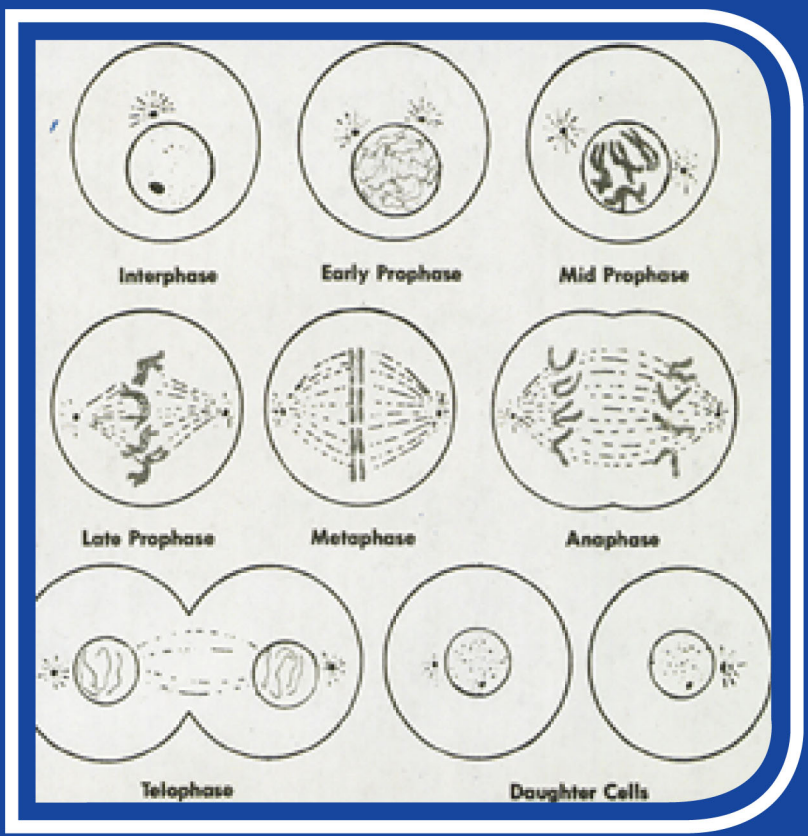
ΙΔΡΥΜΑ ΕΥΓΕΝΙΔΟΥ
1954

ΕΙΔΙΚΑ ΑΓΓΛΙΚΑ

ΓΙΑ ΤΜΗΜΑΤΑ κοινωνικών υπηρεσιών

Γ. Σ. Μουζακίτη

ΚΑΘΗΓΗΤΟΥ Α.Σ.Ε.Τ.Ε.Μ. / Σ.Ε.Λ.Ε.Τ.Ε.



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ΧΡΥΣΟΥΝ ΜΕΤΑΛΛΙΟΝ ΑΚΑΔΗΜΙΑΣ ΑΘΗΝΩΝ

ΠΡΟΛΟΓΟΣ ΙΔΡΥΜΑΤΟΣ ΕΥΓΕΝΙΔΟΥ

Ὁ Εὐγένιος Εὐγενίδης, ὁ ἱδρυτής καί χορηγός τοῦ «Ἱδρύματος Εὐγενίδου», πολύ νωρίς πρόβλεψε καί σχημάτισε τήν πεποίθηση ὅτι ἡ ἄρτια κατάρτιση τῶν τεχνικῶν μας, σέ συνδυασμό μέ τήν ἐθνική ἀγωγή, θά ἦταν ἀναγκαῖος καί ἀποφασιστικός παράγοντας τῆς προόδου τοῦ Ἔθνους μας.

Τήν πεποίθησή του αὐτή ὁ Εὐγενίδης ἐκδήλωσε μέ τή γενναιόφρονα πράξη εὐεργεσίας, νά κληροδοτήσει σεβαστό ποσό γιά τή σύσταση Ἱδρύματος πού θά εἶχε σκοπό νά συμβάλλει στήν τεχνική ἐκπαίδευση τῶν νέων τῆς Ἑλλάδας.

Ἔτσι τό Φεβρουάριο τοῦ 1956 συστήθηκε τό «Ἵδρυμα Εὐγενίδου», τοῦ ὁποίου τήν διοίκηση ἀνέλαβε ἡ ἀδελφή του κυρία Μαριάνθη Σίμου, σύμφωνα μέ τήν ἐπιθυμία τοῦ διαθέτη.

Ἀπό τό 1956 μέχρι σήμερα ἡ συμβολή τοῦ Ἱδρύματος στήν τεχνική ἐκπαίδευση πραγματοποιεῖται μέ διάφορες δραστηριότητες. Ὅμως ἀπ' αὐτές ἡ σημαντικότερη, πού κρίθηκε ἀπό τήν ἀρχή ὡς πρώτης ἀνάγκης, εἶναι ἡ ἔκδοση βιβλίων γιά τούς μαθητές τῶν τεχνικῶν σχολῶν.

Μέχρι σήμερα ἐκδόθηκαν 150 τόμοι βιβλίων, πού ἔχουν διατεθεῖ σέ πολλά ἑκατομμύρια τεύχη, καί καλύπτουν ἀνάγκες τῶν Κατώτερων καί Μέσων Τεχνικῶν Σχολῶν τοῦ Ὑπ. Παιδείας, τῶν Σχολῶν τοῦ Ὀργανισμοῦ Ἀπασχολήσεως Ἐργατικοῦ Δυναμικοῦ (ΟΑΕΔ) καί τῶν Δημοσίων Σχολῶν Ἐμπορικοῦ Ναυτικοῦ.

Μοναδική φροντίδα τοῦ Ἱδρύματος σ' αὐτή τήν ἐκδοτική του προσπάθεια ἦταν καί εἶναι ἡ ποιότητα τῶν βιβλίων, ἀπό ἄποψη ὄχι μόνον ἐπιστημονική, παιδαγωγική καί γλωσσική, ἀλλά καί ἀπό ἄποψη ἐμφανίσεως, ὥστε τό βιβλίο νά ἀγαπηθεῖ ἀπό τούς νέους.

Γιά τήν ἐπιστημονική καί παιδαγωγική ποιότητα τῶν βιβλίων, τά κείμενα ὑποβάλλονται σέ πολλές ἐπεξεργασίες καί βελτιώνονται πρίν ἀπό κάθε νέα ἔκδοση.

Ἰδιαίτερη σημασία ἀπέδωσε τό Ἵδρυμα ἀπό τήν ἀρχή στήν ποιότητα τῶν βιβλίων ἀπό γλωσσική ἄποψη, γιατί πιστεύει ὅτι καί τά τεχνικά βιβλία, ὅταν εἶναι γραμμένα σέ γλώσσα ἄρτια καί ὁμοιόμορφη ἀλλά καί κατάλληλη γιά τή στάθμη τῶν μαθητῶν, μποροῦν νά συμβάλλουν στήν γλωσσική διαπαιδαγώγηση τῶν μαθητῶν.

Ἔτσι μέ ἀπόφαση πού πάρθηκε ἤδη ἀπό τό 1956 ὅλα τά βιβλία τῆς Βιβλιοθήκης τοῦ Τεχνίτη, δηλαδή τά βιβλία γιά τίς Κατώτερες Τεχνικές Σχολές, ὅπως ἀργότερα καί γιά τίς Σχολές τοῦ ΟΑΕΔ, εἶναι γραμμένα σέ γλώσσα δημοτική μέ βάση τήν γραμματική τοῦ Τριανταφυλλίδη, ἐνῶ ὅλα τά ἄλλα βιβλία εἶναι γραμμένα στήν ἁπλή καθαρεύουσα. Ἡ γλωσσική ἐπεξεργασία τῶν βιβλίων γίνεται ἀπό φιλολόγους τοῦ Ἱδρύματος καί ἔτσι ἐξασφαλίζεται ἡ ἐνιαία σύνταξη καί ὁρολογία κάθε κατηγορίας βιβλίων.

Ἡ ποιότητα τοῦ χαρτιοῦ, τό εἶδος τῶν τυπογραφικῶν στοιχείων, τά σωστά σχήματα καί ἡ καλαίσθητη σελιδοποίηση, τό ἐξώφυλλο καί τό μέγεθος τοῦ βιβλίου περιλαμβάνονται καί αὐτά στίς φροντίδες τοῦ Ἱδρύματος.

Τό Ἵδρυμα θεώρησε ὅτι εἶναι ὑποχρέωσή του, σύμφωνα μέ τό πνεῦμα τοῦ Ἱδρυτή του, νά θέσει στήν διάθεση τοῦ Κράτους ὅλη αὐτή τήν πεῖρα του τῶν 20 ἐτῶν, ἀναλαμβάνοντας τήν ἔκδοση τῶν βιβλίων καί γιά τίς νέες Τεχνικές καί Ἐπαγγελματικές Σχολές καί τά νέα Τεχνικά καί Ἐπαγγελματικά Λύκεια, σύμφωνα μέ τά Ἀναλυτικά Προγράμματα τοῦ Κ.Ε.Μ.Ε.

Τά χρονικά περιθώρια γι' αὐτή τήν νέα ἐκδοτική προσπάθεια ἦταν πολύ περιορισμένα καί ἴσως γι' αὐτό, ἰδίως τά πρῶτα βιβλία αὐτῆς τῆς σειρᾶς, νά παρουσιάσουν ἀτέλειες στή συγγραφή ἤ στήν ἐκτύπωση, πού θά διορθωθοῦν στή νέα τους ἔκδοση. Γι' αὐτό τό σκοπό ἐπικαλούμαστε τήν βοήθεια ὅλων ὅσων θά χρησιμοποιήσουν τά βιβλία, ὥστε νά μᾶς γνωστοποιήσουν κάθε παρατήρησή τους γιά νά συμβάλλουν καί αὐτοί στή βελτίωση τῶν βιβλίων.

ΠΡΟΛΟΓΟΣ ΤΟΥ ΣΥΓΓΡΑΦΕΑ

Τό βιβλίο τοῦτο καλύπτει τήν εἰδική ὁρολογία πού θεωρεῖται ἀπαραίτητη γιά τόν τομέα Κοινωνικῶν Ὑπηρεσιῶν τοῦ Ἐπαγγελματικοῦ Λυκείου. Κατά βάση πρόκειται γιά ἰατρική ὁρολογία. Ἡ ἔκταση ὅμως τῆς ὕλης εἶναι τέτοια, ὥστε πιστεύω, πώς θά δώσει στούς μαθητές τήν ἀπαραίτητη ὑποδομή γιά ἕνα ὁλοκληρωμένο λεξιλόγιο πού νά ἀνταποκρίνεται στίς ἀνάγκες καί τίς ἀπαιτήσεις τους.

Ἡ ἀνάπτυξη τῆς ὕλης χωρίζεται σέ 12 ἑνότητες. Κάθε ἑνότητα πραγματεύεται ἕνα συγκεκριμένο θέμα, πού ὁλοκληρώνεται σέ 2-3 τμήματα τῆς ἑνότητας. Ἡ ἴδια ἡ ἑνότητα μέσα στήν ὅλη δομή τοῦ βιβλίου εἶναι αὐτόνομη. Δέν συμβαίνει ὅμως τό ἴδιο καί μέ τά τμήματα μέσα στήν ἑνότητα. Αὐτά προχωροῦν ἀπό τίς βασικές καί πιό γενικές γνώσεις στίς πιό εἰδικές καί λεπτομερειακές. Κάθε τμῆμα πάλι ἀποτελεῖται ἀπό 3-4 μέρη.

Αὐτά εἶναι:

(α) Ἡ παρουσίαση τοῦ ἀντικειμένου μέσα ἀπό εἰκόνες καί διαγράμματα.

(β) Ἡ ἀνάπτυξη τοῦ θέματος μέ παροχή περισσότερων λεπτομερειῶν πάνω στό θέμα.

(γ) Ἡ πρακτική ἄσκηση πού βασίζεται στά δυό πρῶτα μέρη καί ἔχει σκοπό νά βοηθήσει τήν ἐμπέδωση τῶν γνώσεων πού παρέχονται μ' αὐτά.

(δ) Τό λεξιλόγιο πού καλύπτει ὅλες τίς καινούργιες λέξεις πού παρουσιάζονται σέ κάθε τμῆμα.

Ὅταν μέ 2-3 τμήματα ὁλοκληρωθεῖ μιά ἑνότητα, ἀκολουθοῦν ἀσκήσεις πού ἀναφέρονται σέ ὅλη τήν ἔκταση τῆς ἑνότητας. Ἔτσι γίνεται μιά ἀνακύκλωση στό θέμα τῆς ἑνότητας καί πιστεύω πώς εἶναι καί χρήσιμη καί ἀπαραίτητη.

