

## Ph.D. Entrance Examination, 2025

## Electronics and Telecommunication Engineering

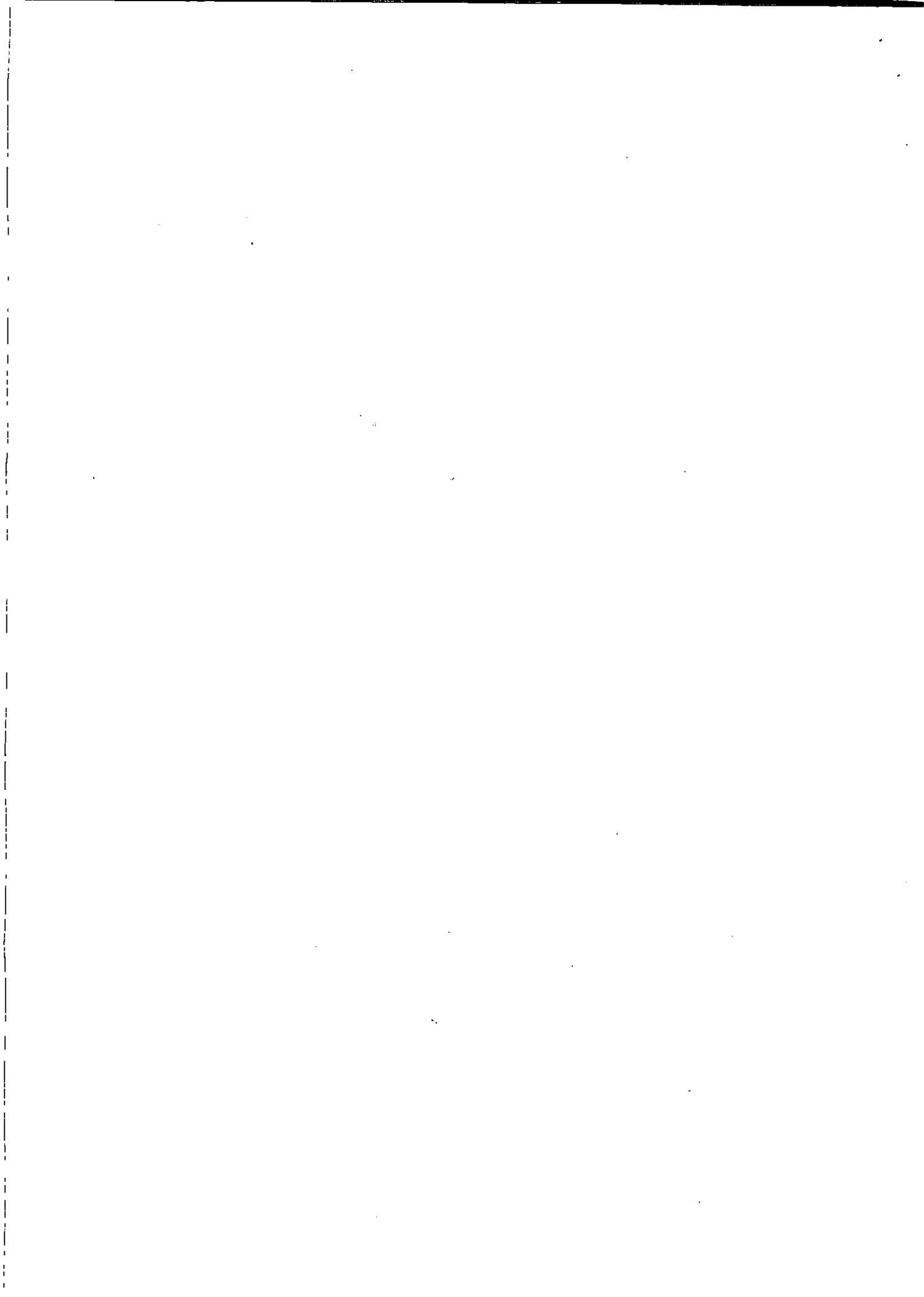
Day and Date: Sunday, 21/12/2025

Total Marks: 100

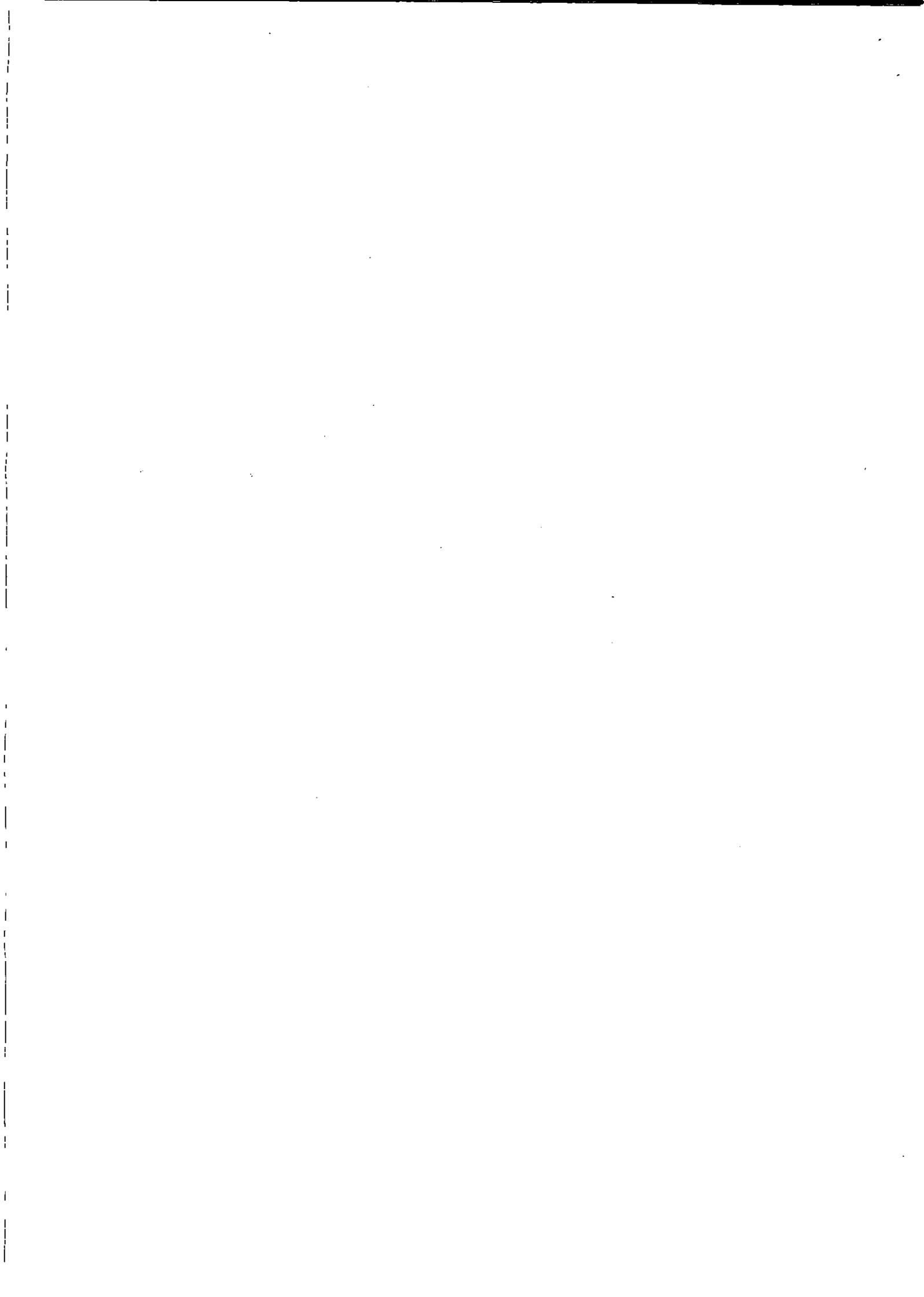
Time:

*Instructions: i) All questions are compulsory**ii) Each question carries 2 marks**iii) Write the correct option in the box at right.**iv) Use of non-programmable calculator is allowed*

