Internal Assessment 3

ECON03SEC1
Department of Economics
Presidency University, Kolkata
Full Marks: 40
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Answer the following questions using Excel: $[4 \times 5 = 20]$

1. Using the data `GDP.xlsx`, for any two countries plot separate line charts for the components of GDP (Household Consumption Expenditure, Government final consumption expenditure, Net exports and Gross Capital formation).
2. Suppose that the firm's production function is $Q = F(K, L) = 50K^{0.5}L^{0.5}$. Suppose, too, that the price of labour $w = 5$ and the price of capital $r = 20$. What is the cost minimising input bundle if the firm wants to produce 1,000 units per year?
3. What is the average displacement of a manual car with 4 cylinders in the `mtcars.xlsx` dataset?
4. How does the number of cylinders `cyl` affect the mileage `mpg` for a given horsepower `hp`? Calculate the partial correlation in the `mtcars.xlsx` dataset.

Answer the following questions using R: $[4 \times 5 = 20]$

5. Calculate the HDI dimension indices and the HDI using the following formula

$$DimensionIndex = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

$$HDI = (I_{health} \times I_{education} \times I_{income})^{1/3}$$

for health, income, and education respectively for all the countries. Refer to the following table for the minimum and maximum values:

Dimension	Indicator	Minimum	Maximum
Health	Life Expectancy (years	20	85
Education	Expected years of schooling (years	0	18
	Mean years of schooling (years)	0	15
Standard of Living	GNI percapita (2011 PPP $)	100	75000

The actual values are in the data. Note that the *knowledge dimension index* is the average of the dimension index for the expected years of schooling, and the mean years of schooling.

6. Create a factor variable `group` that takes the values according to the HDI values in the table given below

Classification	HDI
Very high HDI	0.800 and above
High HDI	0.700 - 0.799
Medium HDI	0.550 - 0.699
Low HDI	Below 0.550

and then summarize the min, max, standard deviation, and mean for each group. The output is shown in the table below.

```
## # A tibble: 4 x 5
##   group           min   max     sd average
##   <fct>         <dbl> <dbl>  <dbl>   <dbl>
## 1 Very high HDI 0.800 0.979 0.0568   0.882
## 2 High HDI      0.703 0.796 0.0279   0.746
## 3 Medium HDI    0.550 0.699 0.0462   0.623
## 4 Low HDI       0.385 0.549 0.0469   0.484
```