

POPULATION STUDIES

PAPER - III

Note : This paper contains seventy five (75) objective type questions of two (2) marks each. All questions are compulsory.

Read the paragraph given below and answer questions (1 to 6) :

In rural areas of low-income countries, rapid population growth has often resulted in added pressure on agricultural land, resulting in land fragmentation and the reduction of yeilds. Such a process is at the root of a further cycle of environmental damage as the people who lack adequate land in one region migrate to ever more environmentally fragile areas in search of better chances of subsistence. Although the rural population of developing countries is expected to increase more slowly in the future than it did over past 40 years, several regions already have very high population densities relative to available agricultural land. Consequently, even low levels of population growth are likely to result in added pressures on the rural environment. In those regions, the continued destruction of natural resources as a result of attempts to extend the agricultural frontier is very likely to continue or to accelerate in the future.

When considering responses to environmental problems, it is necessary to recognise that social-institutional factors are as important as the technological ones. Traditional societies developed communal rules for managing a scarce resource. Population growth has the potential to destabilise such communal arrangements, since rules that functioned adequately at a low population density may lead to over exploitation and pollution at a higher density.

1. Rapid population growth in rural areas of low income countries results into :
 - (1) Increased use of pesticides
 - (2) Increased use of stubble burning
 - (3) Land fragmentation and reduction of yeilds**
 - (4) intensive use of irrigation

2. In spite of slow rural population growth in low income countries, environmental damage will continue because :
 - (1) Consumption level of the population is high
 - (2) Agricultural density is high**
 - (3) Adoption of primitive method in agriculture
 - (4) High use of chemical fertiliser

3. Rural population growth in low income countries causes which of the followings ?

- (a) Pushes people to migrate out
- (b) Extends the agricultural frontier
- (c) Intensifies the use of labour in agriculture

Code :

- (1) **Only (a) and (b)**
- (2) Only (b) and (c)
- (3) Only (a) and (c)
- (4) All (a), (b) and (c)

4. Assertion (A) : Human activities in environmentally fragile areas cause damage to the environment .

Reason (R) : Rural population growth leads to migration of people to environmentally fragile areas.

Code :

- (1) **Both (A) and (R) are true and (R) is correct explanation of (A).**
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

5. Which of the following is the correct combination of factors while understanding population growth and environmental degradation ?

- (1) Social and Institutional
- (2) Institutional and Technological
- (3) **Social-institutional and Technological**
- (4) Social and Technological

6. Which one among the following is not true while considering population growth and resource management ?

- (1) Traditional societies developed communal rules for managing scarce resources.
- (2) **Communal rules work well even when there is high population density.**
- (3) Population growth may destabilise the communal rule.
- (4) Communal rules may cause over-exploitation of scarce resources at higher population density.

7. When there is no extramatrital fertility, the Coale's fertility index i.e. over all fertility (If) is estimated using :

- (1) $I_f = I_g \cdot I_m + (1 - I_m) I_h$ (2) **$I_f = I_g \cdot I_m$**
(3) $I_f = I_g \cdot I_m + I_h$ (4) $I_f = I_g \cdot I_m + (1 - I_h)$

Where I_g - Index of marital fertility
 I_m - Index of proportion married
 I_h - Index of non-marital fertility

8. In which of the following year Thomas Malthus write "First Essay on Principle of Population" ?

- (1) 1698 (2) 1898 (3) **1798** (4) 1959

9. The International Day for Older Person's is celebrated on which of the following date ?

- (1) 1st March (2) **1st October**
(3) 15th September (4) 30th July

10. The term 'Glass Ceiling' refers to which of the following ?

- (1) **Barriers that prevent women from advancing beyond a certain level.**
(2) Barriers that prevent children from advancing beyond a certain level.
(3) Barriers that prevent older people from advancing beyond a certain level.
(4) None of the above.

11. The basic relation between the indices and cumulative fertility measures are given below. Which one of the following is not correct ? Terms taken from Bongaart Model.