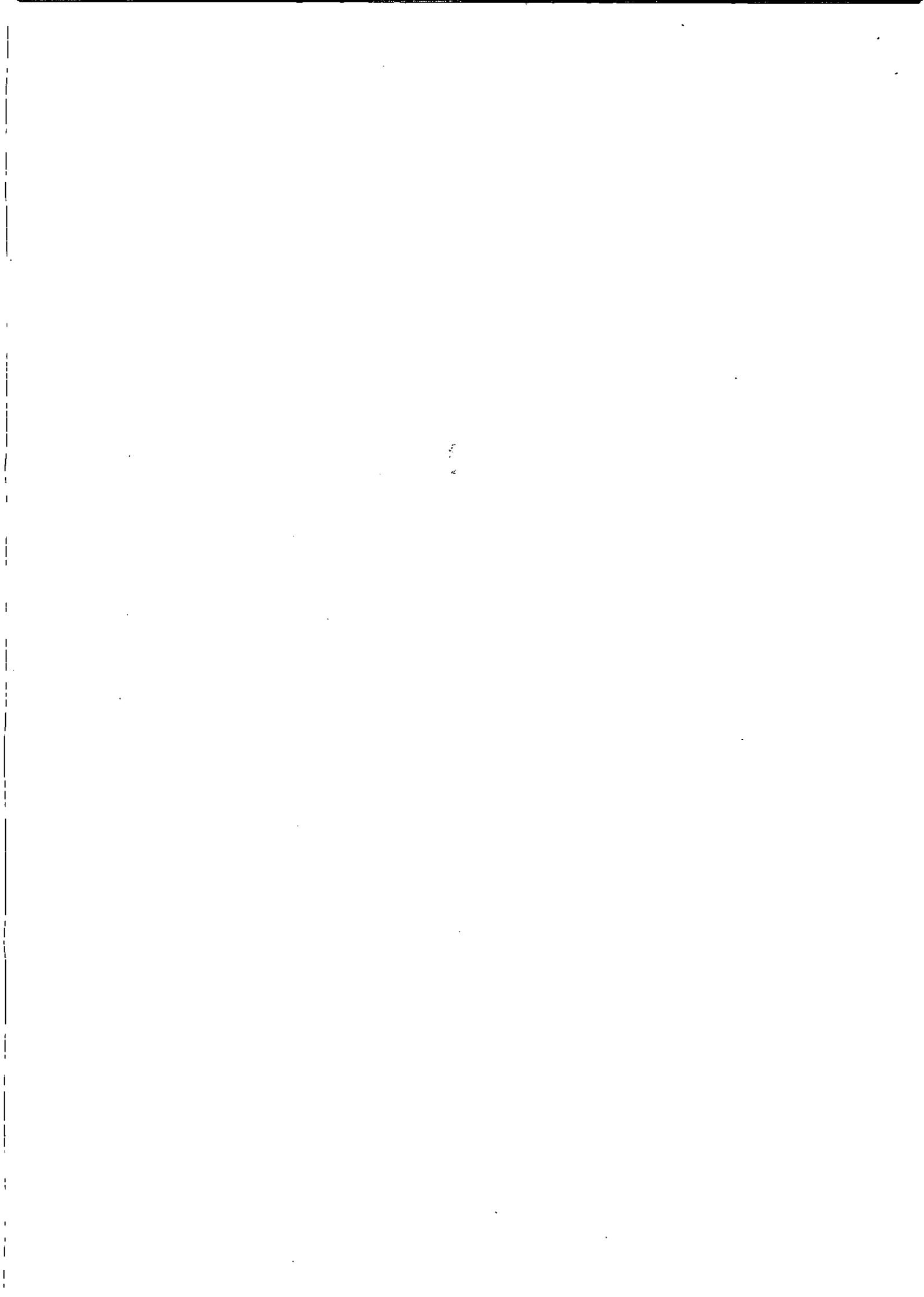
		Correct Option
Q. 1)	Social Science Research.....Problems	<input type="text" value="D"/>
	A)Recommend                      B)Formulate	
	C) Explain                              D) <b>Diagnosis</b>	
Q. 2)	Basing conclusions without any bias and value judgment is.....	<input type="text" value="C"/>
	A)Facts                                      B)Specificity	
	C) <b>Objectivity</b> D)Values	
Q.3)	A research which follows case study method is called	<input type="text" value="B"/>
	A)Causal                                      B) <b>Clinical or diagnostic</b>	
	C) Analytical                              D)Qualitative	
Q. 4)	Attributes of objects, events or things which can be measured are called	<input type="text" value="A"/>
	A) <b>Variables</b> B)Data	
	C) Replication                              D)Qualitative measure	
Q.5)	Generalized conclusion on the basis of a sample is technically known as	<input type="text" value="A"/>
	A) <b>Statistical, inference of external validity of the research</b> B)Data analysis and interpretation	
	C) Parameter inference                              D)All of the above	
Q. 6)	The final result of a study will be more accurate if the sample drawn is	<input type="text" value="B"/>
	A)purposive                                      B) <b>representative to the population</b>	
	C) taken randomly                              D)fixed by quota	
Q.7)	The process not needed in experimental researches is	<input type="text" value="A"/>
	A) <b>reference collection</b> B)observation	
	C) manipulation and replication                              D)controlling	
Q. 8)	10 is the mean of a set of 7 observations and 5 is the mean of a set of 3 observations. The mean of combined set is given by	<input type="text" value="A"/>
	A) <b>8.5</b> B)7.5	



