational education through integration and mainstreaming of vocational education with general education which will help students in acquiring various skills to meet the needs of the industries and to improve the quality of education.
- 44 (d) Department of Science & Technology (DST) was established in May 1971, with the objective of promoting new areas of Science & Technology and to play the role of a nodal department for organising, coordinating and promoting S&T activities in the country. It comes with integrated programs for the socio-economic sectors with the national research and development system to address the national problems and at the same time create a national innovation system.
- 45 (d) During the ancient period, two systems of education were developed, Vedic, and Buddhist. The medium of language during the Vedic system was Sanskrit, while those in the Buddhist system were pali. During those times the education was of Vedas, Brahmanas, Upnishads, and Dharmasutras. Indigenous education was imparted at home, in temples, pathshalas, tols, chatuspadis and gurukuls. There were people in homes, villages and temples who guided young children in imbibing pious ways of life. Temples were also the centres of learning and took interest in the promotion of knowledge of our ancient system.
- 46 (a) The researchers found that children who were three and three-and-a-half years old struggled with this task which led them to conclude that the age range of three to four-and-a-half years old could be crucial in perspective-taking development. The children perspective refers to the child's own experiences, perceptions and understandings of a certain situation. Differ from child perspective which may be seen as, adult perspective of the child and his needs in the same situation.
- 47 (d) Aggression is an issue when children/youth start displaying behaviour that may harm themselves, their families, their communities or society at large. The causes behind aggressive behaviour can include fear, anxiety, and stress. Unmet physical needs -- hunger, silence or emotional needs-- recognition, love, traumatic experiences. Tremblay said - preschoolers coping with high levels or intensity of family conflict struggle emotionally and may express their hostility physiologically through heart rate activity or skin conductance response. El-Sheikh monitored preschoolers for heart rate and skin conductance whilst they were watching an angry interaction between two adults.
- 48 (b) When we use empathy in our daily interactions, we become able to listen deeply to each other, expressing how we feel, what our prejudices and deep-rooted perceptions are without judging them. Cooperative Learning helps to:
- Raise achievement of students.
 - Build positive relationships among students - important for creating a learning community that values diversity.
 - Provide experiences that develop both good learning skills and social skills.
- 49 (a) It has often been assumed that peers are less important in early childhood, when relationships with family members are more influential. However, recent research shows clearly that even infants spend time with peers, and that some three- and four-year-olds are already having trouble being accepted by their peers. Older pre schoolers become more aware of and sensitive to the feelings and actions of others, they'll gradually stop competing and will learn to cooperate when playing with her friends. They take turns and share toys in small groups, though sometimes they won't. But instead of grabbing, whining, or screaming for something, they'll actually ask politely much of the time.
- 50 (d) Children from 3 to 5 Years can think about objects, people and events without seeing them. Although less than before, still think they are the center of the world and have trouble seeing things from someone else's perspective, more able to use words to express thoughts and feelings and to share experiences, they talk to them out loud as a way to control their behaviors, they can think of events in the past or those yet to happen. They begin to think ahead and plan their actions. They often can anticipate physical consequences of actions that are not too complicated.