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**САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
НИЗКОТЕМПЕРАТУРНЫХ И ПИЩЕВЫХ ТЕХНОЛОГИЙ**



Кафедра иностранных языков

АНГЛИЙСКИЙ ЯЗЫК

Программа, методические указания и контрольные работы
для студентов 2-го курса
всех специальностей и направлений
факультета заочного обучения и экстерната



**Санкт-Петербург
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Домбровская А.В., Назарова Е.В. Английский язык: Программа, метод. указания и контрольные работы для студентов 2-го курса всех специальностей и направлений факультета заочного обучения и экстерната / Под ред. Н.А. Дмитренко. – СПб.: СПбГУНИИТ, 2008. – 60 с.

Программа, методические указания и контрольные работы для студентов-заочников 2-го курса содержат 3 контрольных задания для промежуточного и итогового контроля усвоения грамматического минимума и лексики тематической направленности, предусмотренных рабочими программами.

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ПРОГРАММА

ВВЕДЕНИЕ

Практическое владение иностранными языками приобретает большое значение для специалистов, работающих в различных областях науки и техники.

Повышение качества перевода зарубежной научно-технической информации даёт большой экономический эффект.

Цель обучения

При заочном обучении и экстернате в неязыковых вузах практическое владение английским языком означает умение самостоятельно читать и переводить со словарем литературу на английском языке по специальности широкого профиля, с тем чтобы на основе приобретенных в вузе знаний, умений и навыков читать английские тексты по специальности, извлекать из них полезную для работы информацию.

Структура курса

Программа курса рассчитана на стандартный объем преподавания — 170 часов, из них 90 часов — аудиторных и 80 часов — самостоятельной работы студентов.

Успешность освоения программы контролируется шестью контрольными работами, сдачей текстов бытового, страноведческого и общенаучного профиля и одним зачетом. Курс завершается сдачей экзамена.

При осуществлении программы выделяется главное направление «язык для специальных целей». Это направление имеет задачу развить у студентов навык чтения специальной литературы с целью получения необходимой информации.

Содержание программы

Для развития навыков чтения общенаучной литературы и литературы по специальности широкого профиля решающими факторами являются:

- а) накопление словарного запаса
- б) овладение грамматическими категориями, необходимыми для понимания текста и перевода его с английского языка на русский.

А. Лексика английского языка

За полный курс обучения студент приобретает словарный запас в объеме 900-1000 лексических единиц.

Особенно большое значение для расширения запаса слов, необходимого для понимания научных текстов, имеет твердое усвоение системы английского словообразования: аффиксация, словосложение, аббревиация (сокращение) и конверсия. Особое внимание следует уделить конверсии и необходимо научиться с помощью формальных признаков и места в предложении определять, к какой части речи относятся одинаковые по написанию слова. Необходимо освоить основные префиксы (приставки) и суффиксы и запомнить также условные сокращения слов, принятые в английских научных и технических текстах.

Б. Грамматика английского языка

Морфология:

Имя существительное: число, падеж, артикли как признаки имени существительного (правило цепочки существительных), существительное в функции определения (правило цепочки существительных).

Предлоги: компенсация падежных отношений, места, направления, времени.

Имя прилагательное и наречие: степени сравнения, усиление сравнения. Перевод сравнительных предложений, содержащих конструкции типа: the more the less ...

Имена числительные: количественные, порядковые, дробные числительные, чтение дат.

Местоимения: личные, притяжательные, указательные, неопределенные, вопросительные, относительные, отрицательные. Неопределенное местоимение **one (ones)** и его функции. Неопределенные местоимения **some, any**, отрицательные местоимения **no** и их производные.

Глагол: основные формы. Вспомогательные глаголы. Многозначность глаголов **to be, to have, to do**. Действительный залог (Active Voice). Система времен: Simple, Continuous, Perfect, Perfect Continuous в действительном и страдательном залоге. Модальные глаголы. Страдательный залог (Passive Voice). Способы перевода

страдательного залога на русский язык. Неличные формы глагола.

Причастие: (I и II) формы и функции в предложении. Омонимия **-ing** и **-ed** форм.

Независимый причастный оборот.

Герундий: Формы и функции. Герундиальный оборот.

Инфинитив: Формы и функции. Инфинитивные обороты.

Служебные слова: артикли, предлоги, союзы.

Многофункциональность слов: it, that (those), one (ones), very, after, before, because, because of, as, since, if, whether, either, neither и др.

Синтаксис:

Структура предложения: части речи, члены предложения, порядок слов. Прямой порядок слов повествовательного предложения в утвердительной и отрицательной формах. Обратный порядок слов в вопросительном предложении. Оборот **there is (are)** в трех временах (Present, Past, Future).

Простое и сложное предложение. Типы придаточных предложений.

Наклонение: изъявительное, сослагательное и повелительное.

Условные предложения. Инверсия.

Программа, методические указания и контрольные работы предназначены для студентов – заочников 2-го курса всех специальностей, изучающих английский язык по двух годичной программе факультета ЗОиЭ. Контрольные работы составлены с учётом общенаучной лексики учебника Л.Н. Андриановой « Курс английского языка для вечерних и заочных технических вузов» М., « Высшая школа», 2007., рекомендованного кафедрой иностранных языков.

Методическое пособие состоит из двух частей.

В первой части пособия представлены три (№4, №5, №6) контрольные работы для студентов всех специальностей и направлений.

Во второй части пособия представлены тексты только для студентов специальностей и направлений 080000, 080500.

ВЫПОЛНЕНИЕ КОНТРОЛЬНЫХ ЗАДАНИЙ И ОФОРМЛЕНИЕ КОНТРОЛЬНЫХ РАБОТ

1. Студенты заочного отделения 2-го курса выполняют 3

контрольные работы.

2. Контрольное задание №4 в данном пособии предлагается в пяти вариантах. Студент должен выполнить один из пяти вариантов в соответствии с последними цифрами студенческого **шифра** (т.е. номер студенческого билета или зачётной книжки).

- 1 вариант- 1 или 2
- 2 вариант- 3 или 4
- 3 вариант- 5 или 6
- 4 вариант- 7 или 8
- 5 вариант – 9 или 0

3. Контрольные задания №5 и №6 предлагаются в двух вариантах

- 1 вариант — 1,3,5,7,9
- 2 вариант — 2,4,6,8,0

4. Выполнять **письменные** контрольные работы следует в отдельной тетради или все 3 контрольные работы в одной тетради. На обложке тетради следует указать свою фамилию, имя и отчество, **шифр**, адрес (по прописке), **номер** контрольной работы, **язык**.

5. Контрольная работа сдаётся **только** в деканат ЗОиЭ.

6. Контрольная работа должна быть **написана аккуратно, чётким почерком**. Материал контрольной работы следует располагать в тетради по следующему образцу:

английский текст **русский текст (перевод)**

На развороте тетради слева располагайте текст на английском языке, а справа — перевод.

Образец выполнения заданий приводятся в начале контрольной работы №4.

Исправление контрольной работы на основе рецензии.

1. По получении от рецензента проверенной контрольной работы следует внимательно прочитать рецензию, ознакомиться с замечаниями и проанализировать отмеченные в работе ошибки.
2. Если предложено сделать работу над ошибками, то необходимо исправить ошибки в письменном виде в конце данной контрольной работы. Если **нет зачёта** за данную контрольную работу, то её необходимо **исправить и сдать** на рецензию

снова.

3. Отрецензированные контрольные работы являются учебными документами, которые необходимо сохранять.
4. Для того, чтобы сдать экзамен необходимо иметь зачет за 1-ый курс, выполнить, 3 контрольные работы (№4, №5, №6) и устно сдать рекомендованные кафедрой тексты в дни консультаций или во время сессии.

Для того, чтобы выполнить контрольные работы следует воспользоваться учебником Л.Н. Андриановой, Н.Ю. Багровой, Э.В. Ершова «Курс английского языка для вечерних и заочных технических вузов», Высшая Школа, 2007г. (или более ранними изданиями).

При работе над контрольными работами рекомендуется пользоваться следующими словарями:

- Мюллер В.К. Большой англо-русский словарь: в новой редакции – М.: Цитадел-Трейд: Рипол классик, 2005
- Современный англо-русский политехнический словарь / составитель В.В. Бутник – М.: Вече, 1999
- Англо-русский словарь по пищевой промышленности / Под ред. Л.П. Ковальской — М.: Руссо, 1995.
- Розенберг М.Б. Англо-русский словарь по холодильной и криогенной технике. - М.: Русский язык, 1995.
- Англо-русский словарь по экономике и финансам / Под ред. проф., д-ра экон. наук А.В. Аникина — СПб.: Экономическая школа, 1993.

Если возникают трудности с выполнением контрольных заданий, следует обращаться за консультацией к преподавателям кафедры иностранных языков в дни **консультаций**.

Консультации проводятся регулярно 2 раза в месяц. Дату и время можно уточнить на кафедре иностранных языков в ауд. **3201**

Во второй части пособия представлены тексты ТОЛЬКО для студентов обучающихся по специальностям и направлениям 080000, 080500.

Тексты сдаются ТОЛЬКО УСТНО в дни консультаций или во

Часть 1

Контрольное задание № 4

Чтобы правильно выполнить контрольное задание № 4, необходимо усвоить следующие разделы грамматики английского языка по рекомендованному учебнику:

1. Условные предложения трех типов.
2. Сложные формы и функции инфинитива и причастия.
3. Обороты, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот, предложный инфинитивный оборот, независимый причастный оборот.