Ἀπό πλευρᾶς λεξιλογίου τά κείμενα εἶναι γραμμένα κάπως ἐλεύθερα. Αὐτό τά κάνει βέβαια πιό δύσκολα, ὅμως ἀναμφισβήτητα πιό αὐθεντικά. Δέν εἶμαι τῆς γνώμης ὅτι μπορεῖς νά διδάξεις εἰδική ὁρολογία μέσα ἀπό ἁπλοποιημένα σέ μεγάλο βαθμό κείμενα. Ἡ χρησιμότητά τους εἶναι τότε πολύ μικρή καί ἀμφίβολη.

Ὅσο ἀφορᾶ ὅμως τή δομή τῆς γλώσσας, αὐτή περιορίζεται στό μεγαλύτερο ποσοστό στίς γνώσεις πού ἀποκτήθηκαν στό πρῶτο βιβλίο τῆς σειρᾶς. Ὅπου ὑπάρχουν γραμματικά ἤ καί συντακτικά φαινόμενα καινούργια, αὐτό γίνεται ἀπό τήν ἀνάγκη ἡ ἀφήγηση νά εἶναι πιό γνήσια καί σωστή καί δέν πρέπει νά ἐξηγηθοῦν ἀναλυτικά στό μαθητή. Σ'αὐτή τή φάση δέν θά βοηθοῦσε σέ τίποτα.

Τό βιβλίο χρωστᾶ τή φροντισμένη μορφή του στή συγκινητικά πολύτιμη, ὑπεύθυνη καί ἀνυπόκριτη βοήθεια τοῦ προσωπικοῦ τοῦ ἐκδοτικοῦ τμήματος τοῦ Ἱδρύματος.

Νά ἐκφράσω τήν εὐγνωμοσύνη μου γιαὐτό δέν εἶναι παρά μιά πολύ μικρή ἀνταπόκριση στήν ἀπίθανα μεγάλη καί σπουδαία προσφορά του.

Γ.Σ. Μουζακίτης

ΠΙΝΑΚΑΣ ΠΕΡΙΕΧΟΜΕΝΩΝ

Part I - MEDICINE

I. Key to the phonetic symbols

(a) Vowels

1. / i / see
2. / ɪ / sit
3. / e / ten
4. / æ / hat
5. / ɑ / arm
6. / o / got
7. / ɔ / all
8. / ʊ / put
9. / u / too
10. / ʌ / cup
11. / ɜ / fur
12. / ə / ago

(b) Dipthongs

13. / ei / take
14. / əʊ / home
15. / ɑɪ / five
16. / ɑʊ / now
17. / ɔɪ / toy
18. / ɪə / near
19. / eə / hair
20. / ʊə / poor

(c) Consonants

1. / p / pen
2. / b / book
3. / t / ten
4. / d / do
5. / k / cat
6. / g / get
7. / tʃ / child
8. / dʒ / June
9. / f / fall
10. / v / voice
11. / θ / think
12. / ð / this
13. / s / six
14. / z / zoo
15. / ʃ / she
16. / ʒ / vision
17. / h / how
18. / m / man
19. / n / no
20. / ŋ / sing
21. / l / leg
22. / r / red
23. / j / yet
24. / w / wet
25. / ŋ / seven

II. Examples of words with phonetic transcription:

1. see / si /
2. sit / sɪt /
3. take / teɪk /
4. home / həʊm /
5. now / nɑʊ /
6. book / bʊk /
7. child / tʃɑɪld /
8. think / θɪŋ /

III. Phonetic symbols compari son table

	In this book	EPD	Simplified
1.	i	i:	i:
2.	ɪ	i	i
3.	e	e	e
4.	æ	æ	a
5.	ɑ	ɑ:	a:
6.	o	ɔ	o
7.	ɔ	ɔ:	o:
8.	ʊ	u	u
9.	u	u:	u:
10.	ʌ	ʌ	ʌ
11.	ɜ	ə:	ə:
12.	ə	ə	ə
13.	ei	ei	ei
14.	əʊ	ou	ou
15.	ɑɪ	ai	ai
16.	ɑʊ	au	au
17.	ɔɪ	ɔi	oi
18.	ɪə	iə	iə
19.	eə	ɛə	eə
20.	ʊə	uə	uə
21.	—	ɔe	oə

THE STRUCTURE OF THE HUMAN BODY

1.1a Look at the following picture:

Figure 1 shows a typical cell with its different parts. The cell is the simplest and smallest biological unit. There is a *nucleus* in the centre and a *nucleolus* within it.
The *cytoplasm* surrounds the nucleus. Its inner part is the *endoplasm* and its outer part is the *ectoplasm*. There is a *membrane* around the cell to protect it. This is the *cellular membrane*.

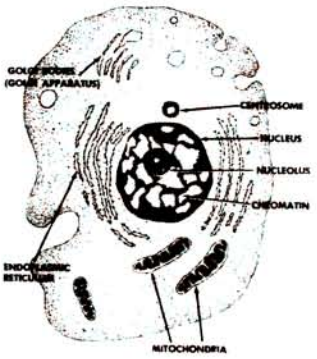


fig. 1

1.1b Now study the following statements:

a. *Biology* deals with the origin, structure, reproduction, growth and development of living organisms.
b. *Biologists* are scientists expert in the science of life.
c. A number of expert scientists conduct *biological* research nowadays.
d. The *membrane* acts as a covering or lining or connecting part in a body.
e. There are *membranous* tissues in animals and plants.
f. The *cytoplasm* supplies food to the cell.
g. The *nucleus* of the cell transforms the food into energy.

1.1c Use the information of the following table to form true and correct sentences:

	cell		central	biological	unit
	nucleus		simplest	———	cell
The	endoplasm	is the	inner	part of the	cytoplasm
	ectoplasm		outer		nucleus
	membrane		extreme		nucleolus

Table 1

i. ----------
ii. ----------
iii. ----------
iv. ----------
v. ----------

Vocabulary

typical / 'tɪpɪkl / τυπικός
cell / sel / κύτταρο
different / 'dɪfrnt / διαφορετικός
part / pɑt / μέρος, τμῆμα
simple / sɪmpl / ἁπλός
small / smɔl / μικρός
biological / 'bɑɪə'lodʒɪkl / βιολογικός
unit / 'junɪt / μονάδα
nucleus / 'njuklɪəs / πυρήνας
centre / 'sentə / κέντρο
nucleolus / 'njuklɪ'əuləs / πυρηνίσκος
cytoplasm / 'sɑɪtoplæzm / κυτόπλασμα
chromatin / krə'mætɪn / χρωματίνη
centrosome / 'sentrəusəum / κεντρόσωμα
vacuole / 'vækjʊ'əul / κενοτόπιο
surround / sə'rɑund / περιβάλλω
inner / 'ɪnə / ἐσωτερικός
endoplasm / 'endəplæzm / ἐνδόπλασμα, ἐνδοσάρκιο
outer / 'ɑutə / ἐξωτερικός
ectoplasm / 'ektəplæzm / ἐκτόπλασμα
membrane / 'membreɪn / μεμβράνη
around / ə'rɑund / γύρω
protect / prə'tekt / προστατεύω
cellular / 'seljʊlə / κυτταρώδης
deal (with) / dil wɪð / ἀσχολοῦμαι
origin / 'orədʒɪn / προέλευση
structure / 'strʌktʃə / δομή
reproduction / 'riprə'dʌkʃn / ἀναπαραγωγή
growth / grəuθ / ἀνάπτυξη
development / dɪ'veləpmənt / ἐξέλιξη
living / lɪvɪŋ / ζωντανός
organism / 'ɔgənɪzm / ὀργανισμός
biology / bɑɪ'olədʒɪ / βιολογία
biologist / bɑɪ'olədʒɪst / βιολόγος
scientist / 'sɑɪəntɪst ἐπιστήμονας
expert / 'ekspɜt / εἰδικός
science / 'sɑɪəns / ἐπιστήμη
life / lɑɪf / ζωή
conduct / kən'dʌkt / διεξάγω
biological / 'bɑɪə'lodʒɪkl / βιολογικός
research / rɪ'sɜtʃ / ἔρευνα
act / ækt / ἐνεργῶ
covering / 'kʌvərɪŋ / κάλυμμα
lining / 'lɑɪnɪŋ / ἐπένδυση
connecting / kə'nektɪŋ / συνδετικός
membranous / 'membrənəs / μεμβρανώδης
tissue / 'tɪʃu / ἱστός
animal / 'ænəml / ζῶο
plant / plænt / φυτό
supply / sə'plɑɪ / παρέχω
transform / træns'fɔm / μετατρέπω

1.2a **Look at the following drawings:**

These drawings show the stages of *mitosis*. Mitosis is the *division* of a living cell into two or more *daughter cells*. There are four basic *phases* from the beginning of the process to the *formation* of the daughter cells. They are:

i. prophase
ii. metaphase
iii. anaphase
iv. telophase

However, we can divide the prophase into four parts:

i. the interphase
ii. the early prophase
iii. the mid prophase, and
iv. the late prophase

There is one essential feature in the process of mitosis. The daughter cells have the same number of *chromosomes* with the parent cell.

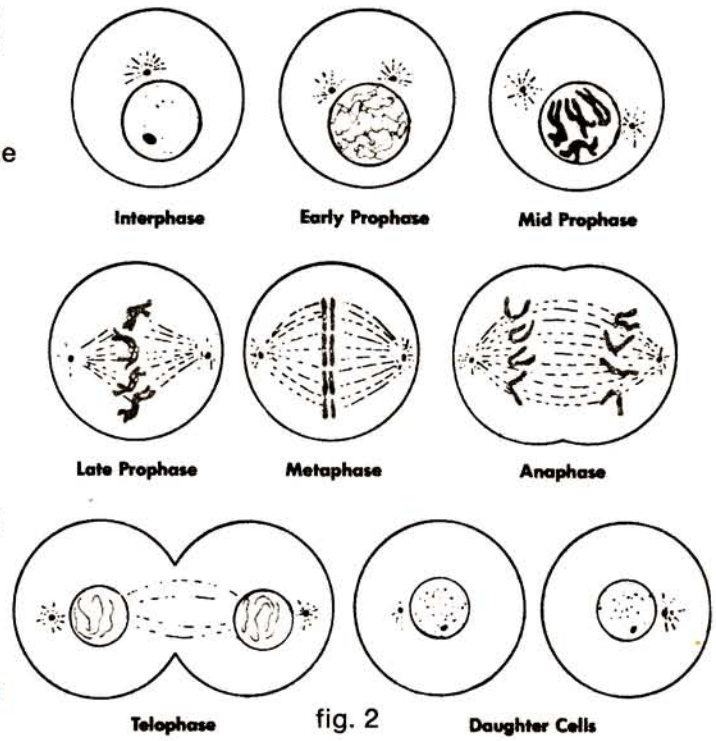


fig. 2

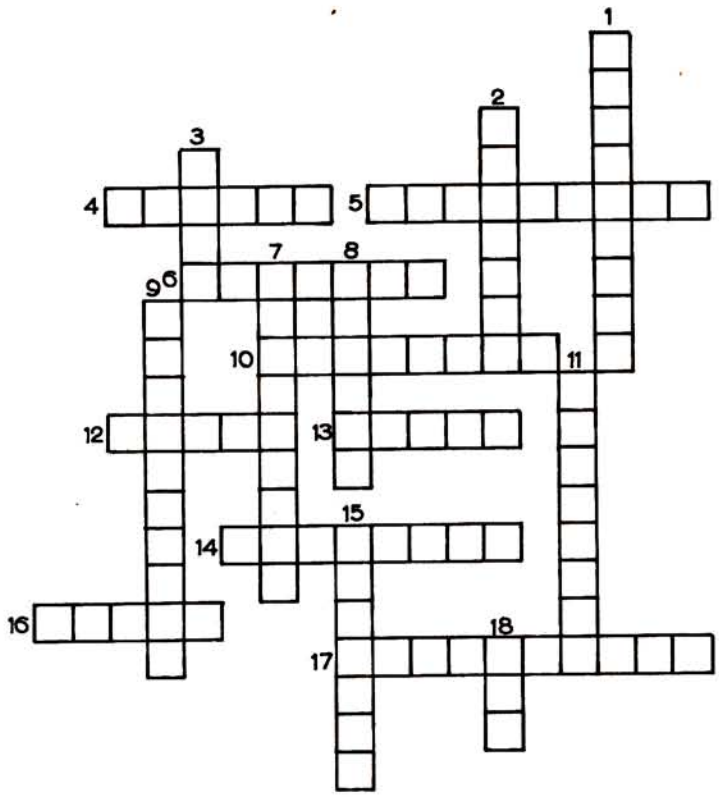
1.2b **Study the following statements:**

a. The *basic* characteristic of mitosis is that the number of chromosomes does not change.
b. This argument has an acceptable scientific *basis*.
c. *Bases* combine with acids to form salts and water.
d. The *processes* of digestion, reproduction and growth are features of living beings.
e. It is still unknown what *forms* the basis of this compound.
f. The *formation* of daughter cells is a most important process.
g. One can easily distinguish the *formative* influences in his theories.
h. When cell *division* begins, the chromatin thickens to form thread-like bodies called chromosomes.
i. The *chromosomes* vary in shape, size and number in different organisms.