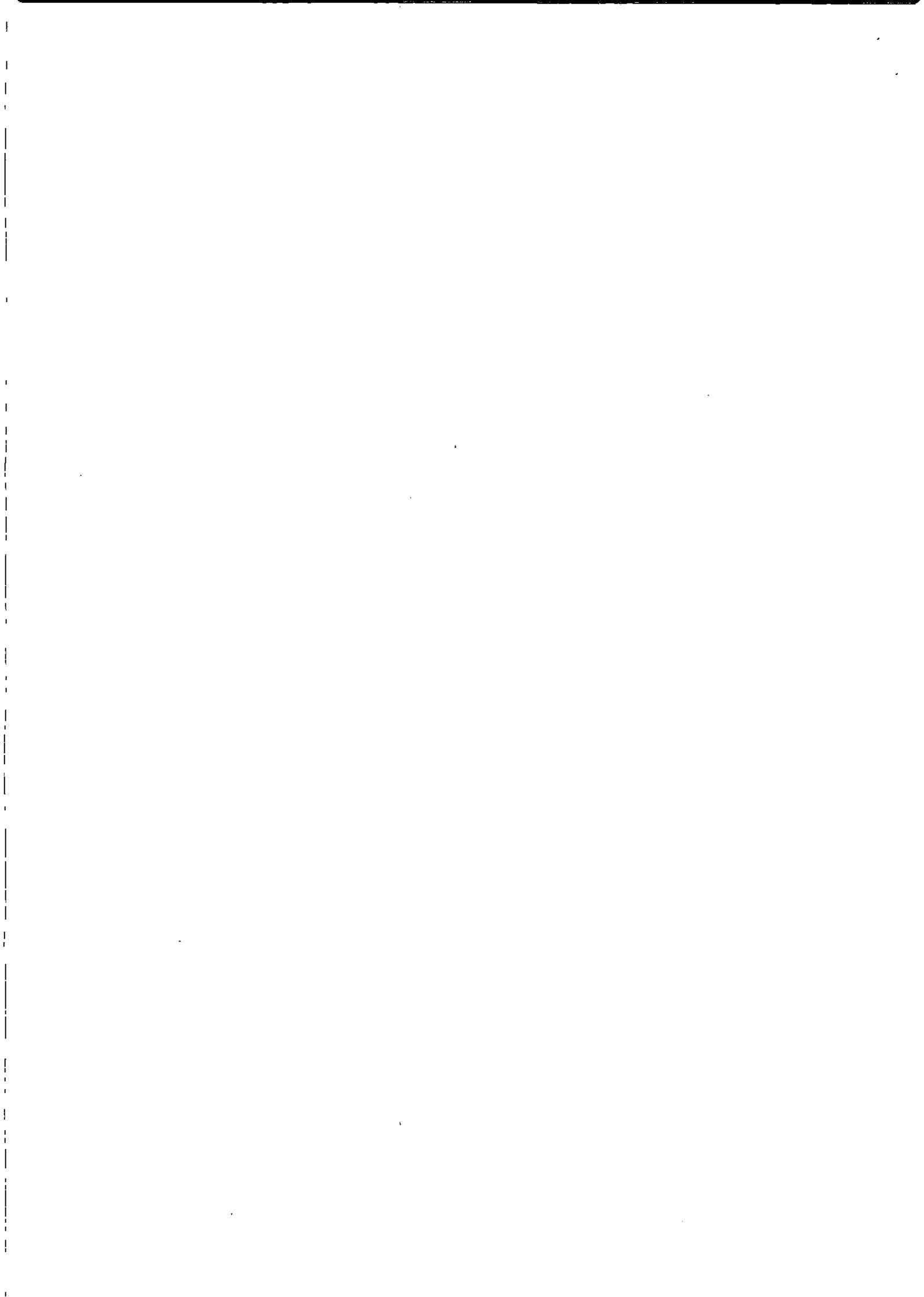
	C) 15	D)9.5	
Q.9)	Following data are the incomes (in thousands of rupees) for a sample of 12 households. Find the range of the data 23,17,32,60,22,52,29,38,42,92,27,46		D
	A)92	B)70	
	C) 60	D)75	
Q. 10)	Following data are the incomes (in thousands of rupees) for a sample of 12 households. Find the first quartile (25 <sup>th</sup> percentile) 23,17,32,60,22,52,29,38,42,92,27,46		B
	A)27	B)25	
	C) 22	D)23	
Q.11)	Parametric test, unlike the non-parametric tests. make certain assumptions about		A
	A) <b>The underlying distribution</b>	B)The sample size	
	C) The population size	D)None of the above	
Q. 12)	Two types of errors associated with hypothesis testing are Type I and Type II. Type II error is committed when		B
	A)We reject the null hypothesis whilst the alternative hypothesis is true	B) <b>We accept a null hypothesis when it is not true</b>	
	C) We reject the null hypothesis whilst the alternative hypothesis is true	D)None of the above	
Q.13)	The null hypothesis of the sign test is that		C
	A)Half the ranks to be less than the mean and half greater than the mean	B)The lower half the ranks to have the same standard deviation as the upper half	
	C) <b>Half the ranks to be less than the median and half greater than the median</b>	D)The lower half the ranks to have the same mean as the upper half	
Q. 14)	What is an effect size?		D
	A)The likelihood of type 1 and type 2 errors	B)The number of expected cases	
	C) The variance explained by the measures	D) <b>The magnitude of the relationship between variables</b>	
Q.15)	What does a significant result in a chi-square test imply?		A
	A) <b>It implies that the sample is not representative of the population</b>	B)That homogeneity of variance has not been established	
	C) That there is a significant	D)All of these are possible	