Вариант 1

АНГЛИЙСКИЙ ВАРИАНТ

ПЕРЕВОД

Образец выполнения к упр. 1

- | | |
|---|--|
| 1. We want this method to be applied at the plant. | 1. Мы хотим, чтобы этот метод применили на заводе. |
| 2. This method is reported to be applied at the plant. | 2. Сообщают, что этот метод применяется на заводе. |

Образец выполнения к упр. 2

- | | |
|--|---|
| 1. Having done a given number of operations , the machine stopped automatically. | 1. Прделав заданное количество операций, машина автоматически остановилась. |
| 2. A given number of operations having been done , the machine stopped automatically. | 2. После того, как было проделано заданное количество операций, машина автоматически остановилась. |
| 3. The installation was automated last year, its capacity rising by 25 per cent. | 3. Эта установка была автоматизирована в прошлом году, причем ее производительность увеличилась на 25%. |

Образец выполнения к упр. 3

- | | |
|--|---|
| 1. I did this work if I had time. | 1. Я делал эту работу, если у меня было |
|--|---|

время.

- | | |
|---|--|
| 2. If this machine were installed at the plant , labour productivity would increase considerably. | 2. Если бы эта машина была установлена на заводе, производительность труда значительно увеличилась бы. |
| 3. If the new technology had not been introduced , labour productivity would not have been raised. | 3. Если бы не была внедрена новая технология, производительность труда не повысилась бы. |

I. Перепишите и письменно переведите на русский язык следующие предложения, принимая во внимание, что объектный, субъектный и предложный инфинитивные обороты большей частью соответствуют придаточным предложениям.

1. Lasers are likely to be used in our everyday life soon.
2. The problem was too serious for us to solve it in haste.
3. They expect the meeting to be over in an hour.
4. The ozone layer is known to act as a filter.

II. Перепишите и письменно переведите на русский язык следующие предложения, учитывая различия в переводе зависимого и независимого причастных оборотов.

1. Having obtained new device, the researchers could make complex experiments.
2. The pressure being reduced in the tube, certain remarkable phenomena occur.
3. The elements in the periodic system fall into seven periods, with the first period containing only one element - hydrogen.

III. Перепишите и письменно переведите на русский язык следующие предложения, содержащие придаточные предложения условия.

1. If I were free, I should help you with great pleasure.
2. If we had tested this material, we should have used it in our work.
3. The results are always good if a scientific research is closely linked with practice.

VI. Прочтите и письменно переведите следующий текст.

Convection

When heat is carried from one place to another by a current of hot

liquid or gas, the process is known to be called convection. We know convection to take place only in liquids and gases. For instance, if a liquid increases in temperature, its density decreases and it tends to rise. And less warm parts of the liquid fill the space left by warmed liquid.

If we consider a room heated by a stove we shall see how heat is transferred by convection. The stove becoming hot, the surrounding air is warmed by its contact with the stove. The warm air rises to the ceiling, the cooler air taking its place. So, we have a continuous flow of air which causes warm air to circulate throughout the room. One should know that the process of convection involves several factors. We must have a medium the molecules of which are free to move from place to place.

We must also have a source of heat causing molecules to become warmer to effect the convection process.

Thus, the convection of heat is the transfer of heat from one place to another by moving the heated body. The particles touching the heated surface become warmer and lighter while ascending and giving place to the colder and heavier particles below.

Вариант 2

| АНГЛИЙСКИЙ ВАРИАНТ | ПЕРЕВОД |
|---|--|
| Образец выполнения к упр. 1 | |
| 1. We want this method to be applied at the plant. | 1. Мы хотим, чтобы этот метод применили на заводе. |
| 2. This method is reported to be applied at the plant. | 2. Сообщают, что этот метод применяется на заводе. |
| Образец выполнения к упр. 2 | |
| 1. Having done a given number of operations , the machine stopped automatically. | 1. Проделав заданное количество операций , машина автоматически остановилась. |
| 2. A given number of operations having been done , the machine stopped automatically. | 2. После того, как было проделано заданное количество операций , машина автоматически остановилась. |
| 3. The installation was automated last year, its capacity rising by 25 per cent. | 3. Эта установка была автоматизирована в прошлом году, причем ее производительность увеличилась на 25%. |
| Образец выполнения к упр. 3 | |
| 1. I did this work if I had time. | 1. Я делал эту работу, если у меня было время. |
| 2. If this machine were installed at the plant , labour productivity would increase considerably. | 2. Если бы эта машина была установлена на заводе , производительность труда значительно увеличилась бы. |
| 3. If the new technology had not been introduced , labour productivity would not have been raised. | 3. Если бы не была внедрена новая технология , производительность труда не повысилась бы. |

I. Перепишите и письменно переведите на русский язык следующие предложения, принимая во внимание, что объектный, субъектный и предложный инфинитивные обороты большей частью соответствуют придаточным предложениям.

1. It is necessary for the students to know the properties of various alloys.
2. The new information is said to be given in the next journal.

3. We found out that this criterion to have been valid.
4. Their advice proved to be very useful in that situation.

II. Перепишите и письменно переведите на русский язык следующие предложения, учитывая различия в переводе зависимого и независимого причастных оборотов.

1. Having finished the test, he put down the results at once.
2. The article deals with refrigerators, with particular attention being paid to the compressors.
3. The steam engine having been invented, a self-propelled vehicle was constructed.

III. Перепишите и письменно переведите на русский язык следующие предложения, содержащие придаточные предложения условия.

1. If I were you, I should check the data once more.
2. He will attend the scientific conference if he is told about it in advance.
3. If they had realized the problem earlier, it would have been solved long ago.

VI. Прочтите и письменно переведите следующий текст.

Heat transfer

Heat transfer is a dynamic process in which heat is transferred from one body to another cooler one. The rate of heat transfer depends upon the differences in temperature between the bodies; the greater the difference in temperature, the greater the rate of heat transfer.

Temperature difference between the source of heat and the receiver of heat is therefore the driving force in heat transfer. One might conclude that an increase in the temperature difference increases the driving force and thus increases the rate of heat transfer. The heat passing from one body to another travels through some medium which in general offers resistance to the heat flow. Both these factors, the temperature difference and the resistance to heat, affect the rate of heat transfer. Heat is known to be transferred in three ways: by conduction, convection and radiation.

When conducted, the molecular energy is directly exchanged from the hotter regions to the cooler ones, the molecules with greater energy communicating some of this energy to molecules with less energy.

Radiation is the transfer of heat energy by electromagnetic waves in the same way as electromagnetic light waves transfer light energy. Convection is the transfer of heat by the movement of groups of molecules in a fluid, these being moved either by density changes or by forced motion of fluid.

In practice, the three types of heat transfer are often found to occur together.

Вариант 3

АНГЛИЙСКИЙ ВАРИАНТ

ПЕРЕВОД

Образец выполнения к упр. 1

- | | |
|---|---|
| 1. We want this method to be applied at the plant. | 1. Мы хотим, чтобы этот метод применили на заводе. |
| 2. This method is reported to be applied at the plant. | 2. Сообщают, что этот метод применяется на заводе. |

Образец выполнения к упр. 2

- | | |
|--|---|
| 1. Having done a given number of operations , the machine stopped automatically. | 1. Проделав заданное количество операций , машина автоматически остановилась. |
| 2. A given number of operations having been done , the machine stopped automatically. | 2. После того, как было проделано заданное количество операций , машина автоматически остановилась. |
| 3. The installation was automated last year, its capacity rising by 25 per cent . | 3. Эта установка была автоматизирована в прошлом году, причем ее производительность увеличилась на 25% . |

Образец выполнения к упр. 3

- | | |
|---|--|
| 1. I did this work if I had time . | 1. Я делал эту работу, если у меня было время . |
| 2. If this machine were installed at the plant , labour productivity would increase considerably. | 2. Если бы эта машина была установлена на заводе , производительность труда значительно увеличилась бы. |
| 3. If the new technology had not been introduced , labour productivity would not have been raised. | 3. Если бы не была внедрена новая технология , производительность труда не повысилась бы. |

I. Перепишите и письменно переведите на русский язык следующие предложения, принимая во внимание, что объектный, субъектный и предложный инфинитивные обороты большей частью соответствуют придаточным предложениям.

1. He requests the letter to be sent at once because of its importance.
2. Atmospheric pollution is considered to have been a pressing

problem for each country.

3. Here are the instructions for you to follow.
4. Our professor is sure to take part in this discussion.

II. Перепишите и письменно переведите на русский язык следующие предложения, учитывая различия в переводе зависимого и независимого причастных оборотов.

1. Having stated the law of gravity, Newton was able to explain the structure of the Universe.
2. Our library buying all the new books, we need not buy them ourselves.
3. The inventor was demonstrating his new device, the workers watching its operation.

III. Перепишите и письменно переведите на русский язык следующие предложения, содержащие придаточные предложения условия.

1. If I were you, I should attend the lecture.
2. If they speak to the manager, he will give them all the necessary information.
3. If they had played better, they would have won the match.

VI. Прочтите и письменно переведите следующий текст.

How is heat transferred?

Heat may be transferred from a hotter body to a colder one by direct contact. Molecules having velocity tend to speed up their slower neighbours on collision. This method of heat transfer is known to be called conduction. Conduction is the flow of heat through an unequally heated body from places of higher to those of lower temperature. Some materials are good conductors of heat and others are poor conductors. Metal are considered to be excellent conductors, the best conductors of electricity being also the best conductors of heat.

In gases and liquids another process of heat transfer is very effective, i.e. convection. Convection is the transfer of heat by the motion of hot body itself carrying its heat with it. A current of liquid or gas that absorbs heat at one place and then moves to another place where it mixes with a cooler portion of the liquid and loses heat is called a convection current.

While the transfer of heat by means of conduction and convection requires the presence of a substance, heat transfer by radiation can occur in a vacuum. Heat may be radiated through any medium that does not absorb it. All bodies, hot or cold, are found to radiate heat at temperatures above absolute zero.