- (1) $TFR = C_m \times T_M$ (2) $C_1 = \frac{T_N}{T_F}$
(3) **$C_c = \frac{T_M}{T_N}$** (4) $C_c \times C_a = \frac{T_M}{T_N}$

12. Which of the following is the best example of the result of 'push factors' operating in place of origin ?
- (1) **Labour out migration**
 - (2) Movement along with head of the family
 - (3) Movement of students for better education
 - (4) Movement after marriage
13. Which one of the following combination of States is correctly arranged in ascending order (lower to higher) of their population Size, as per 2011 Census data ?
- (1) Bihar, Uttar Pradesh, Maharashtra, West Bengal
 - (2) **West Bengal, Bihar, Maharashtra, Uttar Pradesh**
 - (3) Maharashtra, Bihar, Uttar Pradesh, West Bengal
 - (4) Bihar, Maharashtra, West Bengal, Uttar Pradesh
14. The estimate of Total Fertility Rate in India given by Sample Registration System is found to be lower than estimated in demographic surveys.
- Which of the following statements correctly explains it ?
- (1) Field workers in demographic surveys are better trained and thus capture more births
 - (2) Field supervision in demographic surveys is better and thus more births are captured
 - (3) Both (1) and (2) are correct
 - (4) **The statement made about the level of TFR in two sources of data is not correct**
15. Which amongst the following is not true about the Rashtriya Kishore Swasthya Karyakram(RKSK) ?
- (1) It focus on holistic model based on continuum of care.
 - (2) It introduces community based interventions through peer educators.
 - (3) **It covers, compulsory health check-up adolescents in the age-group of 10-19 years.**
 - (4) It targets nutrition reproductive health and substance abuse among adolescents.

16. "Building Knowledge Base on Population Ageing in India (BKPAI)" Survey was conducted in which of the following states of India ?
- (1) All States of India
 - (2) Only in Major States of India
 - (3) Only in South Indian States
 - (4) Selected Seven States of India**
17. According to 2011 Census, which of the following states has the lowest population density?
- (1) **Rajasthan**
 - (2) Gujarat
 - (3) Madhya Pradesh
 - (4) Orissa
18. Among the following which one does not constitute a target under Millennium Development Goal (MDG) ?
- (1) Reduce MMR by three quarters
 - (2) Achieve Universal Access to 'Reproductive Health Services'**
 - (3) Achieve Universal Access to Primary Education
 - (4) Reduce under five mortality by two-thirds
19. According to data published in SRS Bulletin Dec. 2016, which state has highest level of infant mortality rate in Urban areas ?
- (1) Odisha
 - (2) Madhya Pradesh
 - (3) Bihar**
 - (4) Uttar Pradesh
20. Arrange the following countries according to their level of population growth rate (average annual percent change), low to high (Estimates for 2016, World Fact Book) using code given below :
- (a) USA (b) UK (c) Japan (d) France
- Code :
- (1) (d), (c), (a), (b)
 - (2) (b), (c), (d), (a)
 - (3) (c), (d), (b), (a)**
 - (4) (a), (c), (d), (b)

21. According to 2011 Census, which of the following state has the lowest female literacy ?

- (1) Jammu and Kashmir (2) Bihar
(3) **Jharkhand** (4) Rajasthan

22. Match different types of birth intervals given in List - I with their explanations given in List - II using code given below :

List - I

List - II

- | | |
|-------------------------------|---|
| (a) Closed Birth Interval | (i) The Closed Birth Interval which includes the survey date and ends after this date in future |
| (b) Open Birth Interval | (ii) The period between two live births |
| (c) Straddling Birth Interval | (iii) The period elapsed since the last live birth till survey date |
| (d) Forward Birth Interval | (iv) The period from the survey date to the date of next birth |

Code :

(a) (b) (c) (d)

(1) (ii) (i) (iv) (iii)

(2) (ii) (iii) (iv) (i)

(3) (ii) (iv) (i) (iii)

(4) (ii) (iii) (i) (iv)

23. Arrange the following countries according to their population growth rate (average annual percent change), low to high (Estimates 2016, World Fact Book) using code given below :

- (a) Pakistan (b) India (c) Sri Lanka (d) Bangladesh

Code :

(1) (d), (b), (c), (a)

(2) (c), (d), (b), (a)

(3) (c), (b), (a), (d)

(4) (d), (b), (a), (c)

24. Match the International days shown in List - I with their dates when they are celebrated shown in List - II, using code given below :

List - I	List - II
(a) Environment Day	(i) June 21
(b) Health Day	(ii) April 7
(c) Toilet Day	(iii) June 5
(d) Yoga Day	(iv) Nov. 19