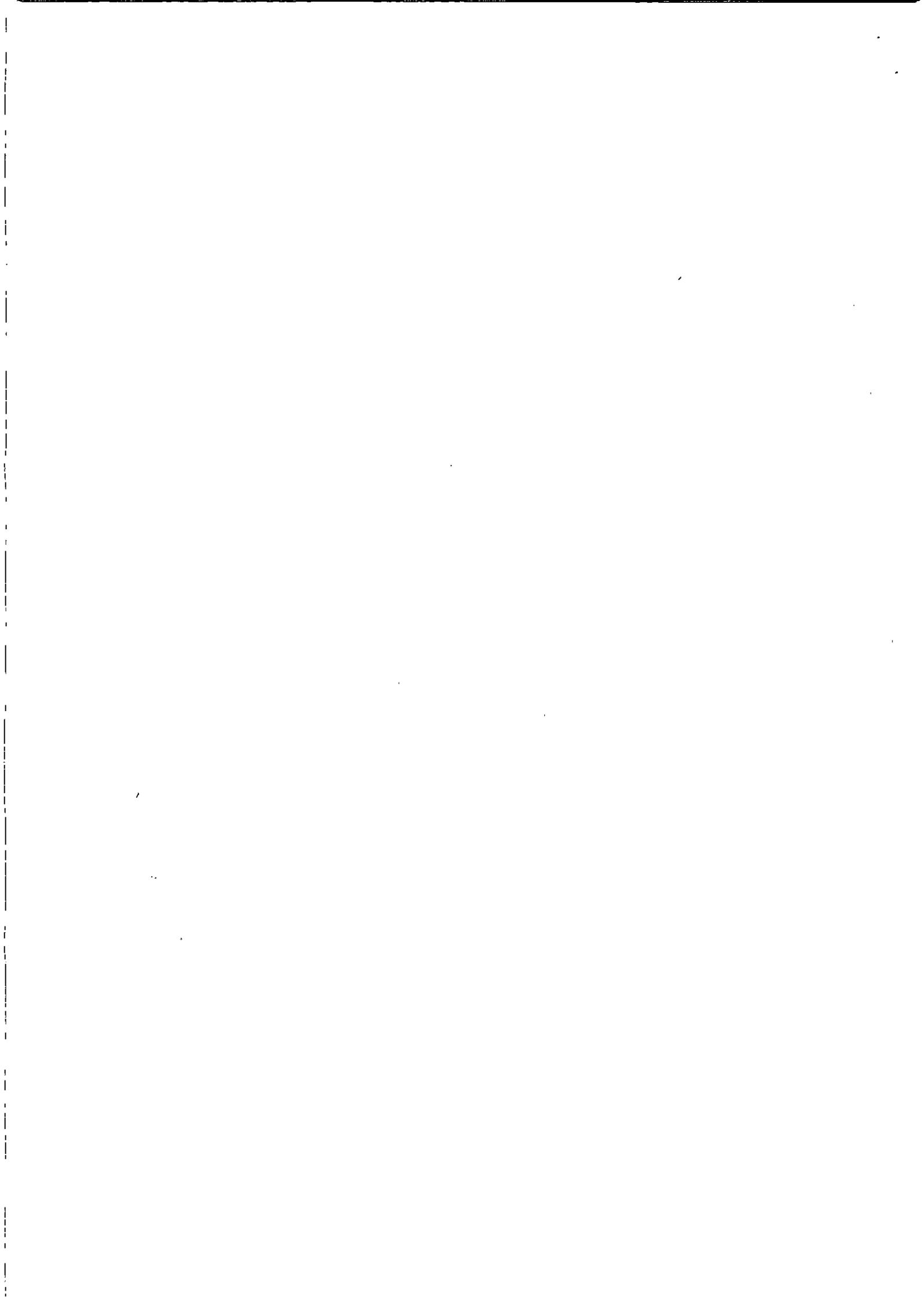
	C) That there is a significant difference between the three categorical variables included in the analysis	D) All of these are possible	
Q. 16)	One or two tail tests will determine		A
	A) <b>If the region of rejection is located in one or two tails of the distribution</b>	B) If the two extreme values (min or max) of the sample need to be rejected	
	C) if the hypothesis has one or possible two conclusions	D) None of the above	
Q.17)	What are the two types of variances which can occur in your data?		D
	A) Repeated and extraneous	B) Independent and confounding	
	C) Experimenter and participant	D) <b>Between or within groups</b>	
Q. 18)	You obtained a significant test statistic when comparing three treatments in a one-way ANOVA. In words, how would you interpret the alternative hypothesis $H_A$ ?		C
	A) Exactly two of the three treatments have the same effect on the mean response.	B) All three treatments have different effects on the mean response.	
	C) <b>At least two treatments are different from each other in terms of their effect on the mean response.</b>	D) All of the above.	
Q.19)	..... will help in finding out a problem for research		C
	A) Tutor	B) Professor	
	C) <b>Guide</b>	D) HOD	
Q. 20)	What does a descriptive study seek to accomplish?		B
	A) Attempts to reveal why or how one variable produces changes in another	B) <b>Discovers answers to the questions who, what, when, where, or how much</b>	
	C) Emphasizes a full contextual analysis of a few events or conditions and their interrelations	D) Attempts to capture a population's characteristics by making inferences from a sample's characteristics and testing resulting hypotheses	
Q.21)	An interval scale contains.....		A
	A) <b>The properties of order, classification, and equal distance between points but no unique origin</b>	B) Mutually exclusive and collectively exhaustive categories, but without the	