Вариант 4

АНГЛИЙСКИЙ ВАРИАНТ

ПЕРЕВОД

Образец выполнения к упр. 1

| | |
|---|--|
| 1. We want this method to be applied at the plant. | 1. Мы хотим, чтобы этот метод применили на заводе. |
| 2. This method is reported to be applied at the plant. | 2. Сообщают, что этот метод применяется на заводе. |

Образец выполнения к упр. 2

| | |
|--|---|
| 1. Having done a given number of operations , the machine stopped automatically. | 1. Прделав заданное количество операций, машина автоматически остановилась. |
| 2. A given number of operations having been done , the machine stopped automatically. | 2. После того, как было проделано заданное количество операций, машина автоматически остановилась. |
| 3. The installation was automated last year, its capacity rising by 25 per cent . | 3. Эта установка была автоматизирована в прошлом году, причем ее производительность увеличилась на 25%. |

Образец выполнения к упр. 3

| | |
|---|--|
| 1. I did this work if I had time . | 1. Я делал эту работу, если у меня было время. |
| 2. If this machine were installed at the plant , labour productivity would increase considerably. | 2. Если бы эта машина была установлена на заводе, производительность труда значительно увеличилась бы. |
| 3. If the new technology had not been introduced , labour productivity would not have been raised. | 3. Если бы не была внедрена новая технология, производительность труда не повысилась бы. |

I. Перепишите и письменно переведите на русский язык следующие предложения, принимая во внимание, что объектный, субъектный и предложный инфинитивные обороты большей частью соответствуют придаточным предложениям.

1. My parents want my sister to become a chemist.
2. The car is big enough for six people to ride in.
3. The data in the paper are certain to be quite reliable.

4. An ozone hole is reported to have been identified over the Antarctic.

II. Перепишите и письменно переведите на русский язык следующие предложения, учитывая различия в переводе зависимого и независимого причастных оборотов.

1. Having completed the discussion, the committee accepted the solution.
2. Metals are good conductors of electricity, copper and aluminum being the best ones.
3. The experiment having been performed, our practical problems were solved much quicker.

III. Перепишите и письменно переведите на русский язык следующие предложения, содержащие придаточные предложения условия.

1. If I were you, I should look for a new job.
2. If ordinary gases are greatly compressed, they become liquids.
3. The work would have been done long ago, if they had prepared for it more properly.

VI. Прочтите и письменно переведите следующий текст.

Pressure, temperature and volume of gases

It was stated that the boiling point of any substance depends on its pressure-temperature relationship. Any increase in pressure is known to be accompanied by a corresponding increase in the boiling point. A gas will liquefy when sufficient pressure is exerted to raise its boiling point above the temperature of the gas at the time of initial compression. This phenomenon is sure to be utilized in obtaining and controlling temperatures within the refrigeration systems.

Every gas has a temperature above which it cannot exist in a liquid state and regardless of the pressure exerted, it will not liquefy. This temperature is called the critical temperature, the corresponding pressure for dry saturated steam at the critical temperature being called the critical pressure.

So pressure, temperature and volume of any gas form a definite relationship in it and a change in any of them causes a change in the others. There are two laws that deal with gas at constant volume and constant temperature. The first of them states that with constant

temperature the volume of gas varies when the pressure is applied to it. The other states that the pressure of specific volume of gas is directly proportional to its absolute temperature. The temperature of a constant volume of gas being increased, a corresponding increase in pressure takes place.

АНГЛИЙСКИЙ ВАРИАНТ

ПЕРЕВОД

Образец выполнения к упр. 1

- | | |
|---|---|
| 1. We want this method to be applied at the plant. | 1. Мы хотим, чтобы этот метод применили на заводе. |
| 2. This method is reported to be applied at the plant. | 2. Сообщают, что этот метод применяется на заводе. |

Образец выполнения к упр. 2

- | | |
|--|---|
| 1. Having done a given number of operations , the machine stopped automatically. | 1. Проделав заданное количество операций , машина автоматически остановилась. |
| 2. A given number of operations having been done , the machine stopped automatically. | 2. После того, как было проделано заданное количество операций , машина автоматически остановилась. |
| 3. The installation was automated last year, its capacity rising by 25 per cent . | 3. Эта установка была автоматизирована в прошлом году, причем ее производительность увеличилась на 25% . |

Образец выполнения к упр. 3

- | | |
|---|--|
| 1. I did this work if I had time . | 1. Я делал эту работу, если у меня было время . |
| 2. If this machine were installed at the plant , labour productivity would increase considerably. | 2. Если бы эта машина была установлена на заводе , производительность труда значительно увеличилась бы. |
| 3. If the new technology had not been introduced , labour productivity would not have been raised. | 3. Если бы не была внедрена новая технология , производительность труда не повысилась бы. |

I. Перепишите и письменно переведите на русский язык следующие предложения, принимая во внимание, что объектный, субъектный и предложный инфинитивные обороты большей частью соответствуют придаточным предложениям.

1. This new car is considered to be safe.
2. This is a document for you to type and send to our partner.
3. The students seem to be making an experiment in the laboratory

now.

4. Mr. Smith asked the contract to be translated into English.

II. Перепишите и письменно переведите на русский язык следующие предложения, учитывая различия в переводе зависимого и независимого причастных оборотов.

1. Having done all the necessary preparations, we shall proceed to analyze the substances.
2. A fax machine is used for sending and receiving copies of documents, a phone line being applied in this case.
3. They having realized the danger, the experiment was stopped.

III. Перепишите и письменно переведите на русский язык следующие предложения, содержащие придаточные предложения условия.

1. If they had enough money, they would hire a designer to decorate their office.
2. If your immune system doesn't work properly, your life can be threatened by some diseases.
3. If he had not lost his passport, he would have gone to the conference abroad.

VI. перепишите и письменно переведите на русский язык следующий текст:

Heat Flow

The study of the movement of heat makes up that branch of physics which is known to be called thermodynamics.

Of course, all consideration of heat flow is to start with the idea that no heat will vanish into nothing or arise out of nothing. This is the law of conservation of energy. And this generalization is so important, in connection with thermodynamics in particular, that it is often called the first law of thermodynamics.

The first law of thermodynamics, however, simply states that the total energy content of a closed system is constant. It says nothing about the manner the energy may travel from place to place in such system.

Suppose a closed system consists of a quantity of ice placed in hot water. One can be quite certain that the ice will melt and the water will cool, the total energy remaining unchanged. However, some of it travelled

from the hot water into the ice. The experience of mankind tells us that this transfer of heat is to take place by all means.

Although the total heat of the system has not changed, there has been a change in the distribution of heat within the system, leading to an equalization of temperature. If we think of temperature as a kind of force directing the flow of heat, then it seems very natural that heat should flow from a region of high temperature to one of low.

Контрольная работа №5

Чтобы правильно выполнить задание №5, необходимо повторить следующие разделы курса английского языка по рекомендованному учебнику:

1. Формы и функции инфинитива.
2. Грамматические функции глаголов should, would.
3. Различные значения слов: provided, either ... or, neither ... nor, both ... and, the only.

| АНГЛИЙСКИЙ ВАРИАНТ | ПЕРЕВОД |
|--|--|
| Образец выполнения к упр. 1 | |
| This is an article to be translated into English. | Эта статья, <u>которую нужно перевести</u> на английский язык. |
| Образец выполнения к упр. 2 | |
| We decided that we should meet in February. | Мы решили, что <u>встретимся</u> в феврале. |
| If it were my book, I should give it to you. | Если бы это была моя книга, я бы дала ее вам. |
| Would you kindly help me. | Будьте любезны, помогите, пожалуйста. |
| Образец выполнения к упр. 3 | |
| She is either English or American. | Она <u>или</u> англичанка, <u>или</u> американка. |

Контрольная работа №5

ДЛЯ СТУДЕНТОВ ХТ специальностей и направлений: 140401 (070200); 140504 (101700); 190603 (230100)

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. The substance to be heated must be surrounded with a medium having a higher temperature.
2. Cold can be described as absence of heat.
3. To cool something means to reduce the heat in a solid, liquid or gaseous body.
4. To store electric charge you must use the condenser.

II. Перепишите и переведите на русский язык следующие

предложения, обращая внимание на различные значения глаголов should и would.

1. Each storage room should have at least two compressors.
2. If two compressors were used, we should have sufficient capacity.
3. They would do it if they had the necessary materials.
4. Young researchers expected that the new heating technique would give better results.

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. **Provided** you were not well acquainted with his design, you would not understand his invention.
2. **Either** copper **or** aluminum is used for cables.
3. This type of evaporator is **the only** one in our laboratory.
4. You can apply **both** metal **and** plastic in this case.

IV. Перепишите и письменно переведите на русский язык следующий текст.

The Ideal Refrigerant

In selecting fluids for refrigerating purposes one has to consider their thermodynamic, chemical, physiological and economic properties in addition to their physical characteristics.

The ideal refrigerant suitable for mechanical refrigerating systems should possess high refrigerating effect and low compression ratio.

The refrigerating effect of a fluid is measured by the amount of energy it is capable to absorb from the time it enters the evaporator as a liquid till it leaves the evaporator as a vapor to enter the suction line¹ leading to the compressor.

As the greatest amount of thermal energy is absorbed during evaporation of the liquid, it means that fluids having high values of latent heat of vaporization have the greater refrigerating effect. This is true only when high latent heat of vaporization is accompanied by reasonably high vapor density and by low specific heat of the liquid. All other characteristics being equal, the ideal refrigerant should possess a high latent heat of vaporization.

The condenser pressure divided by the evaporator pressure is equal to the

compression ratio. As the difference between two pressures increases, i.e. with higher compression ratio, the power necessary to operate the compressor becomes greater.

(1251)

Abbreviations

i.e.-Latin: id est-English: that is-Russian-то есть

¹ suction line-всасывающий трубопровод; линия всасывания

Вариант 2 (для шифров, заканчивающихся на чётные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. To cool a body is to remove heat from it and to keep it isolated from its surroundings.
2. A body to be cooled is to be brought in contact with a cooler one.
3. The physicist must be able to measure temperature accurately.
4. Energy is the capacity of a body to do work.

II. Перепишите и переведите на русский язык следующие предложения, обращая внимание на различные значения глаголов should и would.

1. We were asked whether we should be able to prove his new theory.
2. It would have been impossible to launch space rockets if we had not had the necessary synthetic fuels.
3. Everybody should be careful with this equipment.
4. Would you give me your instrument for a minute?