1.2c **Study the cues and fill the squares of the crossword puzzle:**

1. At the end of the last phase the - - - - - - - - of the daughter cells is complete.
2. We do not observe - - - - - - - - in the number of the chromosomes from the parent to the daughter cells.
3. Sodium and chlorine combine to - - - - - - - - salt.
4. It characterises living beings.

is the second phase in the division of a cell.
That's the scientific name of the division of a living cell into daughter cells.
. The nuclei of the cells - - - - - - - - food into energy.
8. We've got four basic - - - - - - - - in mitosis.
9. It is the condition of cells before division starts.
10. This is the third phase in mitosis.
11. - - - - - - - - and that is the last one.
12. They are the simplest biological units.
13. This prophase is the second stage.
14. The first stage in mitosis.
15. Mitosis is a four stage - - - - - - - -
16. It's got the same meaning with the word "stage".
17. It's a thread-like body which we take from chromatin.
18. It's the third stage in prophase.

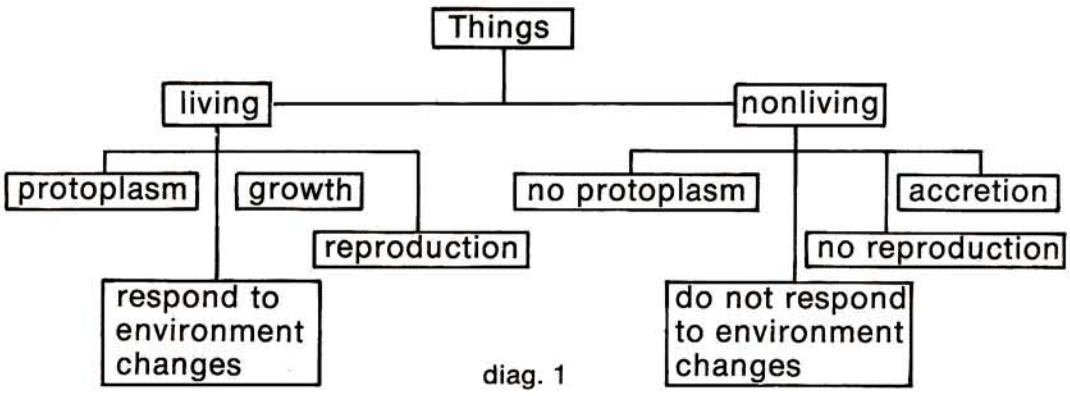


Vocabulary

stage / steɪdʒ / στάδιο
mitosis / 'maɪtosəs / μίτοση
division / dɪ'vɪʒn / διαίρεση
basic / 'beɪsɪk / βασικός
phase / feɪz / φάση
process / 'prəʊses / πορεία
formation / fɔ'meɪʃn / σχηματισμός
prophase / 'prəʊfeɪz / πρόφαση
metaphase / 'metəfeɪz / μετάφαση
anaphase / 'ænəfeɪz / ἀνάφαση
telophase / 'telofeɪz / τελόφαση
divide / dɪ'vaɪd / διαιρῶ
interphase / 'ɪntəfeɪz / ἐσωτερική φάση
early / 'ɜlɪ / πρῶτος

mid / mɪd / μεσαῖος
late / leɪt / τελευταῖος
essential / ɪ'senʃl / οὐσιώδης
feature / 'fitʃə / χαρακτηριστικό
chromosome / 'krəʊməsəʊm / χρωμόσωμα
characteristic / 'kærɪktə'rɪstɪk / χαρακτηριστικός
argument / 'ɑgjʊmənt / ἐπιχείρημα
acceptable / ək'septəbl / παραδεκτός
scientific / 'saɪən'tɪfɪk / ἐπιστημονικός
basis / 'beɪsɪs / βάση
base / 'beɪs / βάση
combine / kəm'baɪn / ἑνώνομαι
acid / æsɪd / ὀξύ
salt / sɔlt / ἅλας
digestion / daɪ'dʒestʃən / πέψη
reproduction / 'riprə'dʌkʃn / ἀναπαραγωγή
growth / grəʊθ / ἀνάπτυξη
unknown / ʌn'nəʊn / ἄγνωστος
form / fɔm / σχηματίζω
compound / 'kompaʊnd / ἕνωση
formation / fɔ'meɪʃn / σχηματισμός
easily / izlɪ / εὔκολα
distinguish / dɪ'stɪŋgwɪʃ / διακρίνω
formative / 'fɔmətɪv / διαμορφωτικός
influence / 'ɪnflʊəns / ἐπίδραση
theory / 'θɪərɪ / θεωρία
thicken / 'θɪkən / πυκνώνω
thread-like / 'θred'laɪk / νηματοειδής
vary / 'veərɪ / ποικίλλω
shape / ʃeɪp / σχῆμα
size / saɪz / μέγεθος
organism / 'ɔgənɪzm / ὀργανισμός
observe / əb'zɜv / παρατηρῶ
sodium / 'səʊdɪəm / νάτριο
chlorine / 'klɔrin / χλώριο

1.3a **Look at the following diagram:**



diag. 1

Living things differ from nonliving things in four very important aspects. Let's take a child:

a. It is made up of a substance called *protoplasm*
b. The child *responds* to the *changes* of the *environment*. It feels cold in cold weather and it feels hot in hot weather.
c. A child *grows*. It takes *food*, something *chemically different* from itself, *transforms* it and makes it part of itself.
d. A living thing can *reproduce* itself. Young beings develop into adults and reproduce themselves.

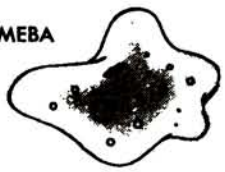
Let's consider a piece of stone:

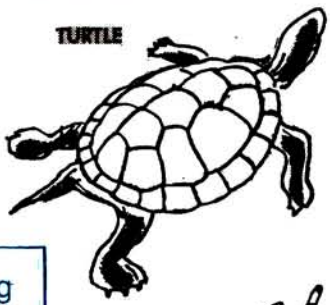
a. We cannot find protoplasm in it.
b. It does not react to any changes occurring in the environment.
c. A piece of stone can become bigger, but by the addition to its bulk of a mass made up of the same substance.
d. A piece of stone has not got the property of reproduction.

1.3b **Study these statements:**

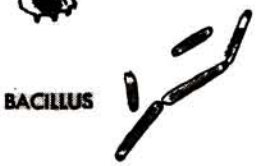
a. *Protoplasm* is made up of about 75% *water* and 25% *proteins* and other *substances*.
b. It contains *chemical elements* such as oxygen, carbon, hydrogen, nitrogen, phosphorus, potassium, sulphur, chlorine, sodium, calcium, magnesium, copper, iron etc.
c. These elements combine in various ways to form *proteins, fats* and *carbohydrates*.
d. Protoplasm also contains small quantities of *sugar* and *mineral salts*.
e. Carbohydrates are *sources of energy* for the activities of the cell.
f. Mineral salts are essential for the formation of *bone*.
g. Protoplasm also contains *enzymes, hormones* and *vitamins*.
h. These *constituents* are very important for the *chemical reactions* within the protoplasm.
i. The chemical and physicall processes within the protoplasm, as a whole, are known as *metabolism*.
j. All living things *respond* to external forces in different ways.
k. A quick *response* to the changes of the environment is sometimes vital for a living organism.
l. Plants *grow* from seeds.
m. All living things reach their full *growth* at various ages.
n. We sometimes refer to adults as *grown ups*.
o. There is a *growing* demand for pollution free environment nowadays.
p. *Chemistry* is the branch of science dealing with the structure, combination and reaction of substances.
q. *Chemist* is a person expert in chemistry.
r. The calcium carbonate [$CaCO_3$] is an example of *chemical combination*.

1.3c(i) **Classify the following things into living and nonliving:**





Living	Nonliving



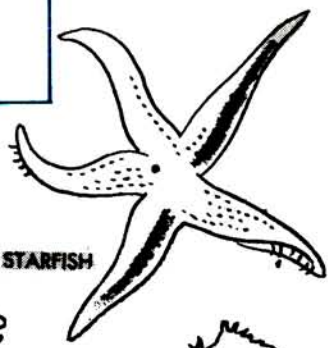
grains of sand

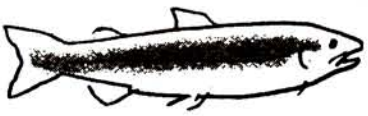
iron rod

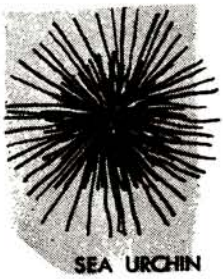
river water

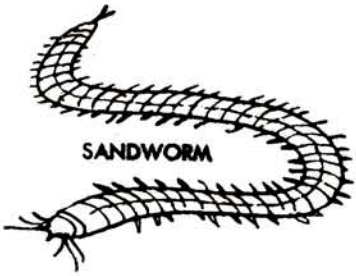
Table 2

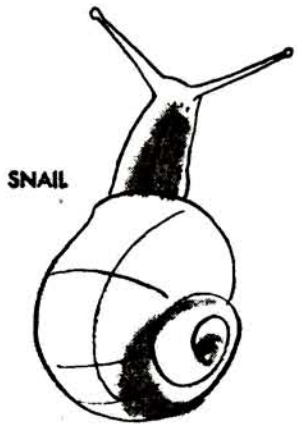
piston rings

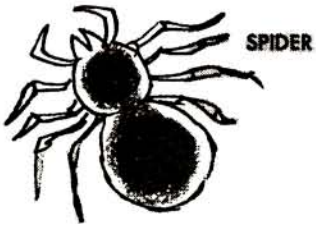


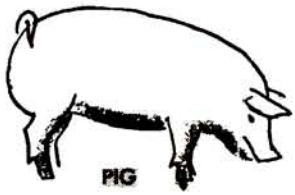






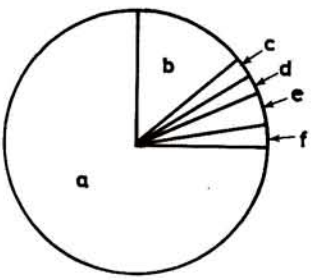






1.3 (ii)

Look at the opposite pie diagram of protoplasm and then fill the blanks corresponding to the letters with one of the following words. Some portions in the diagram are in scale, others are not.



diag. 2

water - proteins - fats - carbohydrates - salts - other substances

a. ----------
b. ----------
c. ----------
d. ----------
e. ----------
f. ----------

Vocabulary

protoplasm / 'prəʊtəplæzm / πρωτόπλασμα
respond / rɪ'spond / ἀνταποκρίνομαι
environment / ɪn'vaɪərnmənt / περιβάλλον
accretion / ə'kriʃn / προσθήκη
differ / 'dɪfə / διαφέρω
aspect / 'æspekt / πλευρά
substance / 'sʌbstəns / οὐσία

develop / dɪ'veləp / ἀναπτύσσομαι
adult / 'ædʌlt / ἐνήλικας
consider / kən'sɪdə / ἐξετάζω
react / rɪ'ækt / ἀντιδρῶ
occur / ə'kɜ / ἐμφανίζομαι
bulk / bʌlk / ὄγκος
mass / mæs / μάζα
property / 'propətɪ / ἰδιότητα
make up / meɪk ʌp / ἀποτελῶ
protein / 'prəʊtin / πρωτεΐνη
carbon / 'kɑbən / ἄνθρακας
potassium / pə'tæsɪəm / κάλιο
sulphur / 'sʌlʃə / θεῖο
calcium / 'kælsɪəm / ἀσβέστιο
carbohydrate / 'kɑbəʊ'haɪdreɪt / ὑδατάνθρακας
source / sɔs / πηγή
activity / æk'tɪvətɪ / ἐνέργεια, δραστηριότητα
bone / bəʊn / ὀστό
enzyme / 'enzaɪm / ἔνζυμο
hormone 'hɔməʊn / ὁρμόνη
vitamin / 'vɪtəmɪn / βιταμίνη
constituent / kən'stɪtʃʊənt / συστατικό
reaction / rɪ'ækʃn / ἀντίδραση
metabolism / mɪ'tæbəlɪzm / μεταβολισμός
external / ek'stɜnl / ἐξωτερικός
force / fɔs / δύναμη
response / rɪ'spons / ἀνταπόκριση
vital / vaɪtl / ζωτικός
seed / sid / σπόρος
grown up / 'grəʊn'ʌp / ἐνήλικας
growing / 'grəʊɪŋ / αὐξανόμενος
pollution / pə'luʃn / μόλυνση
carbonate / 'kɑbəneɪt / ἀνθρακικό ἅλας
classify / klæsɪ'faɪ / ταξινομῶ