Code :

- (a) (b) (c) (d)
- (1) (i) (ii) (iv) (iii)
- (2) **(iii) (ii) (iv) (i)**
- (3) (ii) (iv) (i) (iii)
- (4) (iv) (iii) (ii) (i)

25. The 'PCPNDT Act' in India was enacted for which one of the following purpose ?

- (1) To reduce MMR
- (2) To reduce TFR
- (3) To stop female infanticide
- (4) To stop female foeticide**

26. The theory of epidemiological transaction deals with which one of the following ?

- (1) Changes in mortality pattern
- (2) Changes in fertility pattern
- (3) Changes in disease pattern**
- (4) Changes in migration pattern

27. Match various indicators of use of family planning program services in List - I with their values in List - II as reported in NFHS - IV :

List – I	List - II
(a) Unmet need of limiting	(i) 47.8%
(b) Unmet need of spacing	(ii) 12.9%
(c) Use of contraceptives among eligible couples	(iii) 7.2%
(d) Total unmet need	(iv) 5.7%

Code :

(a) (b) (c) (d)

(1) (iv) (iii) (ii) (i)

(2) (iv) (iii) (i) (ii)

(3) (iii) (iv) (i) (ii)

(4) (ii) (iii) (iv) (i)

28. Match the Demographics Surveys listed in List - I with the periods in where they were conducted shown in List - II using code given below :

List - I	List - II
(a) NFHS - 3	(i) 2005 - 06
(b) NFHS - 4	(ii) 2007 - 08
(c) DLHS - 3	(iii) 2012 - 13
(d) DLHS - 4	(iv) 2015 - 16

Code :

(a) (b) (c) (d)

(1) (i) (ii) (iii) (iv)

(2) (i) (iii) (ii) (iv)

(3) (ii) (iii) (i) (iv)

(4) (i) (iv) (ii) (iii)

29. Which one of the following is the right expansion of SNCU ?
- (1) State and National Contraceptive Unit
 - (2) Sick Newborn Care Units**
 - (3) Severe Neonatal Care Units
 - (4) Sick Neonatal Care Unit
30. If population of a country can be divided into three broad age groups : P₀₋₁₄, P₁₅₋₅₉ and P₆₀₊, then child dependency ratio is defined by which one of the following ?
- (1) $\frac{P_{0-14}}{P_{15-59} + P_{60+}}$
 - (2) $\frac{P_{0-14}}{P_{0-14} + P_{15-59}}$
 - (3) $\frac{P_{0-14}}{P_{15-59}}$**
 - (4) $\frac{P_{0-14}}{P_{0-14} + P_{15-59} + P_{60+}}$
31. Which of the following Ministry is mainly responsible for the welfare of the older persons ?
- (1) Ministry of Health and Family Welfare
 - (2) Ministry of Social Justice and Empowerment**
 - (3) Ministry of Rural Development
 - (4) Ministry of Finance
32. Which of the following is NOT taken as a criterion for defining urban centres in India ?
- (1) Population size
 - (2) Status of basic amenities**
 - (3) Population density
 - (4) Male work force structure
33. Which of the following is one of the indicators used to compute 'Human Development Index' ?
- (1) Infant Mortality Rate
 - (2) Morbidity Rate
 - (3) Life Expectancy at birth**
 - (4) Death Rate

34. Arrange following states by nutritional status of under-five years children (weight-for-age) in the year 2015-16, highest to lowest, as per NFHS-4 fact-sheet.

- (a) Karnataka (b) Kerala
(c) Andhra Pradesh (d) Maharashtra

Code :

- (1) (a), (b), (c), (d) (2) (a), (c), (d), (b) (3) (b), (c), (d), (a) (4) **(d), (a), (c), (b)**

35. The 'National Health Policy 2017' aims to reduce IMR by the year 2019 to which of the following levels ?

- (1) 25 (2) **28** (3) 30 (4) 35

36. Which one of the following given in List - I is not matched correctly with items given in List - II ?

List - I

List - II

- | | |
|---------------------------------|-------------------------------------|
| (1) Coale-Demeny | (i) Model Life Table |
| (2) Whipple's index | (ii) Age-preference index |
| (3) Myer's Blended Index | (iii) Fertility preference |
| (4) Hajnal method | (iv) Singulate mean age at marriage |

37. As per the SRS Abridged life Table 2011-15, which among the following states is having the lowest male life expectancy at birth ?