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. **Provided** there were no evaporators, it would be impossible to effect and control evaporation.
2. There is really **the only** problem to solve.
3. **Neither** this part (деталь) **nor** that one must be made of plastic.
4. Reciprocating compressors (поршневой компрессор) are used **both** for domestic refrigeration **and** for industrial application.

IV. Перепишите и письменно переведите на русский язык следующий текст.

Cycle of Refrigerant

The refrigerant is drawn from the refrigerator or evaporator at the lower pressure, compressed and delivered to the condenser at the higher pressure. There it is condensed and passes, as a liquid, to the regulating valve, allowing a certain quantity to pass to the evaporator, where it evaporates, and the cycle is thereby completed.

The refrigerator or evaporator is known to be generally composed of coils of pipe through which the refrigerant passes, the outside of the coils being surrounded by «brine», where brine circulation is used, or by air, where the direct expansion system is used.

The brine or air enters the refrigerator at a certain temperature and leaves it at a lower temperature, i.e. it gives up heat and is thereby cooled. The compressor requires to be driven, i.e. work has to be done. Steam, gas and oil engines, or electromotors are the chief prime movers employed for this purpose.

The condenser in general construction does not differ greatly from the evaporator. We know it to consist of coils through which the refrigerant passes and to be surrounded by the condensing media- water, or air, or only air, in some cases.

With regard to the thermal operations, the heat is brought into the machine by the brine, having been removed from the body to be cooled. The brine inlet is, therefore, the heat inlet.

This heat is transferred to the refrigerant, which is now compressed. At the end of this operation it contains the heat removed from the body to be cooled, plus the heat equivalent of the work done during compression.

This total heat is removed from the refrigerant by the circulating water, which is, therefore, the heat outlet.

Контрольная работа №5

Чтобы правильно выполнить задание №5, необходимо повторить следующие разделы курса английского языка по рекомендованному учебнику:

1. Формы и функции инфинитива.
2. Грамматические функции глаголов should, would.
3. Различные значения слов: provided, either ... or, neither ... nor, both ... and, the only.

АНГЛИЙСКИЙ ВАРИАНТ

ПЕРЕВОД

Образец выполнения к упр. 1

This is an article **to be translated** into English.

Эта статья, которую нужно перевести на английский язык.

Образец выполнения к упр. 2

We decided that we **should** meet in February.

Мы решили, что встретимся в феврале.

If it were my book, I **should** give it to you.

Если бы это была моя книга, я бы дала ее вам.

Would you kindly help me.

Будьте любезны, помогите, пожалуйста.

Образец выполнения к упр. 3

She is **either** English **or** American.

Она или англичанка, или американка.

Контрольная работа №5

ДЛЯ СТУДЕНТОВ ТПП специальностей и направлений: 260601 (170600); 260602 (271300); 220301 (210200); 280201

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. The components to be mixed are to be placed in the cylinder of a mixer.
2. The simplest method of continuous mixing is to join together several twin mixers.
3. Mixing was necessary to establish a close contact between a liquid and a gas.
4. To decrease friction the machine parts are lubricated with oil.

II. Перепишите и переведите на русский язык следующие предложения, обращая внимание на различные значения глаголов should и would.

1. Many of the modern achievements in various fields of science would be quite impossible without computers.
2. Would you tell me the time?
3. Active measures should be taken to create an international system of ecological security.
4. Our teacher said that we should read a lot of books and articles on the subject.

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. Pneumatic transport systems can be operated under **either** reduced or positive pressure.
2. You can apply **both** the method of crushing **and** the method of setting.
3. **Provided** we get the implements, we shall check the power line.
4. Until recently metals were **the only** materials used in these instruments.

IV. Перепишите и письменно переведите на русский язык следующий текст.

Mixing of materials

Mixing is stated to be the combination of different materials and their distribution until a certain degree of homogeneity is achieved. Mixing is a very frequently used operation.

There are many different problems associated with mixing. Solids may be mixed with solids (most mixed feeds, blends of tea and coffee, dried soups, etc.) or liquids (many canned goods, several dairy products, drinks and also chocolate and sweets), liquids may be mixed with liquids (emulsions like mayonnaise, butter and margarine) or gases (ice cream, whipped cream, some sweets and baked goods).

Mixtures may be homogeneous, for example, solutions of solids and liquids, mixtures of miscible liquids and gas mixtures or heterogeneous, for example, liquid/liquid, liquid/gas, solid/gas, etc.

The following properties are found to be important in mixing: the proportions of the materials to be mixed; the particle size of the materials i.e. mixing becomes more difficult, the more the particle sizes differ; density of the materials, i.e. a large difference in density makes mixing more difficult; shape of the particles.

Mixing is accomplished in mixers¹, which may work batch-wise² or continuously³. In all mixers the particles are moved and displaced in more than one direction. The simplest mixers working batch-wise are drum-mixers or rotating mixers⁴. These mixers consist of a cylinder, the rotation axis of which is normal to the axis of symmetry; a small cylindrical tube from which half of the cylinder wall is removed, which is mounted on each of the two flat walls of the mixer.

(1570)

Abbreviations

e.g.-Latin: *exempli gratia* - English: for example-Russian: например

i.e.-Latin: *id est* - English: that is-Russian: то есть

¹ mixer- мешалка, смеситель, миксер

² batch-wise-периодически

³ continuously- непрерывно

⁴ rotating mixer (drum mixer)- мешалка с вращающимся барабаном

Вариант 2 (для шифров, заканчивающихся на четные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. To mix materials means to combine different substances.
2. The power consumption must be taken as a measure of the mixing action.
3. To carry out this complicated research work special knowledge and training are required.
4. The type of the monometer depends on the magnitude of pressure to be measured.

II. Перепишите и переведите на русский язык следующие предложения, обращая внимание на различные значения глаголов should и would.

1. The measurements are always correct if the necessary instruments

are used.

2. One should be careful when working with toxic substances.
3. Would you pass me that reference book?
4. If mercury didn't expand when heated, it wouldn't be used for taking temperatures.

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. The results are remarkable **provided** all figures have been checked.
2. The way the particles pack depends not **only** on their physical properties.
3. Isotops occur **either** naturally **or** they can be manufactured artificially.
4. It is **the only** metal which can be used in this device.

IV. Перепишите и письменно переведите на русский язык следующий текст.

Filtration

The separation of solids from a suspension in a liquid by means of a porous medium or screen¹ which retains the solids and allows the liquid to pass is termed filtration. In the chemical laboratory filtration is often carried out in a conical funnel² fitted with a filter paper. In the industrial equipment of such an operation difficulties are involved in the mechanical handling³ of much larger quantities of suspension and solids. A thicker layer of solids has to form and, in order to achieve a high rate of passage of liquid through the solids, higher pressures will be needed and it will be necessary to provide a far greater area.

A typical filtration operation uses the filter medium, the support and the layer of solids or filter cake⁴.

The volumes of the suspensions to be handled will vary from the extremely large quantities involved, in water purification, for example, to relatively small quantities in the fine chemical industry where the variety of solids will be considerable. In most instances it is the solids that are wanted and their physical size and properties are of paramount importance.

Filtration is essentially a mechanical operation and is less demanding in energy than evaporation or drying where high latent heat of the liquid

which is usually water, has to be provided.(1346)

¹ screen- сито

² funnel-воронка

³ handling- 1)транспортировка, 2) погрузочно-разгрузочные операции

⁴ filter cake-осадок от фильтрования

Контрольная работа №5

Чтобы правильно выполнить задание №5, необходимо повторить следующие разделы курса английского языка по рекомендованному учебнику:

1. Формы и функции инфинитива.
2. Грамматические функции глаголов should, would.
3. Различные значения слов: provided, either ... or, neither ... nor, both ... and, the only.

| АНГЛИЙСКИЙ ВАРИАНТ | ПЕРЕВОД |
|--|--|
| Образец выполнения к упр. 1 | |
| This is an article to be translated into English. | Эта статья, <u>которую нужно перевести</u> на английский язык. |
| Образец выполнения к упр. 2 | |
| We decided that we should meet in February. | Мы решили, что <u>встретимся</u> в феврале. |
| If it were my book, I should give it to you. | Если бы это была моя книга, я бы дала ее вам. |
| Would you kindly help me. | Будьте любезны, помогите, пожалуйста. |
| Образец выполнения к упр. 3 | |
| She is either English or American. | Она <u>или</u> англичанка, <u>или</u> американка. |

Контрольная работа №5

ДЛЯ СТУДЕНТОВ ПТ специальностей и направлений: 260202 (270300); 260204 (270500); 260504 (270800); 260301 (270900); 260303 (271100); 240902

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. To grow the body must be supplied with sufficient food.

2. It was found that salting and drying helped to preserve meat and fish.
3. All nutrients to be carried to cells are transported by blood plasma.
4. To understand the role of vitamins is very important for scientists working in this field.

II. Перепишите и переведите на русский язык следующие предложения, обращая внимание на различные значения глаголов should и would.

1. If I were you, I would use this method once more.
2. The job should be fulfilled by the end of the week.
3. I said that I should be delighted to accept their assistance.
4. He expected that he would be promoted.

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. **Either** he or you will have to go to London.
2. I can conduct the observation **provided** you help me.
3. He examined **only** the equipment.
4. By means of this instrument you can determine **both** chemical **and** physical properties of the substance.

IV. Перепишите и письменно переведите на русский язык следующий текст.

Composition of Food

Food is known to be necessary for any human being or any form of life. Food has three chief functions. First, it serves as fuel for the body, providing energy to support body activity; second, it furnishes the building material for formation, growth, maintenance and repair of body tissues; and third, it provides for the regulation of the body processes.

The word «food» is used to designate anything edible whether it is a natural product such as meat, eggs, milk, apples; a partially processed product such as flour, or cooked foods such as bread or cakes.

To be a highly qualified food engineer or food technologist one should be well acquainted with the composition of food, its properties and the utilization of food by the human body. Nearly all foods are mixtures of substances known as nutrients. Each nutrient has particular type of

chemical composition and performs at least one specific function when it is digested and absorbed in the body.