EXERCISES

I. Which is correct in the following a, b or c?

1. Endoplasm is the - - - - - - - - part of the cytoplasm.
   a. inner
   b. outer
   c. central
2. Ectoplasm is the - - - - - - - - part of the cytoplasm.
   a. inner
   b. outer
   c. central
3. The membrane acts as a - - - - - - - - in a body.
   a. covering or lining
   b. connecting part
   c. both "a" and "b"

4. Mitosis is the division of a living cell - - - - - - - -
   a. into daughter cells.
   b. into parent cells.
   c. "a" and "b".
5. The four basic phases of mitosis are:
   a. pro —, ana —, telo — and metaphase
   b. ana —, pro —, meta — and telophase
   c. pro —, meta —, ana — and telophase
6. The chromosomes vary in - - - - - - - - in different organisms.
   a. shape only
   b. shape and size
   c. shape, size and number
7. Chemical elements such as oxygen, carbon, hydrogen etc combine to form - - - - - - - -
   a. proteins
   b. fats and carbohydrates
   c. both "a" and "b"
8. Mineral salts are essential - - - - - - - -
   a. for the formation of bone
   b. as sources of energy
   c. for metabolism
9. Metabolism is the total of chemical and physical processes within the - - - - - - - -
   a. protoplasm
   b. cell
   c. chromosome

II. Say whether the following statements are TRUE or FALSE.

1. The cell is the simplest biological unit.
2. The number of chromosomes changes after mitosis.
3. The interphase is a change before prophase.
4. The number of chromosomes does not change after mitosis.
5. The formation of daughter cells is not important.
6. There is no difference between living and nonliving things.
7. Living things are made up of protoplasm.
8. Nonliving things cannot reproduce themselves.
9. A piece of stone has the property of reproduction.
10. 75% of protoplasm is water.
11. Plants do not grow from seeds.
12. Not all living things respond to external forces.
13. Hormones are very important for the chemical reactions within the protoplasm.
14. All living things reach their full growth at the same age.
15. The calcium carbonate is a chemical reaction.

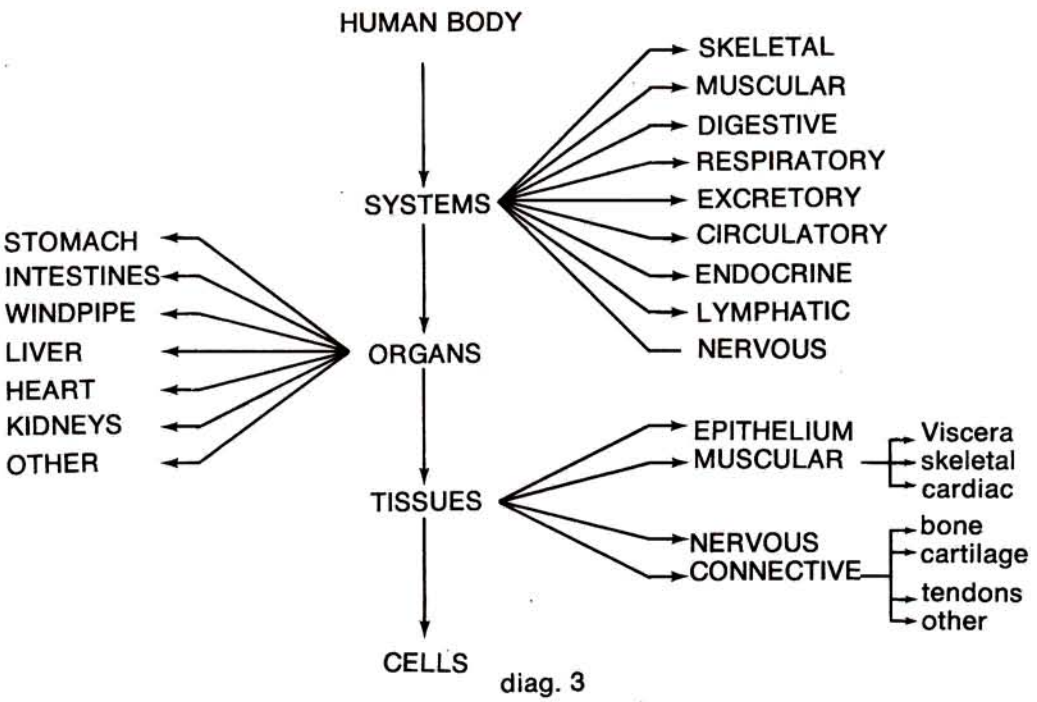
III. Match a word or phrase from column A with a word or phrase from column B to form true and correct statements:

A	B
1. The cytoplasm	a. living things.
2. The nucleus	b. a child.
3. Biologist is a scientist expert in	c. chemical element.
4. Bases combine with acids to form	d. chemical combination.
5. Growth is a feature of	e. transforms food into energy.
6. Living things	f. a grain of sand.
7. The grains of sand	g. in living things.
8. Growth refers to	h. respond to changes of the environment.
9. Accretion refers to	i. non living things.
10. We can find protoplasm	j. supplies food to the cell.
11. Oxygen is a	k. the science of life.
12. The calcium carbonate is a	l. salts and water.
	m. do not respond to changes of the environment.

UNIT M.2

IMPORTANT SYSTEMS IN MAN

2.1a **Study the following diagram:**



diag. 3

2.1b Now consider the following statements in relation to the above diagram:

a. *Similar cells* are grouped together to form *tissues.*
b. *Epithelium* is a protective or lining tissue. Some of its cells are flat (as in the outer part of the skin); others are like cubes and others are cylindrical (as in the digestive system).
c. We find the smooth, *visceral,* muscles in the digestive tract, the urinary and reproductive organs, the blood vessels, the respiratory system etc.
d. The *nervous* tissue is the most important element in the brain.
e. The *connective* tissue is predominant in the windpipe.
f. *Tissues* are combined to form larger units, the *organs.*
g. *Organs* are grouped together to form *systems.*
h. The *respiratory system* includes *organs* of respiration (mouth, nose, pharynx, larynx, trachea — windpipe —, lungs and bronchi) as well as blood carrying respiratory gases.

2.1c There are some structures that form part of one system and others that belong to more than one systems. Look at the following list of organs and structures and opposite them the name of system or systems they belong to:

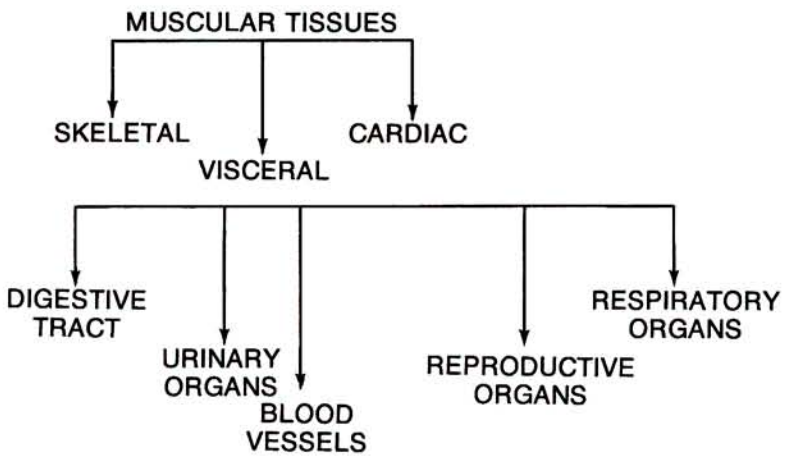
mouth	digestive	— respiratory
nose		— respiratory
trachea	digestive	— respiratory
lungs	digestive	— respiratory — circulatory
esophagus	digestive	— respiratory
liver	digestive	
spleen	digestive	— excretory
stomach	digestive	
pancreas	digestive	— excretory
aorta	excretory	— circulatory
rectum	digestive	— excretory
bladder	digestive	— excretory
skull	skeletal	
sternum	skeletal	
kidney	excretory	
heart	circulatory	

Vocabulary

human / 'hjumən / ἀνθρώπινος
system / 'sɪstəm / σύστημα
skeletal / 'skelɪtl / τοῦ σκελετοῦ, σκελετικός
muscular / 'mʌskjʊlə / μυϊκός
digestive / daɪ'dʒestɪv / πεπτικός
respiratory / rɪ'spɪrətrɪ / ἀναπνευστικός
excretory / ɪk'skritərɪ / ἀπεκκριτήριος
circulatory / 'sɛkjʊ'leɪtərɪ / κυκλοφοριακός
nervous / 'nɜvəs / νευρικός
organ / 'ɔgən / ὄργανο
stomach / 'stʌmək / στομάχι
intestine / ɪn'testɪn / ἔντερο
windpipe / 'wɪndpaɪp / τραχεία
liver / 'lɪvə / συκώτι
heart / hɑt / καρδιά

endocrine / en'dəʊ'kraɪn / ἐνδοκρινικός
lymphatic / lɪm'fætɪk / λεμφατικός, λεμφικός
kidney / 'kɪdnɪ / νεφρό
epithelium / epɪ'θiliəm / ἐπιθήλιο
viscera / 'vɪsərə / σπλάχνα
cardiac / 'kadıæk / καρδιακός
connective / kə'nektɪv / συνδετικός
bone / bəʊn / ὀστό
cartilage / 'kɑtlɪdʒ / χόνδρος
tendon / 'tendən / τένων
similar / 'sɪmlə / ὅμοιος
group / grup / ὁμαδοποιῶ
protective / prə'tektɪv / προστατευτικός
flat / flæt / ἐπίπεδος
skin / skɪn / δέρμα
lung / lʌŋ / πνεύμονας
bronchus / 'broŋkəs / βρόγχος
smooth / smuð / ἁπαλός, λεῖος
visceral / 'vɪsərəl / σπλαγχνικός
tract / trækt / σύστημα, ὁδός
urinary / 'jʊərɪnrɪ / οὐρητικός
reproductive / 'rɪprə'dʌktɪv / ἀναπαραγωγικός
blood / blʌd / αἷμα
vessel / vesl / ἀγγεῖο
brain / breɪn / ἐγκέφαλος
predominant / prɪ'domɪnənt / ἐπικρατέστερος
include / ɪn'klud / περιλαμβάνω
pharynx / 'færɪŋks / φάρυγγας
larynx / 'lærɪŋks / λάρυγγας
trachea / trə'kɪə / τραχεία

2.2a **Study the following diagram:**



diag. 4

2.2b **Read the following statements carefully:**

a. The *visceral* tissue is of great importance.
b. It has to do with *functions* that we cannot control but which are very important.
c. The *skeletal* muscle moves the bones of the skeleton.
d. One of the most important *organs* of the human body is the heart.
e. We can find the *conducting* or *nervous* tissues in the *brain* and *spiral cord.*

f. We can also find them in the *nerves* connecting these organs with the rest of the body.
g. All *systems* in the body are connected with the *circulatory* system.
h. The different systems of the body are not *isolated* from one another.
i. There are *voluntary* and *involuntary* muscles.

2.2c Fill the blanks in the following sentences with one of these words:

functions	voluntary	unimportant
involuntary	muscle	nervous
spinal cord	cardiac	tissues
contribute	kind	complex

i. Although there are not - - - - - - - - tissues some of them are of great importance to the - - - - - - - - of an organism.
ii. We control the - - - - - - - - muscles attached to our bones but we cannot control the reaction of the - - - - - - - - ones.
iii. The heart - - - - - - - - is not a voluntary one.
iv. We call the tissues of the brain conducting or - - - - - - - -
v. We also call the heart tissues - - - - - - - -
vi. We can find in the - - - - - - - - the same kind of - - - - - - - - we find in the brain.
vii. The organs grouped together to form a system - - - - - - - - to the same general function of the system.
viii. The nature of the function of an organ decides about the - - - - - - - - of the tissue.
ix. Organs are - - - - - - - - units.