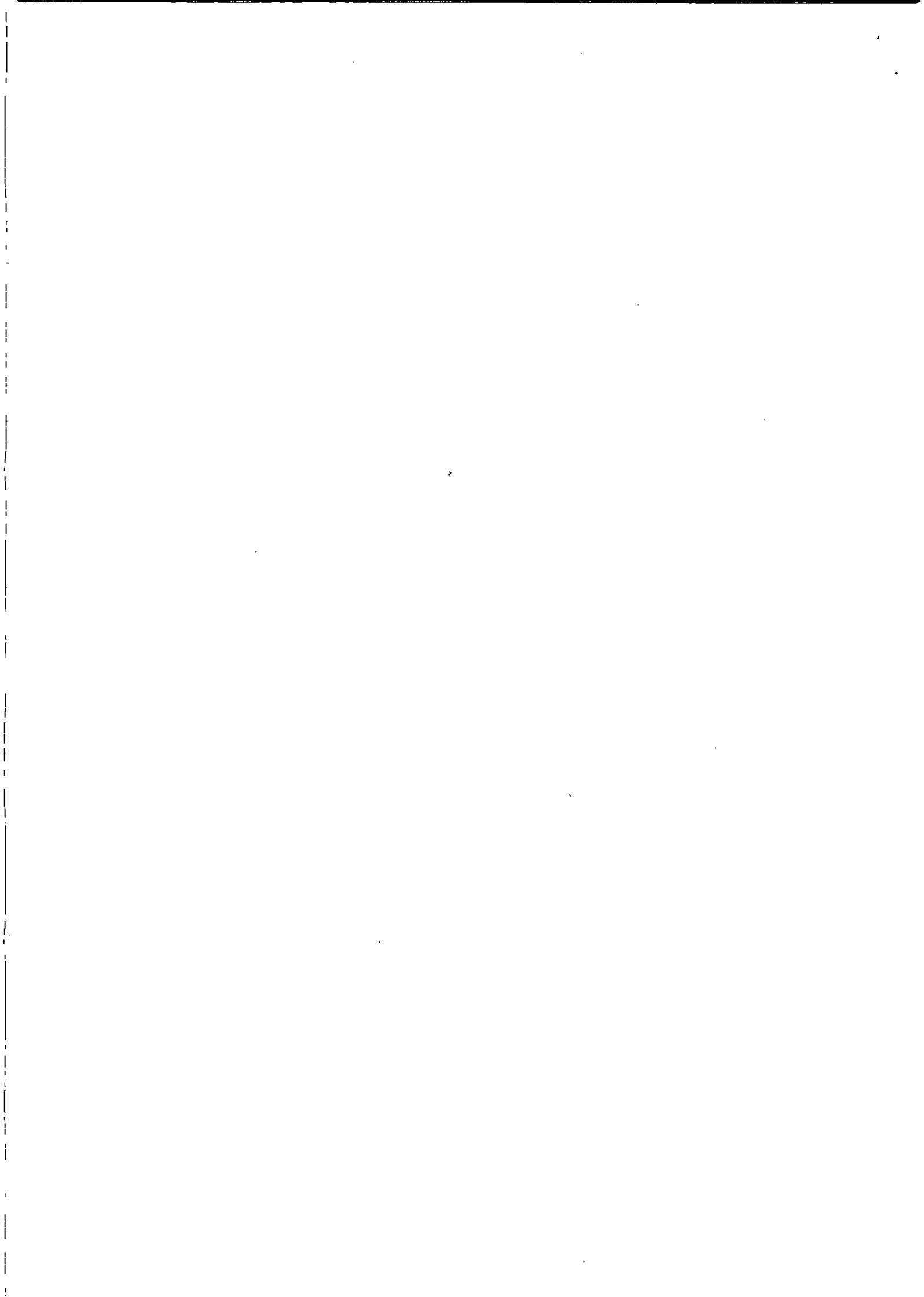
		properties of order, distance, and origin	
	C) The properties of classification, order, equal distance, and unique origin	D) Mutually exclusive and collectively exhaustive categories as well as the property of order, but not distance or unique origin	
Q. 22)	Second step in problem formulation is		D
	A) Discussions	B) Survey	
	C) Statement of the problem	D) <b>Understanding the nature of the problem</b>	
Q.23)	Last step in problem formulation is.....		B
	A) Discussion	B) <b>Re Phrasing the Research problem</b>	
	C) Literature survey	D) Survey	
Q. 24)	Which ONE of these is the best description of secondary data?		C
	A) Ordinal data.	B) Omnibus data	
	C) <b>Existing data.</b>	D) Ordinary data.	
Q.25)	A .....is an abstraction formed by generalization from particulars		B
	A) Variable	B) <b>Concept</b>	
	C) facts	D) Hypothesis	
Q. 26)	Sum of absolute deviation about mean is		A
	A) <b>least</b>	B) greatest	
	C) zero	D) one	
Q.27)	Two unbiased dice are thrown, find the probability that the total of the numbers on the dice is 8		A
	A) <b>5/36</b>	B) 1/6	
	C) 1/3	D) 1/9	
Q. 28)	If three fair coins are tossed simultaneously, what is the probability that two heads will appear?		C
	A) 2/3	B) 1/3	
	C) <b>3/8</b>	D) 1/4	
Q.29)	At a given probability of error, binary coherent FSK is inferior to binary coherent PSK by.		B
	A) 6 dB	B) <b>3 dB</b>	
	C) 2 dB	D) 0 dB	
Q. 30)	The bandgap of Silicon at 300 K is		B
	A) 1.36 eV	B) <b>1.10 eV</b>	
	C) 0.80 eV	D) 0.67 eV	
Q.31)	During transmission over a certain binary communication channel, bit errors occur independently with probability p. The probability of AT MOST one bit in error in a block of n bits is given by		C