The essential constituents of food can be classified into six groups: proteins, fats, carbohydrates, vitamins, minerals and water. Proteins, fats and carbohydrates are used for providing energy to support body activity. They are also required for the formation, growth and replacement of tissues. Vitamins and mineral elements are necessary to regulate body processes, some of them being used for growth and replacement of tissues. Water serves as a vehicle for transporting food and waste products. It assists in regulating body temperature and takes part in many chemical reactions.

(1561)

Вариант 2 (для шифров, заканчивающихся на четные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. To regulate body processes is one of the chief functions of vitamins.
2. A diet containing carbohydrate, fat, protein and minerals is sufficient to maintain health.
3. The amount of heat to be used for changing the temperature of a given substance depends upon its weight and its properties.
4. These methods are to be used to purify the substance.

II. Перепишите и переведите на русский язык следующие предложения, обращая внимание на различные значения глаголов should и would.

1. If there were no atmosphere, there would be neither clouds, nor rain.
2. Would you kindly help me?
3. I should have done this work, in case I had been informed before.
4. We were sure that we should produce a new food product.

III. Перепишите и переведите на русский язык следующие предложения, обращая внимание на значения выделенных слов.

1. The temperature will **either** slightly rise **or** drop.
2. **Provided** we know the rate of the emission, we will determine the range of the particles.

3. You can apply **neither** metal **nor** plastics in this case.
4. It is **the only** compound which is used in this solution.

IV. Перепишите и письменно переведите на русский язык следующий текст.

Proteins, Fats and Carbohydrates

Proteins, fats and carbohydrates are known to be the most essential nutrients in the diet. Proteins in human diet can be obtained from both animal and vegetable sources, the most important being meat, eggs, fish, cereals, legumes, seeds and nuts. In general, foods obtained from animals contain more protein than foods obtained from plants, although some vegetable materials such as soya beans have a high protein content. Vegetable proteins have the advantage of being cheaper than animal proteins.

Proteins are complex organic substances, containing such elements as carbon, hydrogen and oxygen. All proteins also contain nitrogen and some contain sulphur and phosphorus. When foods are eaten the proteins are digested by hydrolytic enzymes and are absorbed into the bloodstream as amino acids. These amino acids are used in the synthesis of new proteins needed for growth, maintenance and replacement of body cells.

Fats are also the necessary component of living tissues and essential in human nutrition. They supply a major portion of man's energy, giving more than twice as much energy as proteins and carbohydrates. Fats are organic compounds containing the elements: carbon, hydrogen and oxygen. The natural foods which contribute the largest amounts of fats to our diet are the animal products — meat, dairy products and eggs.

Carbohydrates are also of great importance for human nutrition. They supply a major portion of man's energy and are primary derived from plant materials, e.g. cereals, vegetables and fruits. Carbohydrates are produced in plants by the process of photosynthesis. These substances accomplish a number of functions in the body. They are oxydized in the cells, are broken down in a series of reactions, and energy is released when this takes place.

(1771)

Контрольная работа №5

Чтобы правильно выполнить задание №5, необходимо повторить следующие разделы курса английского языка по рекомендованному учебнику:

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2. Грамматические функции глаголов should, would.
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| АНГЛИЙСКИЙ ВАРИАНТ | ПЕРЕВОД |
|--|--|
| Образец выполнения к упр. 1 | |
| This is an article to be translated into English. | Эта статья, <u>которую нужно перевести</u> на английский язык. |
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| We decided that we should meet in February. | Мы решили, что <u>встретимся</u> в феврале. |
| If it were my book, I should give it to you. | Если бы это была моя книга, я бы дала ее вам. |
| Would you kindly help me. | Будьте любезны, помогите, пожалуйста. |
| Образец выполнения к упр. 3 | |
| She is either English or American. | Она <u>или</u> англичанка, <u>или</u> американка. |

Контрольная работа №5

ДЛЯ СТУДЕНТОВ экономистов специальностей и направлений:
080000, 080500 (060800)

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. To show the product at an exhibition or even to present it at a special conference isn't an easy task.
2. I just want to draw your attention to the supplement to my report.
3. Do you want to be interviewed?
4. Companies to operate in this market are well established ones.
5. The goal of marketing research is to assist the firm in determining the most effective inputs of the marketplace.

II. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на различные значения глаголов SHOULD, WOULD.

1. Many scientists considered that in future conflicts between countries would be caused by the scarcity of natural resources.
2. The company should advertise the new product to attract more buyers.
3. High productivity in agriculture would be achieved if the government supported the farmers.
4. If the official regulations had been less complicated and difficult we should have completed the project sooner.

III. Перепишите следующие предложения и переведите их на русский язык обращая внимание на различные значения выделенных слов.

1. **Both** contracts were signed after some formalities.
2. The equilibrium price is influenced by **either** supply **or** demand.
3. **Neither** air mail **nor** other types of mail can compete with delivery of data by e-mail.
4. In 1956 there were **only** about 100 computers in use in the whole world.

IV. Перепишите и письменно переведите текст на русский язык.

What Is Economics?

It is difficult to give a full and accurate definition of economics, but it is possible to indicate what problems economists are interested in. They are factors that affect prices of goods and services and also resources necessary to produce them. Economists are also interested in sellers' and buyers' behaviour in the market, in the relationship between «price system» and «market mechanism».

Now economics is more complex. There are three main approaches to economics: microeconomics, macroeconomics, and development economics. There are also several specialized areas of study. Among them are money economics, international economics, labour economics, industrial economics, agricultural economics, growth economics, mathematical economics, etc.

Like many other sciences, economics uses models to understand economic problems. A model often helps an economist to make correct predictions. The economist usually follows several rules when he makes a model of economic behaviour.

First, real life is complex and it is not possible for an economist to include all the details in a model. So, a model is an abstraction from real life. A model usually includes only essential elements and relationships of a particular economic situation.

Second, if an economist has two different models of one phenomenon, he always chooses the model that predicts the results of a particular phenomenon more accurately.

Third, although models are helpful in economic analysis, an economist always studies the actual economic situation before he makes decisions.

It is not enough to make models, it is also necessary to collect and study actual data in order to know how accurate a model is.

Вариант 2 (для шифров, заканчивающихся на четные цифры)

I. Перепишите и переведите на русский язык следующие предложения, обращая внимание на функции инфинитива.

1. People of every nation try to achieve high standards of living.
2. To identify the unsatisfactory demand for the products is the job of a marketer.
3. My sister's desire is to be employed by this particular company.
4. Many companies to launch a product carry out an advertising campaign.
5. To pay a high insurance premium is better than to lose a lot of money when something wrong happens to the goods.

II. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на различные значения глаголов SHOULD, WOULD.

1. If they had used tested materials, the result would have been much better.
2. We were told that we should take part in the discussion.

3. It is necessary that the government foreign policy should be aimed at maintaining a favourable balance of trade.

4. If the company introduced modern inventions, its business would flourish.

III. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на различные значения выделенных слов.

1. Nowadays customers can buy commodities using **either** traditional retail services **or** E-commerce.
2. **Neither** consumers **nor** sellers can win if inflation rates are high in the country.
3. The speed and memory characteristics are **the only** difference between the main types of the computers.
4. Each market is described by two main characteristics: **both** goods themselves **and** geographic areas. **Both** factors are very important.

IV. Перепишите и письменно переведите текст на русский язык.

Areas of Economics

There are three main approaches to economics: microeconomics, macroeconomics, and development economics.

Microeconomics focuses on individual economic units. The economic behaviour of either individual consumers or firms or industries is studied by microeconomics. The distribution of products and income among all these units is also analyzed by microeconomics. In this field of economics individuals are considered both as suppliers of labour and as consumers of goods. Firms are also studied both as suppliers of products and as consumers of labour and capital.

There was a long period in the 19th and early in the 20th centuries when microeconomic questions dominated in economics. In the 20th century economists' interest in forces that affect income, employment and prices grew. They considered economy in all its relationships.

The term «macroeconomics» was first used in the 1930s. The world depression that began in 1929 required the study of such macroeconomic questions as achievement of full employment and economic growth by means of proper government policies. This area of economics was

developed by the British economist John Maynard Keynes.

The third main field of economics, that is, development economics, studies these factors of economic growth and how these factors are used by governments in order to achieve high living standards.

Контрольная работа №6

ДЛЯ СТУДЕНТОВ ХТ специальностей и направлений: 140401 (070200); 140504 (101700); 190603 (230100)

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

Перепишите и письменно переведите на русский язык следующий текст.

Fundamental Parts of the Compression Refrigeration System.

The evaporator is a coil or chamber in which refrigerant is evaporated, the place where refrigeration is produced. The low-pressure side of the system, or evaporator side, is maintained at the proper pressure to cause boiling at the required evaporator temperature.

Vapor produced by evaporation is withdrawn from the evaporator by the compressor through a suction line¹. Although refrigeration is produced in the evaporator, the ratio at which the compressor can remove this vapor determines the refrigeration capacity of the system.

The compressor raises the pressure of the vapor to the condensing pressure. The heat of the compression heats the vapor during this compression. A discharge line² carries the vapor to the condenser.

Condensed liquid collects in a liquid receiver, often called simply a receiver. From the receiver, liquid flows through a liquid line to the expansion valve³.

The expansion valve feeds this liquid to the evaporator at the rate to replace liquid boiled away, the high-pressure side of the system being kept separated from the low-pressure side.

These five parts of the compression refrigeration system are considered fundamental because they are all necessary for the circulation of the refrigerant through the refrigerating cycle, thermodynamic changes in the refrigerant state being made in all parts except the receiver.

¹ suction line-всасывающий трубопровод; линия всасывания

² discharge line-линия нагнетания

³ expansion valve-расширительный клапан

Вариант 2 (для шифров, заканчивающихся на четные цифры)

Перепишите и письменно переведите на русский язык следующий текст.

The Compression Cycle

The production of low temperatures has become a very important factor in industry. Approximately 200 industries are known to depend more or less upon mechanical refrigeration.