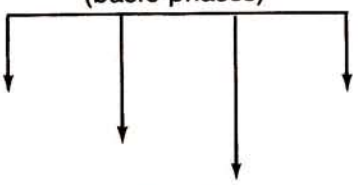
Vocabulary

importance / ɪm'pɔtns / σπουδαιότητα
function / 'fʌgkʃn / λειτουργία
control / kən'trəʊl / ἐλέγχω
move / muv / κινῶ
conducting / kən'dʌktɪŋ / φέρων
spinal cord / spaɪnl kɔd / νωτιαῖος μυελός
isolated / 'aɪsəleɪtɪd / ἀπομονωμένος
voluntary / 'vɔləntrɪ / ἑκούσιος
involuntary / ɪn'vɔləntrɪ / ἀκούσιος
although / ɔl'ðəʊ / ἄν καί
attach / ə'tætʃ / προσκολλῶ
nature / 'neɪtʃə / φύση
decide / dɪ'saɪd / καθορίζω, ἀποφασίζω
complex / 'kompleks / σύνθετος

EXERCISES

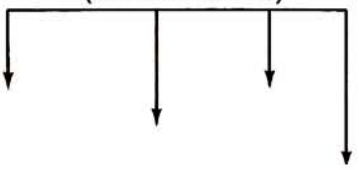
I. Complete the following diagrams:

(a) MITOSIS
(basic phases)



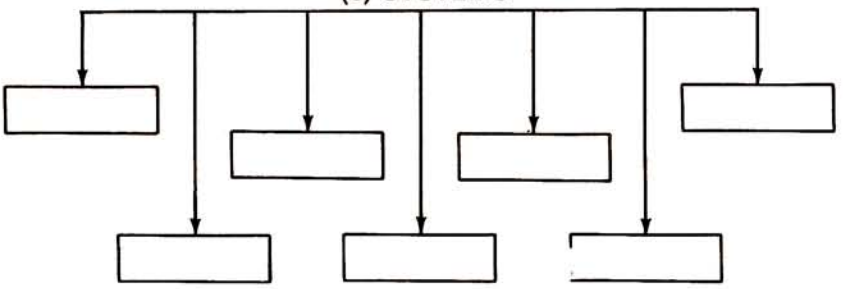
diag. 5

(b) LIVING BEINGS
(characteristics)



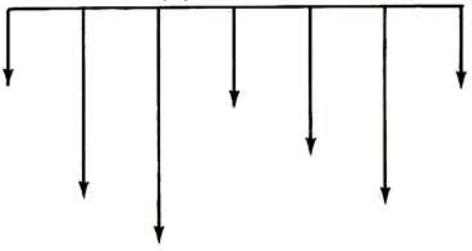
diag. 6

(c) SYSTEMS



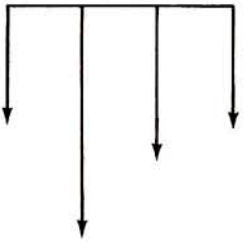
diag. 7

(d) ORGANS



diag. 8

(e) CONNECTIVE TISSUES



diag. 9

II. Which is correct in the following a, b or c?

1. The stomach is an organ in the - - - - - - - - system.
   a. digestive
   b. excretory
   c. endocrine
2. The windpipe is an organ in the - - - - - - - - system.
   a. excretory
   b. endocrine
   c. respiratory
3. The liver is an organ in the - - - - - - - - system.
   a. excretory
   b. digestive
   c. respiratory
4. The heart is an organ in the - - - - - - - - system.
   a. excretory
   b. digestive
   c. circulatory
5. The kidneys are organs in the - - - - - - - - system.
   a. excretory
   b. digestive
   c. respiratory
6. The lungs are organs in the - - - - - - - - system.
   a. excretory
   b. endocrine
   c. respiratory
7. The sternum belongs to the - - - - - - - - system.
   a. excretory
   b. skeletal
   c. endocrine
8. The spleen is an organ in the - - - - - - - - system.
   a. excretory
   b. skeletal
   c. endocrine
9. The esophagus is an organ in the - - - - - - - - system.
   a. digestive
   b. excretory
   c. endocrine
10. The skull belongs to the - - - - - - - - system.
    a. excretory
    b. skeletal
    c. endocrine
11. The pancreas is an organ in the - - - - - - - - system.
    a. endocrine
    b. digestive
    c. respiratory
12. The mouth belongs to the - - - - - - - - system.
    a. excretory
    b. endocrine
    c. respiratory
13. The bladder is an organ in the - - - - - - - - system.
    a. excretory
    b. endocrine c. respiratory

14. The nose belongs to the - - - - - - - - system.
    a. excretory
    b. endocrine
    c. respiratory
15. The rectum is an organ in the - - - - - - - - system.
    a. endocrine
    b. digestive
    c. respiratory
16. The aorta is an organ in the - - - - - - - - system.
    a. digestive
    b. respiratory
    c. circulatory
17. The epithelium is a - - - - - - - - tissue.
    a. protective
    b. connective
    c. muscular
18. The cells of the epithelium in the outer part of the skin are - - - - - - - -
    a. cubic
    b. flat
    c. cylindrical
19. In the digestive system the cells of the epithelium are - - - - - - - -
    a. cubic
    b. flat
    c. cylindrical
20. Cells are grouped to form - - - - - - - -
    a. organs
    b. systems
    c. tissues
21. Tissues are combined to form - - - - - - - -
    a. organs
    b. systems
    c. cells
22. Organs are grouped to form - - - - - - - -
    a. tissues
    b. systems
    c. cells
23. The - - - - - - - - tissue is very important in the brain.
    a. nervous
    b. muscular
    c. connective
24. The - - - - - - - - tissue is predominant in the trachea.
    a. nervous
    b. muscular
    c. connective
25. There are - - - - - - - - muscles in our body.
    a. only voluntary
    b. only involuntary
    c. both voluntary and involuntary
26. In the spinal cord the - - - - - - - - tissues are predominant.
    a. muscular b. conductive c. connective
27. All systems in the body are connected with the - - - - - - - - system.
    a. digestive b. circulatory c. respiratory

THE SKELETAL SYSTEM

3.1a **Look at the following illustrations. They present the major bones of the human skeleton in front view (LEFT) and side view (RIGHT).**

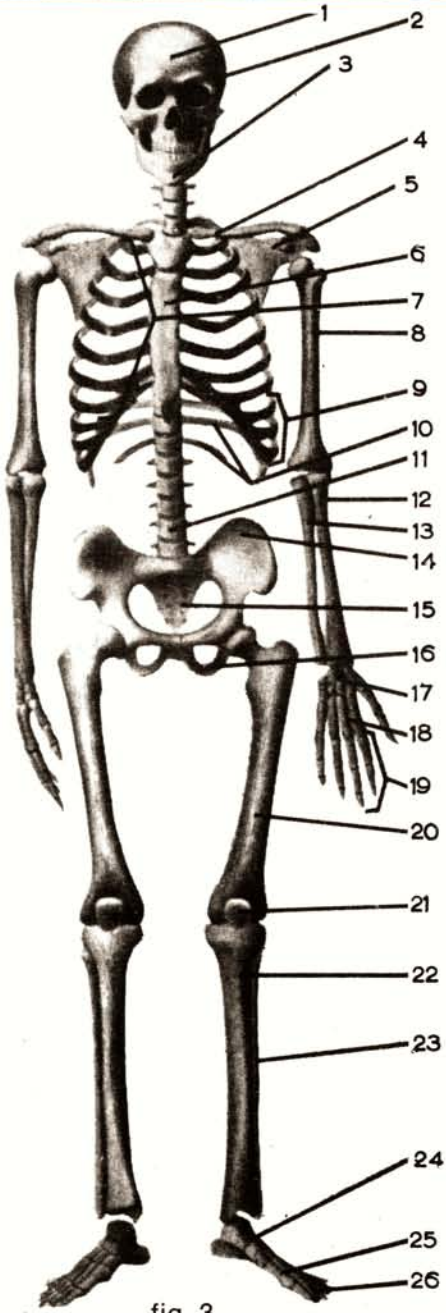


fig. 3

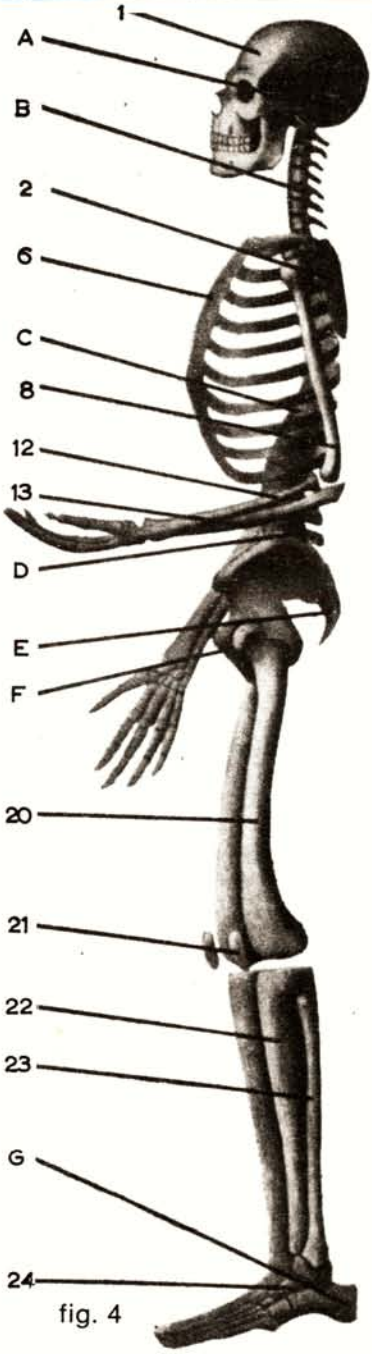


fig. 4

3.1b **Study the reference numbers and letters in connection with the respective terms:**

1. Frontal bone
2. Parietal bone
3. Mandible (lower jaw)
4. Clavicle (Collarbone)
5. Scapula (Shoulder blade)
6. Sternum (breastbone)
7. True ribs
8. Humerus
9. False ribs
10. Floating ribs
11. Spinal column
12. Radius
13. Ulna
14. Ilium
15. Sacrum
16. Ischium
17. Carpal Bones (Wrist bones)
18. Metacarpal bones
19. Phalanges
20. Femur
21. Patella (Kneecap)
22. Tibia
23. Fibula
24. Tarsal bones (Ankle bones)
25. Metatarsal bones
26. Phalanges

A Occipital bones
B Neck Vertebrae
C Thoracic Vertebrae
D Lumbar Vertebrae
E Coccyx
F Pubis
G Calcaneus (bone of the heel)

3.1c(a) **Answer the following questions referring to the illustrations:**

1. What is number one?
2. What is number three?
3. What is number five?
4. What is number seven?
5. What is number eleven?
6. What is number thirteen?
7. What is number fifteen?
8. What number is the parietal bone?
9. What number is the collarbone?
10. What number is the sternum?
11. What number is the humerus?
12. What number is the radius?
13. What number is the ilium?
14. What number is the ischium?

(b) Fill in the blanks in the following sentences:

In figure 9:
1. the letter A stands for - - - - - - - -
2. the letter C stands for - - - - - - - -
3. the letter E stands for - - - - - - - -
4. the letter G stands for - - - - - - - -
5. the letter - - - - - - - - stands for the neck vertebrae.
6. the letter - - - - - - - - stands for the lumbar vertebrae.
7. the letter - - - - - - - - stands for the pubis.