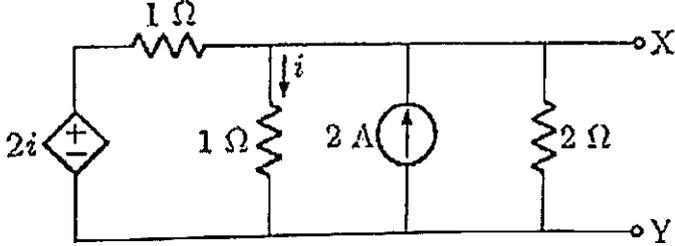


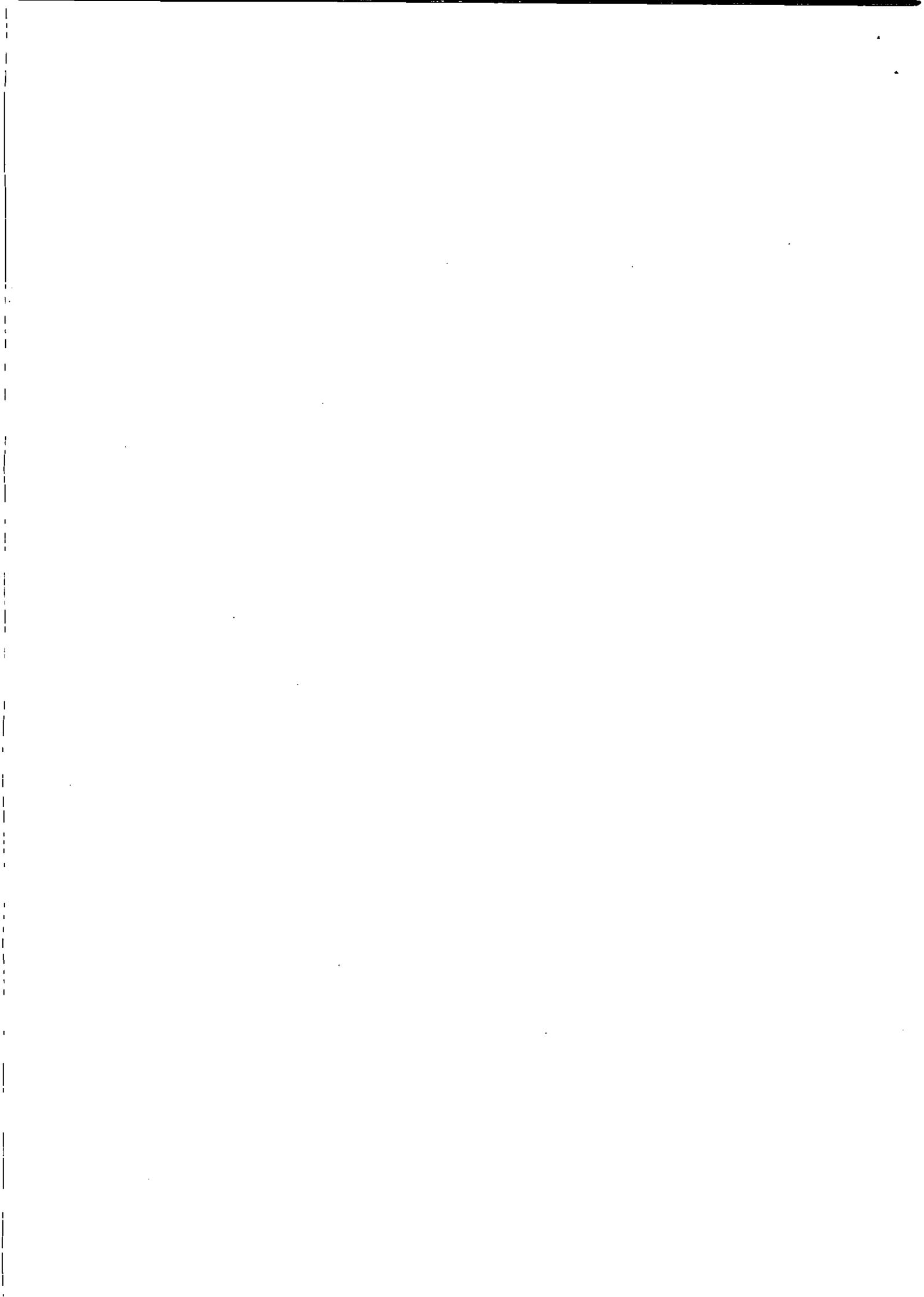
	A) $p^n$	B) $1-p^n$	
	C) $np(1-p)^{n-1}+(1-p)^n$	D) $1-(1-p)^n$	
Q. 32)	Once a PAL has been programmed:		A
	A) <b>It cannot be reprogrammed</b>	B) Its outputs are only active HIGHs	
	C) Its outputs are only active LOWs	D) Its logic capacity is lost	
Q.33)	What is the output voltage $V_0$ of the circuit below		C
	A) -1.1 V	B) +1.1 V	
	C) 1.0 V	D) 10 V	
Q. 34)	If $\beta_{DC}$ is increased by 10%, the collector-to-emitter voltage drop		C
	A) increases by less than or equal to 10%	B) decreases by more than 10%	
	C) <b>decreases by less than or equal to 10%</b>	D) increases by more than 10%	
Q.35)	In the modulo-6 ripple counter shown in figure, the output of the 2-input gate is		C
	A) a NAND gate	B) a NOR gate	
	C) <b>an OR gate</b>	D) an AND gate	
Q. 36)	What is the resolution of a digital-to-analog converter (DAC)?		C
	A) It is the comparison between the actual output of	B) It is the deviation between the ideal straight-line output and	