There are essentially 4 types of refrigeration systems: vapour compression, vapour absorption, and the air system, the compression system being the most important one.

All compression systems of refrigeration operate on a refrigerant. In working it repeats over and over the freezing and cooling operations. This process or repetition of a similar order of things is known to be called a cycle. The compression cycle is called by that name because it is the compressor that enables a transfer of heat energy. It is by means of the compressor that the refrigerant is able to absorb heat in one place and replace it in another. The compressor is that part of the mechanism used to put the refrigerant in such a condition that it may dissipate the heat energy it absorbed when it was evaporating at low pressure.

The compressor has two functions: first, to draw the cold vapour from the evaporator, thereby maintaining a pressure in the evaporator sufficiently low to give a boiling point of the refrigerant low enough to maintain the desired evaporator temperature; and second, to pump the vapour into the condenser where it can be liquefied at ordinary temperatures by means of cooling water or air. The compressor is merely a gas pump, so constructed that it handles the particular vapour used.

Контрольная работа №6

ДЛЯ СТУДЕНТОВ ТПП специальностей и направлений: 260601 (170600); 260602 (271300); 220301 (210200); 280201

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

Перепишите и письменно переведите на русский язык следующий текст.

Mechanical Separation

Mechanical separation is used for heterogeneous mixtures of solids, solids and liquids, solids and gases, liquids and gases and also immiscible liquids. The purpose of the solid/liquid separation may be either the recovery of the liquid (in the clarifying of fruit juices and wine), the recovery of the solids (examples are the winning of starch from aqueous suspensions and the pressing of all kinds of products before drying — sugar beet pulp, fish waste, etc.). The processing of oil-containing raw material is an example of a separation in which both the liquid and the solid are important products.

The separation of solids is important in the processing of cereals and seeds (such as oil seeds, coffee and cocoa beans), vegetables and fruits, potatoes, fish etc. The separation of solids and gases is not used in food processing but is necessary when dust must be removed from air in factories, production halls or the surroundings of machinery.

In order to obtain a separation of two substances they must differ in some property. Since there are numerous properties, there are also many different methods of separation. The materials to be separated very seldom differ in only one property, but if so, there is only one possible method of separation. Generally, the substances differ in two or more properties and consequently it is usually possible to choose from several separation methods. To find the best method for a particular case, all advantages and disadvantages of available methods have to be considered.

These methods are commonly divided into two classes: physical methods and mechanical methods. For example, filtration, centrifugation and pressing are mechanical methods and evaporation is a physical method. Combinations of physical and mechanical methods are also applied.

The method and the equipment required also depend on the combination of substances to be separated. If it is necessary to separate solid from liquid, sedimentation, filtration or pressing can be used.

Вариант 2 (для шифров, заканчивающихся на четные цифры)

Перепишите и письменно переведите на русский язык следующий текст.

Separation of Solids

The separation of solids is usually called sorting or classification. The process can be defined as the separation of mixtures into two or more fractions in such a way that each fraction is more uniform in one particular property than the original mixture. From this definition it follows that in order to obtain fractions that are uniform in more than one property, it may be necessary to apply more than one separation method. Although the purpose of sorting varies considerably it is generally used to obtain final products of good and uniform quality.

The sorting of raw materials is very important, particularly in the processing of cereals and seeds, vegetables and fruits, potatoes, fish, etc. The prime purpose is to remove foreign matter, defective material or inedible substances, and furthermore to classify according to size, color, ripeness or any other property concerning quality.

For example, disc separator has a horizontal axle on which a large number of circular discs are mounted. The discs are equipped with cavities on both sides and they rotate through the seed mixture. The advantage of this type of separator is that the active surface is very much larger. It can be used for the separation of round and oblong grains, and also frequently for the separation of broken wheat grains from whole ones.

Foreign matter is considered to include dirt. The cleaning of raw materials is very important for hygienic reasons. Large numbers of microorganisms are also removed with the dirt. The removal of pesticides is also becoming more and more important. Before the dirt can be removed it must be loosened. This sometimes can be done by shaking or by blowing air through the material; in other cases it is necessary to use washing machines.

There are many types of washing machines adapted to the materials to be cleaned.

Washing can be carried out by vigorous spraying with water, with the aid of shaking and stirring (mechanically or with air) and by other methods. The dirt usually differs so greatly from the product to be cleaned in certain properties that the actual separation is very simple.

Контрольная работа №6

ДЛЯ СТУДЕНТОВ ПТ специальностей и направлений: 260202 (270300); 260204 (270500); 260504 (270800); 260301 (270900); 260303 (271100); 240902

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

Food Processing by Heat Sterilization

The canned food industry applies the principle that perishable foods can be preserved through proper application of heat process. Progress in canning has been continuous since about 1809 when H. Appert discovered that food could be preserved if it were placed in a sealed container and heated.

The manufacture of heat processed canned foods is known to cover operations that prepare raw products for packing in containers and operations involving the application of heat for sterilization, rendering the product free of spoilage microorganisms and enzymes. Heat processed canned food products include fruits, vegetables, meats and seafoods.

A can or a jar of canned food contains a sterilized product that at a room temperature will remain unspoiled indefinitely from a microbiological standpoint and, depending on the type of food, will have a shelf life from six months to two years. The majority of canned foods have been heat processed to prevent microbial and enzymatic spoilage. The terms «sterilized», «commercially sterilized» and «pasteurized» are used to describe heat processes.

When a product is sterilized, it is free of viable microorganisms. The term «commercial sterilization» describes the heat process given to canned foods which may contain viable spores of thermophilic¹ organisms and, therefore, are not truly sterile. The terms «sterile» and «sterilized» are used in this presentation to mean «commercially» sterile, which is defined as that degree of sterility at which all pathogenic and toxin-forming organisms have been destroyed, while the other more resistant types which, if present, could grow in the product and produce spoilage under normal storage conditions.

Pasteurization is a heat treatment that kills part, but not all the organisms present and usually involves the application of temperatures below 100°C. In pasteurized canned foods preservation is affected by a combination of a heat treatment and other factors such as a low pH, a high concentration of sugar or salt and storage at temperatures of 0 to 5°C. To evaluate heat process it is necessary to know the number of spoilage organisms present

and the thermal resistance characteristic of the spoilage organisms.

¹ termophilic bacteria — теплолюбивые бактерии.

Вариант 2 (для шифров, заканчивающихся на четные цифры)

Using Chemical Preservatives

A large range of chemicals called preservatives can be used to control the growth of microorganisms. A food «preservative» is defined as a chemical compound or mixture of compounds applied for the specific purpose of preventing spoilage due to the growth of bacteria, yeasts or molds. These substances may be either added to the product or produced in it by fermentation.

Sugar is known to be the most important chemical food preservative. It preserves foods by inhibiting the growth of bacteria, yeasts and molds at concentrations of at least 65 per cent. The preservation in this case is believed to be effected by dehydration of the microorganisms. Naturally, to be effective sugar must be in solution. Many fruit products such as jams, jellies and syrups are preserved with sugar. However, except with candies, it is not possible to rely upon sugar alone for preservation. Although fruit products contain 65 to 75 per cent sugar, still it is customary to give them a mild heat treatment in a sealed container often in addition to air removal by vacuum. These supplemental processes help to control fermentation, surface molding and discoloration.

Second in importance, only to sugar, is salt. Salting or salting combined with drying is much used in the curing of meats, fish and some vegetables. Salt is antiseptic and it does not destroy all bacteria. Salt acts as a drying agent by withdrawing water. In salted, dried fish and meats bacterial and enzymic actions are stopped.

Addition of acids is another way of preserving foods, this method being carried out in one of two manners. The food may be pickled, i.e. soaked in an acid solution such as vinegar (acetic acid). Another method is to inoculate the food with a culture of selected bacteria and to rely on acid produced by the activities of these bacteria. For example, foods such as yoghurt and sauerkraut (fermented cabbage) are produced in this way.

Sulphur dioxide either in the form of a gas or soluble sulfite salts aids in the preservation of dried fruits and vegetables.

Контрольная работа №6

ДЛЯ СТУДЕНТОВ экономистов специальностей и направлений:
080000, 080500 (060800)

Вариант 1 (для шифров, заканчивающихся на нечетные цифры)

Microeconomics

The word «micro» means small, microeconomics meaning economics in the small. The optimizing behaviour of individual units such as households and firms provides the foundation for microeconomics.

Microeconomists may investigate individual markets or even the economy as a whole, but their analyses are derived from the behaviour of individual units. Microeconomic theory is used extensively in many areas of applied economics. For example, it is used in industrial organization, labour economics, international trade and many other economic subfields.

The microeconomist is interested in the determination of individual prices and relative prices (i.e. exchange ratios¹ between goods).

Optimization plays a key role in microeconomics. The consumer is assumed to maximize utility or satisfaction constrained by income.

The producer is assumed to maximize profit or minimize cost of the technological constraints under which the firm operates. Optimization of social welfare sometimes is the criterion for the determination of public policy.

Opportunity cost² is an important concept in microeconomics. Many courses of action are valued in terms of what is sacrificed so that they might be undertaken. For example, the opportunity cost of a public project is the value of the additional goods that the private sector would have produced with the resources used for the public project.

¹ exchange ratio — ставка (соотношение) обмена, меновое отношение

² opportunity costs — альтернативные издержки

Вариант 2 (для шифров, заканчивающихся на четные цифры)

Macroeconomics

The word «macroeconomics» means economics in the large. Macroeconomists are known to deal with such global questions as total production, total employment, the rate of economic growth, and so on. The

questions asked by macroeconomists are in terms of broad aggregates¹ — what determines the spending of all consumers as opposed to the microeconomic question of how the spending decisions of individual households are made; what determines the capital spending of all firms combined as opposed to the decision to build a new factory by a single firm; what determines total unemployment in the economy as opposed to why there have been layoffs² in a specific industry.

Macroeconomists measuring overall economic activity, they analyze the determinants of such activity by the use of macroeconomic theory: forecast future economic activity.