- (1) Bihar (2) Haryana (3) Karnataka (4) **Rajasthan**

38. Which one of the following is correct annual rate of growth for the population, which takes 25 years to double itself ?

- (1) 2.5% (2) 2.7% (3) **2.8%** (4) 3.0%

39. Match Various Social Health Insurance Schemes given in List - I with states where these were launched given in List - II using code given below :

List - I	List - II
(a) Rajiv Arogya Shree Scheme	(i) Goa
(b) Kutumbshree Scheme	(ii) Andhra Pradesh
(c) Deen Dayal Swasthya Seva Yojana	(iii) Rajasthan
(d) Bhama Shah Yojana	(iv) Kerala

Code :

(a) (b) (c) (d)

(1) (ii) (iv) (i) (iii)

(2) (ii) (iii) (iv) (i)

(3) (iii) (iv) (i) (ii)

(4) (iv) (i) (ii) (iii)

40. Which among the following EAG states is having highest percent of institutional births during 5 years before the survey according to NFHS-4, 2015-16 ?

- (1) Bihar (2) Madhya Pradesh
(3) **Rajasthan** (4) Uttar Pradesh

41. Which among the following does not correctly describe the elderly population in India ?

- (1) **Males are more than females**
(2) Widows are more than widower
(3) Marginal workers are more than main workers
(4) Numbers of rural elderly are more than of urban

42. Which one of the following measure is useful for comparing the fertility level of two population ?

- (1) CBR (2) CEB
(3) ASFR (4) **TFR**

43. When was Emergency Contraceptive Pill (ECP) introduced in the family welfare programme by the Ministry of Health and Family Welfare, Government of India ?

- (1) **2002** (2) 2004 (3) 2005 (4) 2001

44. Ranking of health facilities viz PHCs, CHCs etc. started by the Government of India using which of the following data Source ?
- (1) **HMIS** (2) MCTS (3) DLHS (4) NFHS
45. Which of the following is not government strategy under 'Mission Parivar Vikas' for high fertility districts ?
- (1) Assured services
 (2) Building additional HR capacity
 (3) Ensuring commodity security and promotional schemes
 (4) **Public-private partnership for increasing modern contraceptive methods.**
46. Which one of the following statement is correct about the high sex ratio in a state of India ?
- (1) High number of males than females in the population.
 (2) **Low number of males than females in the population.**
 (3) High number of female infants than male infants in the population.
 (4) High number of females than males in the age group 15-49 years.
47. Which one of the following is not part of the RMNCH+A Programme ?
- (1) Maternal Health (2) Adolescent Health
 (3) **Geriatric Health** (4) Family Planning
48. Match items given in List - I with the their dates given in List - II using code given below :
- | List - I | List - II |
|----------------------------|--------------|
| (a) International Yoga Day | (i) April 7 |
| (b) World Environment Day | (ii) July 11 |
| (c) World Population Day | (iii) June 5 |
| (d) World Health Day | (iv) June 21 |
- Code :
- (a) (b) (c) (d)
- (1) (i) (ii) (iii) (iv)
 (2) (iii) (iv) (ii) (i)
 (3) (iv) (iii) (i) (ii)
 (4) **(iv) (iii) (ii) (i)**

49. Which code among the following is true related to measuring migration by using life table survival ratio ? It will be a gross measurement as life tables in India :

- (a) Cannot capture sub-regional variations
- (b) Cannot capture rural-urban variations
- (c) Cannot capture population sub-group variations
- (d) Cannot capture temporal variations

Code :

- (1) (a) and (b)
- (2) (a), (b) and (c)
- (3) (b), (c) and (d)
- (4) (b) and (d)

50. Match the stages under 'Demographic Transition' given in List - I with their descriptions given in List - II using code given below :

List - I

- (a) Stage - I
- (b) Stage - II
- (c) Stage - III
- (d) Stage - IV

List - II

- (i) Low birth and low death rates
- (ii) Declining birth rate and low death rate
- (iii) High birth rate and falling death rate
- (iv) High birth rate and high death rate

Code :

- (a) (b) (c) (d)
- (1) (iv) (i) (ii) (iii)
- (2) (iv) (iii) (i) (ii)
- (3) (iv) (ii) (iii) (i)
- (4) (iv) (iii) (ii) (i)

51. As per the SRS Bulletin December 2016, among the following states, which is having the highest female infant mortality rate ?