3.1d Study the following statements:

a. There are more than two hundred *bones* in the body.
b. These bones make up the *skeletal* system.
c. The bones give *form* to the body; they are its *framework.*
d. They *protect* the vital organs, they serve as a *chemical laboratory,* and they also act as a *storehouse.*
e. Red *blood cells* are manufactured in the bones.
f. They store *mineral calcium* and supply it to the blood.
g. The bones are *hard* because of the mineral matter in their composition (largely calcium phosphate) but also *flexible* due to the animal matter (collagen).
h. An ivorylike substance makes up the outer surface of the bones. Its name is *compact bone.*
i. A tissue fills the central cavity of the compact bone. Its name is bone *marrow.*

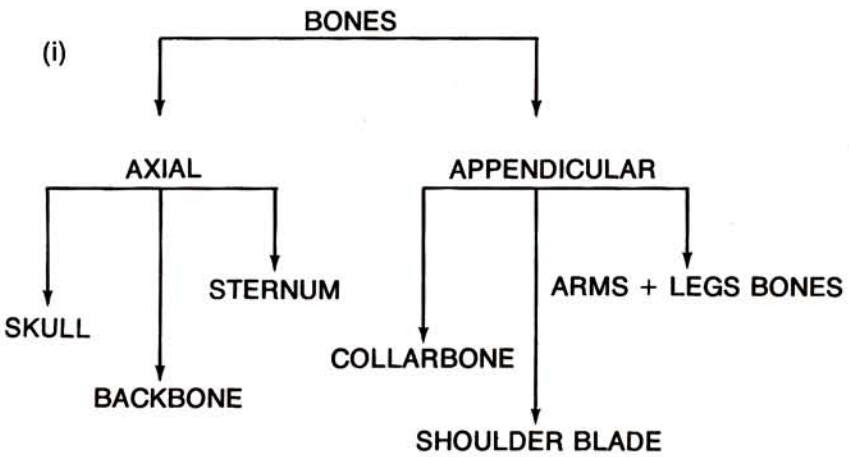
Vocabulary

illustration / ɪlə'streɪʃn / εἰκονογράφηση
present / prɪ'zent / παρουσιάζω
major / 'meɪdʒə / σημαντικὸς
front / frʌnt / ἐμπρόσθιος
view / vju / ὄψη
side / saɪd / πλάγιος
reference / 'refrns / παραπομπή
in connection with / σχετικά μέ
respective / rɪ'spektɪv / ἀντίστοιχος
term / tɜm / ὅρος
frontal / frʌntl / μπρόσθιος
parietal / 'pærɪətl / βρεγματικός
mandible / 'mændəbl / κάτω γνάθος
jaw / dʒɔ / σιαγών
clavicle / 'klævɪkl / κλείδωση
collar / 'kolə / τράχιλος
scapula / 'skæpjulə / ὠμοπλάτη, σπάλα
shoulder / 'ʃəʊldə / ὦμος
blade / bleɪd / πτερύγιο
sternum / 'stɜnəm / στέρνο
rib / rɪb / πλευρά, πλευρικό ὀστό
humerus / 'hjumərəs / βραχιόνιο ὀστό
floating / 'fləʊtɪŋ / κινητός
spinal / 'spaɪnl / σπονδυλική
column / 'koləm / στήλη
radius / 'reɪdɪəs / κερκίς
ulna / 'ʌlnə / ὠλένη
ilium / 'ɪlɪəm / λαγόνιο ὀστό
sacrum / 'sækrəm / ἱερό ὀστό
ischium / 'ɪskɪəm / ἰσχίο
carpal / 'kɑpl / καρπικός
wrist / rɪst / καρπός
metacarpal / 'metə'kɑpl / μετακαρπικός

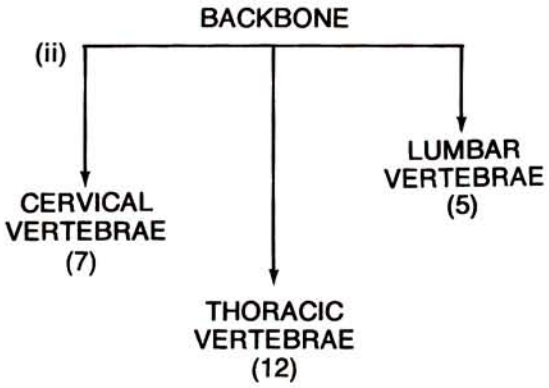
phalanxe / 'fælæŋks / φάλαγξ
femur / 'fimə / μηρός
patella / pə'telə / ἐπιγονατίδα
kneecap / 'nikæp / ἐπιγονατίδα
tibia / 'tɪbɪə / κνημιαῖο ὀστό
fibula / 'fɪbjʊlə / περόνη
tarsal / 'tɑsl / ταρσικός
ankle / 'æŋkl / ἀστράγαλος
metatarsal / 'metə'tɑsl / μεταταρσικός
occipital / o'ksipɪtl / ἰνιακός
neck / nek / λαιμός
vertebra / 'vɜtɪbrə / σπόνδυλος
thoracic / θɔ'ræsɪk / θωρακικός
lumbar / 'lʌmbə / ὀσφυϊκός
coccyx / 'koksɪks / κόκκυξ
pubis / 'pjʊbəs / ἡβικό ὀστό
calcaneus / kəl'kaɪnəs / πτερνικός
heel / hil / πτέρνα
framework / 'freɪmwɜk / πλαίσιο, σκελετός
vital / 'vaɪtl / ζωτικός
storehouse / 'stɔhaʊs / ἀποθήκη
manufacture / 'mænjʊ'fæktʃə / παράγω
calcium phosphate / 'kælsɪəm 'fosfeɪt / φωσφορικό ἀσβέστιο
flexible / 'fleksəbl / εὔκαμπτος
collagen / ko'lægən / κολλαγόνο
ivorylike / 'aɪvrɪlaɪk / χρώματος κρέμ
compact / 'kompækt / συμπαγής
cavity / *'kævətɪ* / *κοιλότητα*
marrow / 'mærəʊ / μυελός, μεδούλι

3.2a **Look at the following diagrams:**

(i)



diag. 10



diag. 11

3.2b **Study the following statements:**

a. The *axial* bones protect the cavities of the body.
b. The axial bones *transmit* weight.
c. All the bones are *connected* at their ends by *flexible joints.*
d. The *vertebral column* divides animals into two important groups. The *vertebrates* such as fishes, frogs, reptiles, birds, beasts and man and the *invertebrates* such as worms, snails, lobsters, insects etc.
e. The vertebral column consists of small cylindrical blocks which we call *vertebrae.*
f. *Discs* of resilient cartilage join the vertebrae together. We call these discs *intervertebral discs.*
g. The *ribs* are very important in the breathing process. They also *shield* the heart and lungs, and *protect* other organs such as the stomach, liver and kidneys.
h. The *skull* is divided into two parts: the *cranial cavity* and the *bones of the face.*
i. The *collarbone or clavicle* joins the breastbone with the shoulder blade.
j. Ordinary bones can move only backward and forward but the *scapula* enables the *upper arm* to move in all directions.
k. In the ends of some long bones there are centres transporting oxygen to the tissues. This function is very important for the red blood cells. If there is a damage in the marrow of these bones the production of the cells is not adequate and the body suffers from anemia.
l. Here are some *injuries* and *diseases* of the bones:

i. *bruises* are very common and not very severe.
ii. *fractures* are far more serious and in case they are compound they may be dangerous.
iii. *rickets* is a children's disease. It brings deformation of the bones and is due to lack of calcium, phosphorus and vitamin D.
iv. *osteomyelitis* and *tuberculosis* are diseases of the bones.
v. *cancer,* of course, is fatal.

3.2c **Look at the following illustrations of:**

(i) the important bones of the human arm and hand

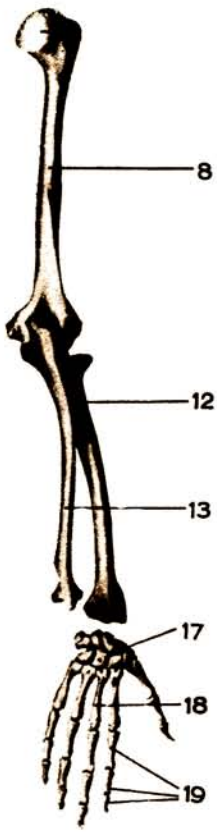


fig. 5

(ii) the important bones of the human leg and foot

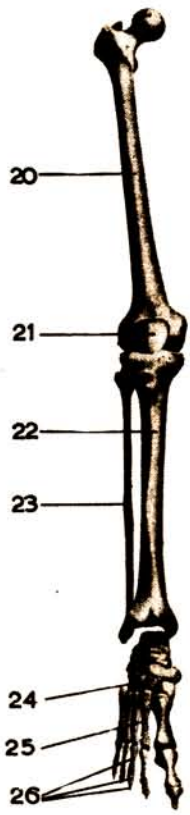


fig. 6

Now, answer these questions:

1. What is number seventeen?
2. What number are the metacarpal bones?
3. What is number nineteen?
4. What number is the femur?
5. What is number twenty-one?
6. What number is the tibia?
7. What is number twenty-three?
8. What is number twenty-five?
9. What number are the tarsal bones?

Vocabulary

axial / 'æksɪəl / ἀξωνικός
skull / skʌl / κρανίο
backbone / 'bækbəʊn / σπονδυλική στήλη
appendicular / ə'pen'dɪkjʊlə / ἐξαρτηματικός
cervical / sɜ'vaɪkl / αὐχενικός
transmit / trænz'mit / μεταβιβάζω
weight / weɪt / βάρος
joint / dʒɔɪnt / σύνδεση
vertebral / 'vɜtɪbrl / σπονδυλωτός
vertebrate / 'vɜtɪbrət / σπονδυλωτό
frog / frog / βάτραχος
reptile / 'reptaɪl / ἑρπετό
beast / bist / κτῆνος
invertebrate / 'ɪn'vɜtɪbrət / ἀσπόνδυλο
worm / wɜm / σκουλίκι
snail / sneɪl / σαλιγκάρι
lobster / 'lobstə / ἀστακός
insect / 'ɪnsekt / ἔντομο
disc / dɪsk / δίσκος
resilient / rɪ'zɪlɪənt / ἀνθεκτικός
intervertebral / 'ɪntə'vɜtɪbl / μεσοσπονδύλιος
breathing / briðɪŋ / ἀναπνοή
shield / ʃild / προφυλάσσω
cranial / 'kreɪnɪəl / κρανιακός
ordinary / 'ɔdnrɪ / συνηθισμένος
damage / 'dæmɪdʒ / βλάβη
adequate / 'ædɪkwət / ἐπαρκής
suffer / 'sʌfə / ὑποφέρω
anemia / ə'nimɪə / ἀναιμία
injury / 'ɪndʒərɪ / τραῦμα
disease / dɪ'zɪz / ἀσθένεια
bruise / bruz / μωλωπίζω, μώλωπας
severe / sə'vɪə / σοβαρός
fracture / 'frækʧə / θλάση
rickets / 'rɪkɪts / ραχίτις
deformation / dɪfo'meɪʃn / παραμόρφωση
osteomyelitis / 'ostɪo'maɪə'laɪtɪs / ὀστεομυελίτις
tuberculosis / tju'bɜkjʊ'ləʊsɪs / φυματίωση
cancer / 'kænsə / καρκίνος
fatal / 'feɪtl / μοιραῖος

Exercises

I. Answer the following questions using one complete sentence for each answer:

1. What do axial bones do?
2. What is the function of the intervertebral discs?
3. What do the ribs shield?
4. How are the bones connected?
5. What is a vertebra?

6. Into how many parts is the skull divided?
7. How do ordinary bones move?
8. How does the upper arm move?
9. What enables it do so?
10. What happens if the production of the red cells is inadequate?

II. Fill the numbers in the following illustrations with the relative terms.

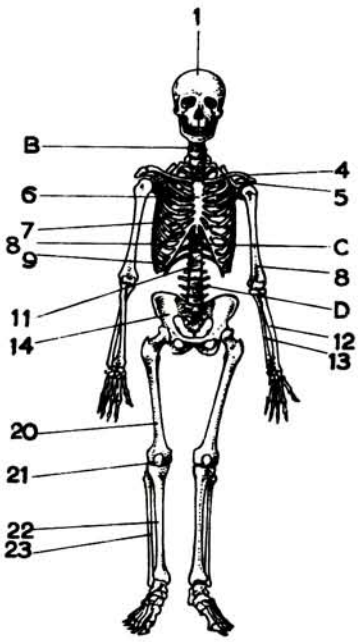


fig. 7

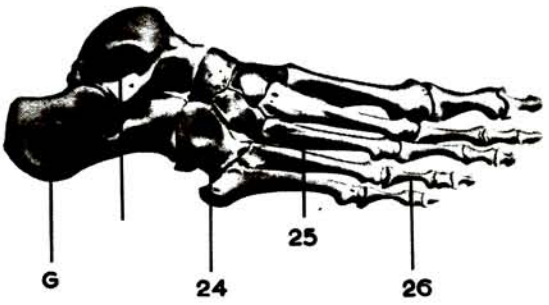


fig. 8

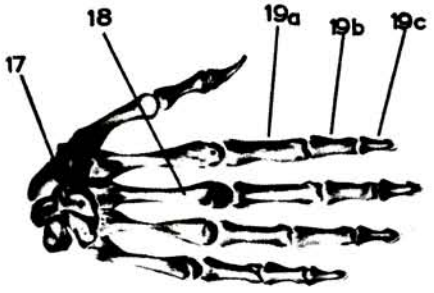


fig. 9

III. Match a word or phrase from column A with a word or phrase from column B to form true and correct statements:

A	B
1. The bones are	a. storehouse.
2. We call the outer surface of the bone	b. bone marrow.
3. The axial bones protect	c. mineral calcium.
4. The bones also act as a	d. breathing process.
5. We call the tissue filling the compact bone	e. injuries of the bone.
6. The ribs are very important in the	f. are diseases of the bone.
7. The cranial cavity is part of the	g. skull.
8. The bones store	h. the cavities of the body.
9. The bruises are	i. the framework of the body.
10. Osteomyelitis and tuberculosis	j. blood cells.
	k. compact bone.