An important task of macroeconomics is to develop ways of aggregating the values of economic activities of individuals and firms into meaningful totals³. To this end such concepts as gross domestic product (GDP), national income, personal income have been developed.

Macroeconomic analysis attempts to explain how the magnitudes of the principal macroeconomic variables are determined and how they interact. And through the development of theories of the business cycle and economic growth, macroeconomics helps to explain the dynamics of how these aggregates move over time.

¹ broad aggregates — масштабные совокупности

² layoff — увольнение

³ meaningful totals — значимые итоги

Часть 2

ДЛЯ СТУДЕНТОВ экономистов специальностей и направлений:
080000, 080500 (060800)

Тексты для устного перевода

Supply and Demand

Elasticity of supply, as a response to changes in price, is related to demand. Economists define «demand» as a consumer's desire or want, together with his willingness to pay for what he wants. We can say that demand is indicated by our willingness to offer money for particular goods or services. Money has no value in itself, but serves as a means of exchange between commodities which do have a value to us.

People very seldom have everything they want. Usually we have to decide carefully how we spend our income. When we exercise our choice, we do so according to our personal scale of preferences. In this scale of preferences essential commodities come first (food, clothing, shelter, medical expenses etc.) then the kind of luxuries which help us to be comfortable (telephone, special furniture, insurance etc.), and finally those non-essential which give us personal pleasure (holidays, parties, visits to theatre or concerts, chocolates etc.) They may all seem important, but their true importance can be measured by deciding which we are prepared to live without. Our decisions indicate our scale of preferences and therefore our priorities.

Elasticity of demand is a measure of the change in the quantity of a good, in response to demand. The change in demand results from a change in price. Demand is inelastic when a good is regarded as a basic necessity, but particularly elastic for non-essential commodities. Accordingly, we buy basic necessities even if the price rise steeply, but we buy other things only when they are relatively cheap.

Labor and Capital

Labour is any work performed for an employer at a negotiated rate, while profit is the surplus which accumulates as a result of productive work. The employer obtains this surplus after he pays the necessary expense of his business and the wages of his employees. He may be

required to share the surplus with others who have provided the capital with which he started his business. Most businesses need capital in order to start productive work, and the capital pays for the accommodation, machinery and other items which the business needs. There is always an element of risk in providing capital and starting a business. The business may not be successful. The employees of the business do not bear this risk, but the employers and the providers of capital do bear it. If the business is successful, the risk has been justified and the invested capital earns part of the profits as a return on the investment.

The capital which people provide to help new business is an accumulation of previous surpluses on previous business activities. In this way the past is used to finance the future. Such capital is accumulated by a deliberate policy of saving surpluses. This policy may be personal and individual, or it may be public and collective. As such, it is common to both the capitalistic and communistic systems. In both systems, a certain part of the profits is «ploughed back» into the system in order to create capital.

In general terms, capital can be defined as a factor of production (for example, machinery or cash); the assets possessed by a person, a company or a nation. Land, houses and shares in business are capital. In term of state, all railways, docks roads, airports and state funds of money are of the nation's capital.

Market and Monopolies

The term «market», as used by economists, is an extension of the ancient idea of a market as a place where people gather to buy and sell goods. In former days part of a town was kept as the market or marketplace, and people would travel many kilometres on special market-days in order to buy and sell various commodities. Today, however, markets as the world sugar market, the gold market and the cotton market do not need to have any fixed geographical location. Such a market is simply a set of conditions permitting buyers and sellers to work together.

In a free market, competition takes place among sellers of the same commodity, and among those who wish to buy that commodity. Such competition influences the prices prevailing in the market. Prices inevitably fluctuate, and such fluctuations are also affected by current supply and demand.

Whenever people who are willing to sell a commodity contact people who are willing to buy it, a market for that commodity is created. Buyers and sellers may meet in person, or they may communicate in some other way: by letter, by telephone or through their agents. In a perfect market, communications are easy, buyers and sellers are numerous and competition is completely free. In a perfect market there can be only one price for any given commodity: the lowest price which sellers will accept and the highest which consumers will pay. There are, however, no really perfect markets, and each commodity market is subject to special conditions. It can be said however that the price ruling in a market indicates the point where supply and demand meet.

The Open Market

In addition to being a means of exchange, money is also a means of measuring the value of men's labour. Labour, in economic theory, is any work undertaken in return for a fixed payment. A mother may work very hard in caring for her children, but she receives no fixed wages for this work. It is not therefore labour in the strict economic sense. Economists are interested in measuring the services which people render to each other. Although aware of the services which people provide for nothing, they are not concerned with such services. In economics, money is the standard by which the value of things is judged. This is an objective, scientific standard and not in any way related to standards of a religious, ethical or subjective nature.

Human labour produces both goods and services. The activities of a farmworker and a nurse are very different, but each is measurable in terms of payment received. If however a farmer is self-employed and does not receive a fixed wage from anyone else, he is in a different category from the nurse and from his own farmworkers. His activities are not wholly labour. His workers receive their wages, but he receives whatever surplus (large or small) emerges from his farming. This surplus, like any surplus in industry or commerce, is what we usually call «profit».

Employers obtain their net profits only after they have paid all expenses arising out of their business activities: interest, rentals, payments for machinery, wages and overheads generally. The surplus is not usually available only for employers and their families. Normally part of it goes to

those who have provided the initial capital needed to start a business. There is always an element of risk in providing capital for new business. Such business may fail. Both those who provide the capital and those who run the business agree to bear the risk, but employees of such business are not expected to bear any risk. If the business is successful, the risk-taking has been justified, and invested capital earns part of the profits as a return on the investment and the period during which the capital was at risk.

Capital in this instance is simply the accumulation of previous surpluses on previous business activities. In this way the past is used to finance the future. The accumulation of capital is almost always deliberate, either on the part of individual citizens or in the part of the state. Even in non-capitalistic societies a certain part of the surplus achieved in any enterprise is «ploughed back» into the system in order to promote further growth.

When capital, labour and enterprise combine to make a new business successful, the business must still continue to compete on the market with other companies producing the same type of commodity. The term «market», as used by economists, is a logical extension from the idea of a place set aside for buying and selling. Formerly, part of a town was kept as a marketplace, and country people would come in on market-days to buy and sell. Markets today need not however be located in any fixed place: the sugar market and cotton market are not geographical locations, but simply sets of conditions which permit buyers and sellers to work together.

In free market, competition takes place among sellers in order to sell their commodities at the best possible price, and among buyers in order to obtain what they want at a price which suits them. Such competition influences prices. Changes in supply and demand have their effects, and it is not surprising that considerable fluctuations in prices can take place over periods of weeks and months.

Since these modern markets are not normally located in any special place, buyers and sellers do not always have to meet face-to-face. They may communicate by letter, by cable, by telephone or through their agents. In a perfect market, such communications are easy. Buyers and sellers are numerous, and competition is completely unimpeded. In a perfect market there can be only one price for any given commodity: the lowest price which sellers will accept. There are, however, no really perfect markets, because each market is subject to its own peculiar conditions. It can be

said however that the price ruling in market indicates the point where supply and demand meet.

Monopoly is one of the peculiar factors which can affect the sale and purchase of certain commodities. In some markets, there may be only one seller or a cartel of sellers working very closely together to control prices. The result of such monopolistic activity is to fix prices at a level suitable to the sellers, a level which brings him artificially high profits. Many governments dislike this procedure and have taken legal action to restrict or halt any business activities directed towards «cornering the market». In the US, antitrust laws operate to limit cartels and mergers, while in Britain the Monopolies Commission examines all special arrangements and mergers referred to them by the Board of Trade which appear to operate against the public interest.

This type of monopoly is not the only possibility, however. There are three other forms: state, legal and natural. State monopolies are quite common nowadays, where the authorities in a particular country control industries like steel and transport or important and prestigious services like national airlines. Legal monopolies are rather different, because the law permits certain individuals to benefit solely from their special inventions, discoveries or processes. No other person may infringe their rights in respect to such monopolies. Finally, natural monopoly arises where a nation or individual possesses most of a particular mineral for reasons of geography and geology. Canadian nickel and South African gold are two well-known examples of this kind of monopoly.

Money and Banking

All values in the economic system are measured in terms of money. Our goods and services are sold for money, and that money is in turn exchanged for other goods and services. Coins are adequate for small transactions, while paper notes are used for general business. There is additionally a wider sense of the word «money», covering anything which is used as a means of exchange, whatever form it may take. Originally, a valuable metal (gold, silver or copper) served as a constant store of value, and even today the American dollar is technically «backed» by the store of gold which the US government maintains. Because gold has been universally regarded as a very valuable metal, national currencies were for

many years judged in terms of the so-called «gold standard». Nowadays however national currencies are considered to be as strong as national economies which support them.

Valuable metal has generally been replaced by paper notes. These notes are issued by governments and authorized banks, and are known as «legal tender». Other arrangements such as cheques and money order are not legal tender. They perform the function of substitute money and are known as «instruments of credit». Credit is offered only when creditors believe that they have a good chance of obtaining legal tender when they present such instruments at a bank or other authorized institution. If a man's assets are known to be considerable, then his credit will be good. If his assets are in doubt, then it may be difficult for him to obtain large sums of credit or even to pay goods with a cheque.

The value of money is basically its value as a medium of exchange, or, as economists put it, its «purchasing power». This purchasing power is dependent on supply and demand. The demand for money is reckonable as the quantity needed to effect business transactions. An increase in business requires an increase in the amount of money coming into general circulation. But the demand for money is related not only to the quantity of business but also to the rapidity with which the business is done. The supply of money, on the other hand, is the actual amount in notes and coins available for business purposes. If too much money is available, its value decreases, and it does not buy as much as it did, say, five years earlier. This condition is known as «inflation».

Banks are closely concerned with the flow of money into and out of the economy. They often co-operate with governments in efforts to stabilize economics and to prevent inflation. They are specialists in the business of providing capital, and in allocating funds on credit. Banks originated as places to which people took their valuables for safe-keeping, but today the great banks of the world have many functions in addition to acting as guardians of valuable private possessions.