- (1) **Bihar**
- (2) Rajasthan
- (3) Madhya Pradesh
- (4) Uttar Pradesh

52. Which one of the following is not the part of commitment under the Family Planning-2020 Programme ?

- (1) Expanding the basket of choices.
- (2) Provision of services to all beneficiaries including adolescents through integrated RMNCH+A.
- (3) Fostering Partnership with Non-governmental sector for improved service delivery.
- (4) **Universal access to family planning services by 2020.**

53. Table below gives denominators and numerators of different fertility indicators.

Births	Women in reproductive ages	ASFR
B_{15-19}	W_{15-19}	$ASFR_{15-19}$
.	.	
.	.	
.	.	
$\frac{B_{45-49}}{B_{15-49}}$	$\frac{W_{45-49}}{W_{15-49}}$	$\frac{ASFR_{45-49}}{ASFR_{15-49}}$

Assuming ratio of female to male births as $\frac{F}{M}$ and total population P. Match the indicators

shown in List - I with their method of computation shown in List - II.

List - I	List - II
(a) TFR	(i) $\sum_{x=15}^{49} ASFR_{x-x+5} \times 5$
(b) GFR	(ii) $(B_{15-49}/W_{15-49}) \times 1000$
(c) CBR	(iii) $\sum_{x=15}^{49} ASFR_{x-x+5} \times \frac{F}{F+M} \times 5$
(d) GRR	(iv) $(B_{15-49}/P) \times 1000$

Code :

- (a) (b) (c) (d)
- (1) (iii) (iv) (ii) (i)
- (2) **(i) (ii) (iv) (iii)**
- (3) (i) (iii) (iv) (ii)
- (4) (iii) (iv) (i) (ii)

54. Life expectancy at age 1 for india as per SRS Abridge life Table 2011-15 was about ?

- (1) 65 years (2) 67 years **(3) 70 years** (4) 75 years

55. Which one of the following is not a mandate of 'National Commission on Population' ?
- (1) **To formulate state specific plans for promotion of family planning programme**
 - (2) To review, monitor and give directions for implementation of National Population Policy
 - (3) To promote synergy between health, education and development programmes
 - (4) To develop a vigorous people's programme to support the national efforts
56. Assertion (A) : The contraceptive use among women who had 3 or more sons found to be high compared to those who had less children.
- Reason (R) : Contraceptive use may have been adopted primarily by those who wish to stop child bearing.
- Code :
- (1) Both (A) and (R) are true and (R) is correct explanation of (A).
 - (2) **Both (A) and (R) are true, but (R) is not the only explanation of (A).**
 - (3) (A) is true, but (R) is false.
 - (4) (A) is false, but (R) is true.
57. With reorganisation of administrative boundaries, which of the following measures of migration gets affected ?
- (1) Migration rate
 - (2) Percentage distribution of migration in different streams
 - (3) **Percentage distribution of migration in distance categories**
 - (4) Net migration
58. Which of the following age groups has been used to describe the "Young Population" by United Nations ?

(1) 15-19

(2) **15-24**

(3) 15-29

(4) 15-34

59. Match various committees under List - I with their recommendations given in List - II and answer using code given below :

List - I

- (a) Bhore Committee
- (b) Mudaliar Committee
- (c) Srivastava Committee
- (d) Jungalwala Committee

List - II

- (i) Integration of health services
- (ii) Development of Primary Health Centers
- (iii) Creation of All India Health Services
- (iv) Reorientation of Medical Education

Code :

(a) (b) (c) (d)

- (1) **(ii) (iii) (iv) (i)**
- (2) (iii) (iv) (i) (ii)
- (3) (iv) (i) (ii) (iii)
- (4) (i) (ii) (iii) (iv)

60. Match names of the eminent Demographers in List - I with the year of population theory given in List - II using code given below :

List - I

- (a) Caldwell
- (b) Kingsley Devis
- (c) Liebestein's
- (d) Backer's

List - II

- (i) 1976
- (ii) 1957
- (iii) 1963
- (iv) 1960

Code :

(a) (b) (c) (d)