THE MUSCULAR SYSTEM

4.1a **Look at the following illustrations of the most important muscles in the human body. Front view is on the left hand side of the page and rear view on the right.**

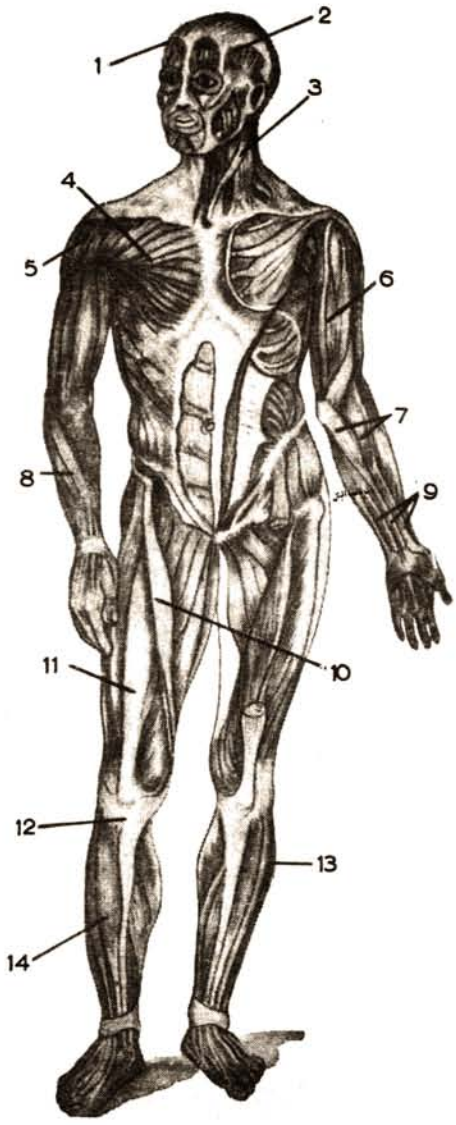


fig. 10

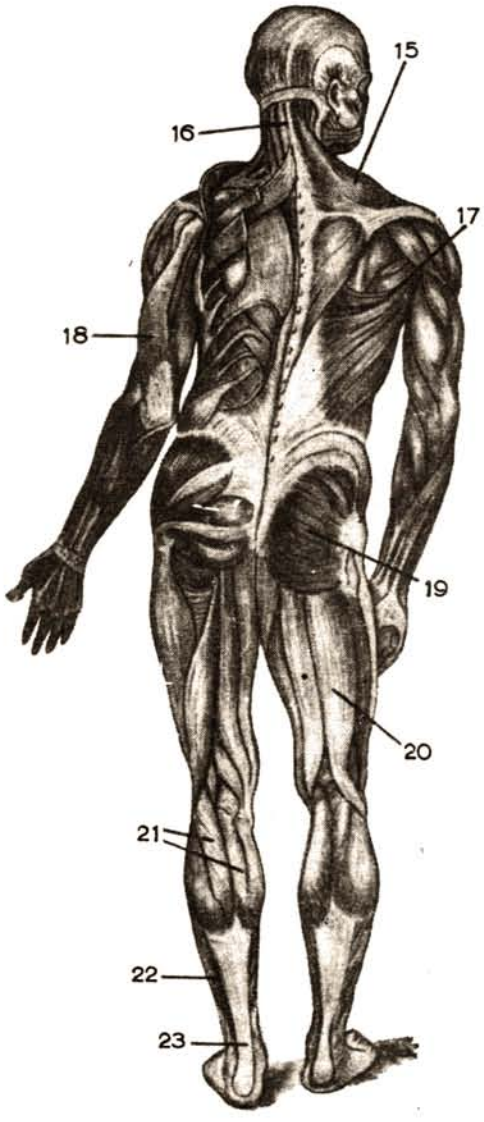


fig. 11

4.1b **Identify the names of the various groups of muscles:**

1. Frontalis (muscle of forehead).
2. Muscle of the temple.
3. Muscles that bend the head.
4. Pectoralis major (greater breast muscle).
5. Deltoideus (deltoid muscle).
6. Biceps branchii (two - headed arm muscle).
7. Bending muscles for fingers and wrist.
8. Extending muscles for fingers and wrist.
9. Tendons.
10. Sartorius (tailor's muscle).
11. Rectus femoris (straight muscle of the femur).
12. Ligamentum patellae (ligament of the kneecap).
13. Peroneus longus (long fibular muscle).
14. Tibialis anterior (Anterior fibial muscle).
15. Trapezius.
16. Muscles that turn the head.
17. Latissimus dorsi (broadest muscle of the back).
18. Triceps brachii (three - headed muscle of the arm).
19. Gluteus maximus (principle muscle of the buttocks).
20. Biceps femoris (two - headed femur muscle).
21. Gastrocnemius (a muscle of the calf of the leg).
22. Soleus (a muscle of the calf of the leg).
23. Achilles' tendon.

4.1c **Answer the following questions referring to the illustrations:**

1. Give the numbers of the muscles that turn and bend the head.
2. Which number is the two-headed muscle of the arm and which number the three-headed one?
3. Give the numbers of two muscles of the calf of the leg.
4. Which are their Latin names?
5. What muscles have we got for the fingers and the wrist?
6. Which are their numbers in the illustration?
7. What muscle is number one?
8. What number is the muscle of the temple?
9. What is the translation for the sartorius muscle?
10. Which is its number in the illustration?
11. Give the number of the trapezius muscle.
12. Which is the number of the femur muscle?
13. What does latissimus dorsi mean?
14. Which is its number in the illustration?
15. Give the number of the tendons in the illustration.
16. What is number four?
17. What is number twelve?
18. What is number twenty?
19. What is number fourteen?
20. What does deltoideus mean?

21. Which is its number in the illustration?
22. What is the meaning of peroneus longus?
23. Give its number in the illustration.
24. What is number twenty-three?
25. Give the number of the gluteus maximus in the illustration.

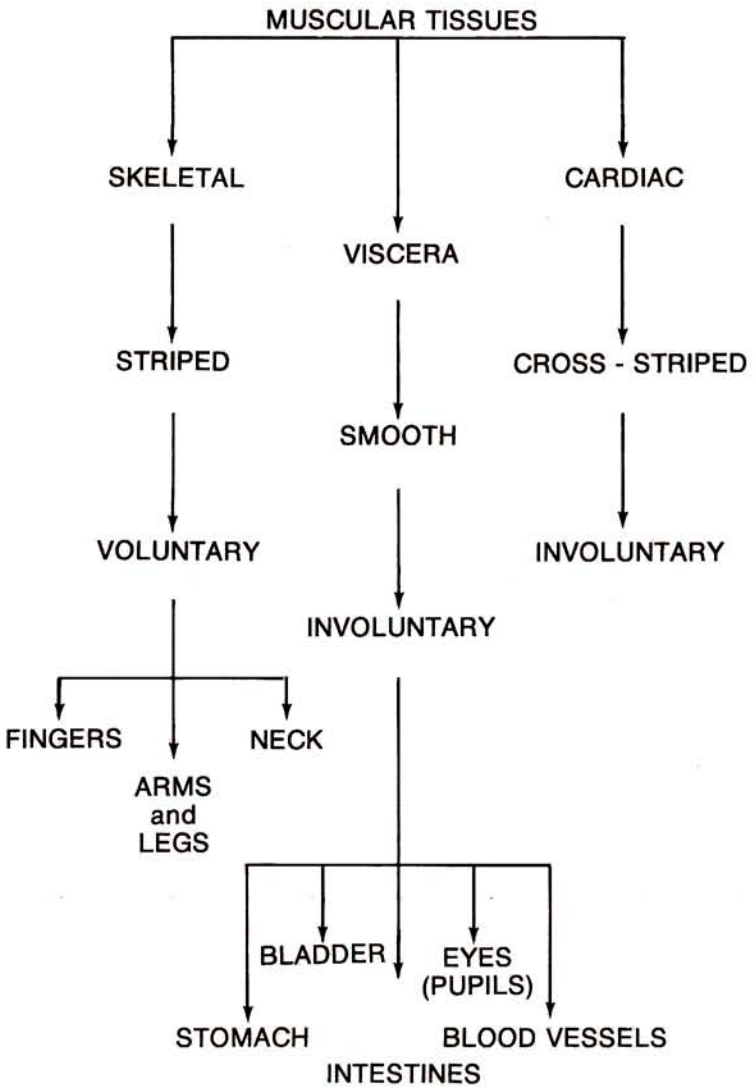
4.1d **Study the following statements:**

a. The *muscles* are very essential to life.
b. The *motion* of all parts of the body depends on them.
c. There are big differences between muscles in the same body in terms of *size* and *shape*
d. Some muscles *move* our mouth, others *help* us breathe and others *enable* us to walk or run.
e. *The brain, the spinal cord and the nerves work* when we want to start our muscles working.
f. When we want to move our hand, the *impulses* proceed from brain to muscle by way of the spinal cord.
g. Muscles do not have only one *function.* We can *bend* our knee, but we can also *stretch* it or we can *give it rotating motion.*
h. The *variety of movements* is very great, so there is an equal *variety of muscles performance,* i.e. for bending, straightening or side - to - side movement.
i. Muscles always act in groups.

Vocabulary

rear / ˈrɪə / ὀπίσθιος
identify / aɪˈdentɪfaɪ / διακρίνω, καθορίζω
forehead / fɔhed / μέτωπο
temple / ˈtempl / κρόταφος
bend / bend / λυγίζω
deltoid / delˈtoɪd / σὲ σχῆμα Δ
wrist / rɪst / καρπός χεριοῦ
extend / ɪkˈstend / προεκτείνω
ligament / ˈlɪgəmənt / σύνδεσμος
anterior / ænˈtɪərɪə / ἐμπρόσθιος
broad / brɔd / εὐρύς
principle / ˈprɪnsəpl / κύριος, βασικός
buttock / ˈbʌtək / γλουτός
calf / kaf / γάμπα
leg / leg / κνήμη
essential / ɪˈsenʃl οὐσιώδης
depend / dɪˈpend / ἐξαρτῶμαι
in terms of / ɪn ˈ tɜmz əv / σὲ σχέση μὲ
impulse / ˈɪmpʌls / παλμός
stretch / stretʃ / τεντώνω
rotating / rəʊˈteɪtɪŋ / περιστροφικός
variety / vəˈraɪətɪ / ποικιλία
performance / pəˈfɔməns / λειτουργία

4.2a **Look at the following diagram and study it carefully:**



diag. 12

4.2b **Underline the correct word, in parenthesis, according to the information of the diagram.**

a. The sceletal tissues are (striped — cross - striped).
b. We (can - cannot) control the movements of our legs.
c. The cardiac muscle is (the same — about the same) with the skeletal in structure.

d. The cardiac muscle (resembles — does not resemble) the skeletal in the way of function, but it (resembles — does not resemble) the smooth one.
e. The movements of arms and legs (are-are not) controlled by our will.
f. The muscles of the neck are (striped - smooth).
g. The muscles of the blood vessels are the same in structure with those of the (stomach — neck).
h. The muscles of the heart (are — are not) the same with those of the intestines in the way of function.
i. The bladder muscles and the muscles around the pupils of eyes are (striped — smooth).