Banks normally receive money from their customers in two distinct forms: on current account, and on deposit account. With a current account, a customer can issue personal cheques. No interest is paid by the bank on this type of account. With a deposit account, however, the customer undertakes to leave his money in the bank for a minimum specified period of time. Interest is paid on this money.

The bank in turn lends the deposited money to customers who need

capital. This activity earns interest for the bank, and this interest is almost always at a higher rate than any interest which the bank pays to its depositors. In this way the bank makes its main profits.

We can say that the primary function of a bank today is to act as an intermediary between depositors who wish to make interest on their savings, and borrowers who wish to obtain capital. The bank is a reservoir of loanable money, with streams of money flowing in and out. For this reason, economists and financiers often talk of money being «liquid», or of the «liquidity» of money. Many small sums which might not otherwise be used as capital are rendered useful simply because the bank acts as a reservoir.

The system of banking rests upon a basis of trust. Innumerable acts of trust build up the system of which bankers, depositors and borrowers are part. They all agree to behave in certain predictable ways in relation to each other, and in relation to the rapid fluctuations of credit and debit. Consequently, business can be done and cheques can be written without any legal tender visibly changing hands.

Some Economic Laws

Basic human needs are simple, but every individual has additional personal wants which may be very complex. These complex personal wants are satisfied in different ways by different things. A car, a bottle of whisky and a newspaper satisfy very different wants and the whisky is not a close substitute for the car. This special characteristic of satisfying a want is known in economics as its «utility». Utility is not the same as usefulness. A submarine, for example, may or may not be useful in peacetime, but it satisfies a want. Many nations want submarines. Economists describe this kind of utility as «the relationship between a consumer and a commodity».

Utility varies between different people and between different nations. A vegetarian does not want meat, but may rate bananas very highly. A mountain-republic like Switzerland has little interest in submarines, while maritime nations rate them highly. Utility also varies with time. In time of war, the utility of bombs is high and that of pianos is low. Utility is therefore related to our sense of priorities. The utility of a commodity is also related to the quantity available to the consumer. If men buy a large quantity of paper, they will lose interest in buying more paper.

The demand for paper will go down. The utility of a commodity consequently decreases as the consumer's stock increases.

In most economic systems, the prices of the majority of goods and services are fixed. The individual cannot change the prices of the commodities he wants, and when planning his expenditure, he must accept these prices. A consumer will go on buying cigarettes as long as his satisfaction continues and they render utility. If he continues to pay the current price, his satisfaction is greater than his financial sacrifice. With each purchase, however, his satisfaction decreases, although the prices remain the same. If a consumer's supply of money is limited, a point will come when the financial sacrifice is greater than the satisfaction of smoking cigarettes. He will stop buying the commodity. The cigarettes are the same, but their utility has changed. If the prices rose, he would buy fewer; if they fell, he might buy more.

We can see that the nature of a commodity remains the same, but its utility changes. This indicates that a special relationship exists between goods and services on the one hand and consumer and his money on the other hand. The consumer's desire of a commodity tends to diminish as he buys more units of that commodity. This tendency is called the Law of Diminishing Marginal Utility.

Utility is of course related to the Laws of Supply and Demand. When economists talk about a Law of Supply, they mean that a rise in prices tends to increase the supply of a commodity, while a fall in prices tends to reduce it. When they talk about a Law of Demand, they mean that a fall in prices tends to increase the demand for a commodity, while a rise in price tends to decrease the demand. In any economic situation, a consumer will decide to buy a commodity only in terms of its particular utility to him.

If the prices of a particular commodity rise in the economy as a whole, the rise will naturally encourage producers to make more of that commodity. If, on the other hand, prices fall locally or throughout the world, producers will reduce production. Supplies of many commodities can generally be adjusted to suit market conditions. This means that changes in market prices lead to changes in the quantity of a particular commodity made available to consumers. Household goods and furniture are in this category. In such instances, supply is said to be elastic, because it can be increased or decreased rapidly to suit market prices.

The principle of elasticity operates in the area of demand as well as

in the area of supply. People very seldom have everything they want. They usually have to choose carefully how they will spend their money. When they exercise this choice, they work according to their personal scale of preferences, beginning with top-priority essentials like food and housing. Next of their scale come those commodities which provide comfort or convenience of some kind (telephones, insurance etc.) and finally come the non-essentials like holidays and trips to the theatre, which are important parts of life but not comparable with food and shelter. If it is necessary to pay very high prices for the essentials of life, people pay them - even if this means spending all their income. In such case demand is inelastic. For non-essentials, however, demand is elastic and particularly responsive to changes in price.

Revision and Conclusion

Most people work to earn a living, and produce goods and services. Goods are either agricultural (like maize) or manufactured (like cars). Services are such things as education, medicine and commerce. Some people provide goods; some provide services. Other people provide both goods and services. For example, in the same garage man may buy a car or some service which helps him to maintain his car.

The work people do is called economic activity. All economic activities taken together make up the economic system of a town, a city, a country or the world. Such an economic system is the sum-total of what people do and what they want. The work people do either provides what they need or provides the money with which they can buy essential commodities. Of course, most people hope to have enough money to buy commodities and services which are nonessential but which provide some particular personal satisfaction, such as toys for children, visits to the cinema and books.

The science of economics is based upon the facts of our everyday lives. Economists study our everyday lives and the general life of our communities in order to understand the whole economic system of which we are part. They try to describe the facts of the economy in which we live, and to explain how it works. The economist's methods should of course be strictly objective and scientific.

We need food, clothes and shelter. We probably would not go to work if we could satisfy these basic needs without working. But even

when we have satisfied such basic needs, we may still want other things, such as the toys, visits to the cinema and books mentioned above. Our lives might be more enjoyable if we had such things. Human beings undoubtedly have a wide and very complex range of wants. The science of economics is concerned with all our needs: with the desire to have a radio as well as the basic necessity of having enough food to eat.

So far we have suggested that economic systems are the same everywhere. This is not entirely true. Not all economic systems in the world are the same. The economic system of the USA differs greatly from the system in the former USSR. The American system is based on private enterprise and essentially capitalistic, while the former USSR system was communistic and based on the principles of Karl Marx, the 19th century political economist. The economic systems of these two nations contrast strongly.

Britain is similar to the USA. It has economic system based on private enterprise and private supplies of capital. An important form of capital is surplus income available for investment in new business activities. Property in both the USA and Britain can be and is owned by individual citizens and these citizens exercise considerable economic freedom of choice. They can choose what they want to do and how they want to earn their living, but are not, of course, entirely free to do as they wish. They must obey the law. Otherwise, however, they can use their time, money and energy as they wish. If a person can do this, the economists say that he is economically free. In all communities, of course, limits are imposed upon personal freedom, which are sometimes very complex.

Complete economic freedom of action can create great difficulties, because the freedoms exercised by various individuals inevitably conflict. If citizens were completely free, some landowners might build factories in unsuitable place, while some factory owners might make their employees work too long each day. If they were completely free, workers might stop working when they got their first pay, and come back only when they need more money. Such economic anarchy could create instability in the entire economy of a country.

Laws which relate to economic conditions are sometimes concerned with contracts between employers and employees. Sometimes they are concerned with workers' health, wages and pensions, and sometimes with the location of places of work. Sometimes they protect the

interests principally of the workers, while at others they may be beneficial to the employers. The government policy towards both employees and employers will depend very much upon the political and economical ideology which the government adopts, and may be biased towards employers and capital on the one hand, or workers and the problems of labour on the other.

In states which have a communistic system, private property and private enterprise are reduced to a minimum. They exist but are limited to a small area of the economy. Karl Marx conceived of a world in which there would be no private property whatsoever. Communism in theory states that all property should belong to the State. In practice, however, the citizens of states like the former USSR are permitted to have personal properties.

The important thing about the communist system is central planning. The State organizes the whole economic effort of the nation. A central authority with complete power decides what goods and services will be produced. The authority decides what quantities of goods will be produced, and also controls their quality, and decides where they will go and what price will be charged for them. Additionally, the State provides all (or most of) the services which the citizens require. It is responsible for the economy and is therefore concerned with methods of production as well as quality and quantity. The national economy must be planned ahead over a number of years.

Marxist economics are planned. The system is related to the needs of the State as a whole, not the needs of the private person. The emphasis is collective and not individual, so that the individual is subordinated to the needs of the collective State.

The central authority in communist countries performs the function of the price system in capitalistic economies. Under capitalism the prices of goods and services are related to supply and demand. The system operates freely, dependent upon the quantities available and what people want. Therefore, we say that in private enterprise systems the production of goods tends to follow price movements, to rise when prices rise and fall when prices fall. This rise and fall is not, however, normal in communist countries. The control exercised by the State prevents any such fluctuation of prices. Government planners under communism, therefore, know what goods are available and what prices will be charged, but economists in non-communist systems do not always know this.

No state today is completely communistic or completely capitalistic. The various national economic systems tend towards one economic type or other, but many are difficult to classify. It has been found necessary in many countries to exercise some degree of control over national economic conditions, and under-developed nations particularly are interested in longterm plans. Countries like India have had a number of plans guided by the government. India makes a clear distinction between the public sector and the private sector of its economy and so has a system called a mixed economy.

Britain today has a mixed economy. In the public sector are the nationalized industries like coal and steel, British Rail and British Petroleum (BP). In the private sector are the majority of the nation's industries, from giants like BP down to small family businesses. In 1962 the British government set up an official planning body known as the National Economic Development Council (NEDC), a body which would help to plan national production and set up production targets. The members of NEDC are representatives of both the employer's federations and the Trade Union Congress (TUC), together with members of the government, eminent industrialists and leading economists.

It is, however, a very difficult matter to plan ahead in a mixed economy. It is not possible to plan ahead with any certainty even in a rigidly controlled economy, because natural disasters, political changes and other factors can affect the general plan in unexpected ways.

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