- (1) (i) (ii) (iii) (iv)
- (2) (ii) (iii) (iv) (i)
- (3) **(i) (iii) (ii) (iv)**
- (4) (iv) (iii) (ii) (i)

61. Earth quake is an example of which of the following hazard ?

- (1) **Geological Hazard**
- (2) Climatic Hazard
- (3) Man made Hazard
- (4) Environmental Hazard

62. The tendency of a population to grow after achieving the replacement level of fertility is known as :
- (1) Population Explosion (2) **Population Momentum**
 (3) Population Structure (4) Population Pyramid
63. Which of the following is the prime reason underlying 'Rural-Urban' migration in India ?
- (1) **Search of jobs and better employment opportunities**
 (2) Lure for better civic amenities
 (3) Better educational facilities
 (4) Cultural diversities
64. Which of the following states witnessed 'negative net migration' during 1980s ?
- (1) Maharashtra (2) **Punjab** (3) Gujarat (4) Haryana
65. Which one of the following is NOT the key highlight of National Health Policy 2017 ?
- (1) It aims to achieve universal access to good quality health care.
 (2) It proposes to free drug and free diagnostic services in public hospitals.
 (3) **It proposes atleast 5 beds per 1000 population to enable access within the first 60 minutes after a traumatic injury.**
 (4) It advocates pre-screening to reduce morbidity of non-communicable diseases.
66. Why do we celebrate 11 July as 'World Population Day'? The reason is, that is the approximate day when world population touched :
- (1) 1 billion (2) 4 billion (3) **5 billion** (4) 6 billion
67. What was the net gain in the urban population between 2001 and 2011 Censuses ?
- (1) About 50 million (2) About 60 million
 (3) About 80 million (4) **About 90 million**

68. Which of the following inputs data are essential for using P/E RATIO METHOD BASED ON DATA ABOUT ALL CHILDREN to estimate fertility parameters ?

- (a) Children ever-born classified by five year age group of mother
- (b) Births in a year classified by five-year age group of mother
- (c) Women by five year age-group
- (d) Total population

Code :

- (1) (a), (b), (c) **(2) (a), (b), (c), (d)** (3) (a), (c), (d) (4) (b), (c)

69. Which data source among the following could be used to study the settlement characteristics in India ?

- (1) Population census of India**
- (2) National Family Health Survey
- (3) Sample Registration System data
- (4) District level Health and (Facility) Survey

70. Which of the following streams of migration in india has experienced significant decrease in its proportion between 2001 and 2011 Censuses ?

- (1) Rural to Rural** (2) Rural to Urban
- (3) Urban to Urban (4) Urban to Rural

71. Which one of the following is not the measure of nutrition ?

- (1) Weight for height (2) **Glycaemic Index**
- (3) BMI (4) Waist to hip ratio

72. Which of the following combinations is correct about measures of population density ? Answer using code given below :
- (a) Crude and arithmetic density are one and the same thing.
 - (b) Physiological density is ratio between total population and total agricultural lands in a region.
 - (c) Agricultural density is ratio between agricultural population and total geographic area.
 - (d) The concept of 'room density' is commonly used by urban planners.

Code :

- (1) (a), (b) and (c)
 - (2) (a), (b) and(d)**
 - (3) (a) and (b)
 - (4) (b), (c) and (d)
73. Which of the following is a characteristically out migrating state ?
- (1) Maharashtra
 - (2) Punjab
 - (3) Gujarat
 - (4) **Odisha**

Direction : Read the data from the following life table and answer the questions no. 74 and 75 :

Age	L_N	5^L_x	T_x
0	L_0	5^L_0	T_0
15	L_{15}	5^L_{15}	T_{15}
60	L_{60}	5^L_{60}	T_{60}
100	L_{100}	5^L_{100}	T_{100}

74. Expectation of life for those who survive age 15 is :

- (1) $L_{100} - L_{15}$
- (2) $\frac{T_{15}}{L_{15}}$**
- (3) $\frac{T}{L} - L_{100}$
- (4) $\frac{T_{15} - T_{100}}{L_{15} - L_{100}}$

75. Number of person-years lived between ages 15 and 60 years are :

- (1) $L_{15} - L_{60}$
- (2) $\frac{T_{15} - T_{60}}{L_{15} - L_{60}}$**
- (3) $T_{15} - T_{60}$**
- (4) $5L_{15} - 5L_{60}$

- o o o -