	the converter and its expected output.	the actual output of the converter.	
	<b>C) It is the smallest analog output change that can occur as a result of an increment in the digital input.</b>	D) It is its ability to resolve between forward and reverse steps when sequenced over its entire range.	
Q.37)	In the transistor amplifier circuit shown in the figure below, the transistor has the following parameters: $\beta_{DC} = 60$ , $V_{BE} = 0.7V$ , $h_{ic} \rightarrow \infty$ . The capacitance $C_c$ can be assumed to be infinite.		<b>C</b>
	Under the DC conditions, the collector-or-emitter voltage drop is		
	A) 4.8 V	B) 5.3 V	
	C) <b>6.0 V</b>	D) 6.6 V	
Q. 38)	The voltage gain $A_v$ of the circuit shown below is		<b>D</b>
	A) $ A_v  \approx 200$	B) $ A_v  \approx 100$	
	C) $ A_v  \approx 20$	D) $ A_v  \approx 10$	
Q.39)	At a given probability of error, binary coherent FSK is inferior to binary coherent PSK by.		<b>B</b>
	A) 6 dB	B) <b>3 dB</b>	
	C) 2 dB	D) 0 dB	
Q. 40)	When a plane wave traveling in free-space is incident normally on a medium having the fraction of power transmitted into the medium is given by		<b>A</b>
	A) <b>8/9</b>	B) 1/2	
	C) 1/3	D) 5/6	



Q.41)	<p>A multiple-choice question on a test has 5 answers. If a student chooses one answer based on "pure guess", what is the probability that the answer is wrong</p> <p>A) 50%                      B) <b>80%</b></p> <p>C) 20%                      D) 75%</p>	B
Q. 42)	<p>For the circuit shown in the figure, the Thevenin voltage and resistance looking into X -Y are</p>  <p>A) <math>4/3</math> V, <math>2\Omega</math>                      B) 4V, <math>2/3 \Omega</math></p> <p>C) <math>4/3</math>V, <math>2/3 \Omega</math>                      D) <b>4V, <math>2\Omega</math></b></p>	D
Q. 43)	<p>The transmission line with a characteristic impedance of <math>100 \Omega</math> is used to match a <math>50 \Omega</math> section to a <math>200 \Omega</math> section. If the matching is to be done both at 429 MHz and 1 GHz, the length of the transmission line can be approximately</p> <p>A) 82.5 cm                      B) <b>1.05 m</b></p> <p>C) 1.58 m                      D) 1.74 m</p>	B
Q. 44)	<p>A source generates three symbols with probabilities 0.25, 0.25, 0.50 at a rate of 3000 symbols per second. Assuming independent generation of symbols, the most efficient source encoder would have average bit rate is</p> <p>A) 6000 bits/sec                      B) <b>4500 bits/sec</b></p> <p>C) 3000 bits/sec                      D) 1500 bits/sec</p>	B
Q. 45)	<p>An AM signal and a narrow-band FM signal with identical carriers, modulating signals and modulation indices of 0.1 are added together. The resultant signal can be closely approximated by</p> <p>A) broadband FM                      B) BSSB with carrier.</p> <p>C) <b>SSB without carrier</b>                      D) DSB-SC</p>	C
Q. 46)	<p>A 1 mW video signal having a bandwidth of 100 MHz is transmitted to a receiver through cable that has 40 dB loss. If the effective one-side noise spectral density at the receiver is <math>10^{-20}</math> Watt/Hz, then the signal-to-noise ratio at the receiver is</p> <p>A) <b>50 dB</b>                      B) 60 dB</p> <p>C) 40 dB                      D) 30 dB</p>	A
Q. 47)	<p>A long-channel NMOS transistor is biased in the linear region with <math>V_{DC} = 50</math> mV and is used as a resistance. Which one of the following NOT correct?</p>	D



	A) If the device width $W$ is increased, the resistance decreases.	B) If the threshold voltage is reduced, the resistance decreases.	
	C) If the device length $L$ is increased, the resistance increases.	D) If $V_{GS}$ is increased, the resistance increases.	
Q. 48)	One end of a loss-less transmission line having the characteristic impedance of $75\Omega$ and length of 1 cm is short-circuited. At 3 GHz, the input impedance at the other end of transmission line is		<input type="checkbox"/> D
	A) 0	B) Resistive	
	C) Capacitive	D) <b>Inductive</b>	
Q. 49)	Which is the major factor for determining whether a medium is free space, lossless dielectric or a good conductor		<input type="checkbox"/> B
	A) Attenuation constant	B) <b>Loss tangent</b>	
	C) Reflector coefficient	D) Constitutive parameters.	
Q. 50)	Three identical amplifiers with each one having a voltage gain of 50, input resistance of $1k\Omega$ and output resistance of $250\Omega$ are cascaded. The opened circuit voltages gain of the combined amplifier is		<input type="checkbox"/> D
	A) 49dB	B) 51dB	
	C) 98dB	D) <b>102dB</b>	