4.2c **Read the following statements:**

a. *Diseases* of the nerves, blood vessels, bones often affect muscles.
b. *Sprains* are common injuries of muscles in the vicinity of joints.
c. *Cramps* are painful tightenings of the muscles. They may occur in any muscle of the body.
d. Cramps are caused by cold or overwork and make *movement difficult.* They often occur in the foot and leg muscles.
e. *Lumbago* is a muscular pain in the lumbar region.
f. *Rheumatism* refers to pains of the muscles but also of the joints and other parts of the body.
g. The *overstrain* or *violent wrench* of joints causes *sprains*
h. The cause of *lumbago* varies. However the *inflammation* of the connective tissues sometimes gives rise to it.
i. *Exposure* to cold water, *irritation* of the muscles, mineral poisons, *bacterial toxins* often result to cramps.
j. Rheumatism is due to a variety of causes.

4.2d **Complete the following table of muscle diseases and injuries giving the region they commonly occur and the causes of same:**

No	Disease	Region	Cause
1.	Cramp		
2.	Lumbago		
3.	Sprain		
4.	Rheumatism		

Table 3

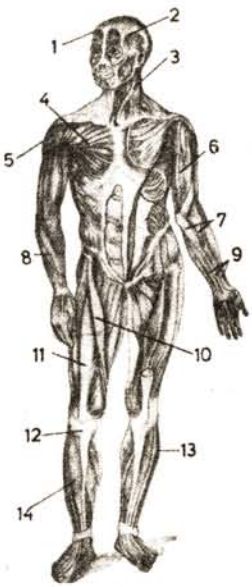
Vocabulary

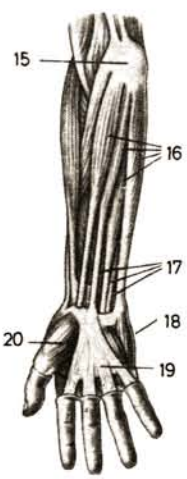
striped / 'straɪpt / ραβδωτός
cross - striped / 'krɔs straɪpt / μὲ διασταυρούμενες ραβδώσεις
undeline / 'ʌndəlaɪn / ὑπογραμμίζω
control / kən'trəʊl / ἐλέγχω
resemle / rɪ'zembl / παρομοιάζω
will / wɪl / θέληση

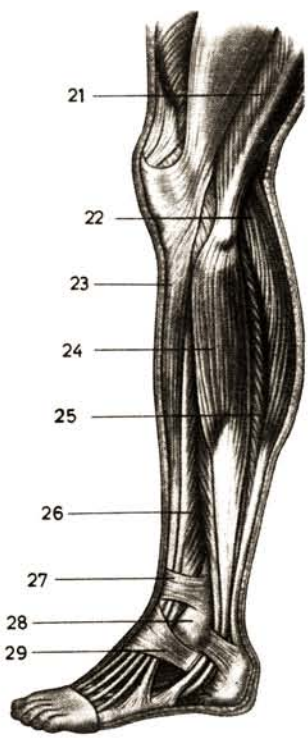
pupil (of eye) / ˈpjupl / κόρη (ματιοῦ)
affect / əˈfekt / ἐπηρεάζω
sprain / spreɪn / διάστρεμμα
cramp / ˈkræmp / κράμπα
painful / ˈpeɪnfʊl / ὀδυνηρός
tightening / ˈtaɪtnɪŋ / τέντωμα
cause / kɔz / προκαλῶ, αἰτία
overwork / ˈəʊvəˈwɜk / ὑπερκόπωση
lumbago / lʌmˈbeɪgəʊ / λουμπάγκο
lumbar / ˈlʌmbə / ὀσφυϊκός
rheumatism / ˈrumətɪzm / ρευματισμός
overstrain / ˈəʊvəˈstreɪn / ὑπερκόπωση, διάστρεμμα
violent / ˈvaɪələnt / βίαιος
wrench / rentʃ / ἐξάρθρωση
inflammation / ˈɪnfləˈmeɪʃn / φλεγμονή
give rise to / ˈgɪv ˈraɪz tə / προκαλῶ
exposure / ɪkˈspəʊʒə / παραμονή, ἔκθεση
irritation / ˈɪrɪˈteɪʃn / ἐρέθισμα
bacterial / bækˈtɪərɪəl / βακτηριακός
toxin / ˈtoksɪn / τοξίνη
result / rɪˈzʌlt / καταλήγω

EXERCISES

I. Fill the numbers in the following drawings with the respective terms:







II. Say whether the following are TRUE or FALSE according to the context:

— 1. Muscles are different in size and shape.
— 2. The same muscles move our hands and feet.
— 3. Muscles have only one function.
— 4. There is no variety of movements in our body.
— 5. The muscles are important in the body.
— 6. There is no variety of muscles performance.
— 7. Muscles always act in groups.
— 8. The impulse proceeds from brain to muscle through the spinal cord.
— 9. When we start our muscles working our brain also works.
— 10. The motion of some parts of the body only depend on muscles.

III. Which is correct in the following a, b or c?

1. The skeletal tissues are - - - - - - - -
   a. smooth.
   b. striped.
   c. cross-striped.
2. The tissues of the bladder are - - - - - - - -
   a. smooth.
   b. striped.
   c. cross-striped.
3. The cardiac tissues are - - - - - - - -
   a. smooth.
   b. striped.
   c. cross-striped.
4. We can control the movements of our - - - - - - -
   a. neck.
   b. stomach.
   c. heart.
5. We cannot control the movement of our - - - - - -
   a. fingers.
   b. legs.
   c. intestines.
6. Cramps occur - - - - - - - -
   a. only in foot muscles.
   b. only in arm muscles
   c. in any muscle of the body.
7. Inflammation of the connective tissues causes - -
   a. sprains.
   b. lumbago.
   c. cramps.
8. Cramps are often caused by - - - - - - - -
   a. irritation of muscles.
   b. bacterial toxins.
   c. both "a" and "b".
9. Rheumatism refers to pains - - - - - - - -
   a. of the muscles only.
   b. of the joints only.
   c. of the muscles, the joints, and other parts of the body.

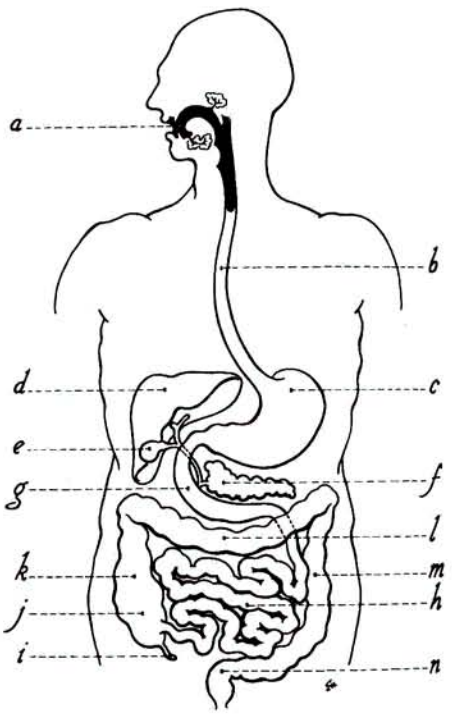
10. Rheumatism is due to - - - - - - - -
    a. a variety of causes.
    b. exposure to hot water.
    c. overstrain.
11. Sprains are injuries in the - - - - - - - -
    a. ligaments.
    b. lumbar region.
    c. cardiac muscles.
12. There are - - - - - - - - muscles of the arm.
    a. only two-headed
    b. only three-headed
    c. both two-headed and three-headed
13. There is - - - - - - - - muscle covering the shoulders.
    a. an I—shaped
    b. a Δ—shaped
    c. a U—shaped
14. There are extending muscles - - - - - - - -
    a. only for the fingers.
    b. only for the wrist.
    c. for the fingers and the wrist.

UNIT M.5

THE DIGESTIVE SYSTEM

5.1a **Look at the following sketch and watch the letters with the respective terms:**

a. oral cavity
b. esophagus
c. stomach
d. liver
e. gall bladder
f. pancreas
g. duodenum
h. small intestine
i. appendix
j. caecum
k. ascending colon
l. transverse colon
m. descending colon
n. rectum



5.1b **Now complete the following sentences referring to the above drawing:**

1. The letter "a" stands for the - - - - - - - -
2. The letter "m" stands for the - - - - - - - -
3. The letter "f" stands for the - - - - - - - -
4. The letter "l" stands for the - - - - - - - -
5. The - - - - - - - - is shown by letter "d"
6. The - - - - - - - - is presented by letter "b".
7. The letter "i" stands for the - - - - - - - -
8. The - - - - - - - - is shown by letter "h".
9. The letter - - - - - - - - stands for the stomach.
10. The - - - - - - - - is shown by letter "e".
11. The - - - - - - - - is presented by letter "j".
12. The letter - - - - - - - - stands for the ascending colon.
13. The letter - - - - - - - - stands for the duodenum.
14. The letter - - - - - - - - stands for the rectum.

5.1c **Study the following statements:**

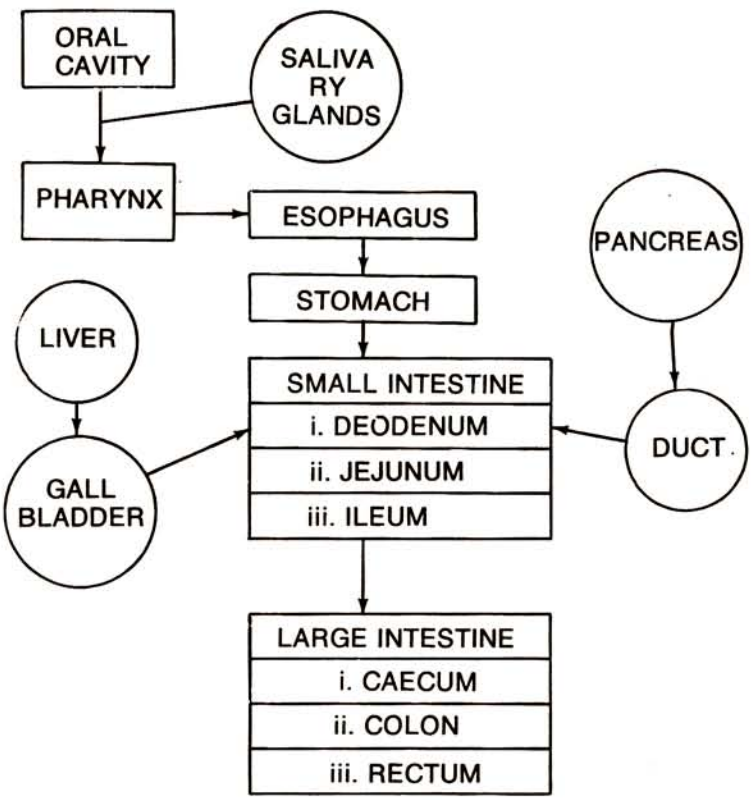
a. *Digestion* is the process bringing food into absorbing condition.
b. It must be in this condition before blood and lymph can *utilize* it.
c. Various *glands* secrete factors necessary for the breakdown of foodstuff.
d. *The salivary glands* secrete saliva which acts upon carbohydrates and begins the breakdown process.
e. *The liver* produces bile stored in the gall bladder. The gall bladder empties this secretion into the duodenum when fats undergo the digestion process.
f. *The glands in the wall of the stomach* secrete hydrochloric acid and enzymes.
g. *Other cells* in the stomach wall elaborate hormones which blood carries to the gall bladder.
h. *The pancreas* elaborates digestive enzymes emptied into the duodenum through the pancreatic duct.
i. *The enzymes and the bile salts* accelerate the breakdown of proteins, fats and carbohydrates.

Vocabulary

oral / 'ɔrl / στοματικός
carity / 'kævətɪ / κοιλότητα
gall / gɔl / χολή
bladder / 'blædə / κύστη
pancreas / 'pæŋkrɪəs / πάγκρεας
duodenum / 'djuə'dinəm / δωδεκαδάκτυλο
appendix / ə'pendɪks / προσάρτημα, άπόφυση
caecum / 'sikəm / τυφλό έντερο
colon / 'kəʊlən / κόλον
ascending / ə'sendɪŋ / άνω
descending / dɪ'sendɪŋ / κάτω
transverse / trænz'vɜs / έγκάρσιος
rectum / 'rektəm / όρθό έντερο

digestion / dɑɪ'djestʃən / πέψη
absorbing / əb'sɔbɪŋ / ἀπορροφητικός
condition / kən'dɪʃn / κατάσταση
utilize / 'jutɪlɑɪz / χρησιμοποιῶ
gland / glænd / ἀδένας
secrete / sɪ'krit / ἐκκρίνω
factor / 'fæktə / παράγοντας
breakdown / 'breɪkdaʊn / ἀνάλυση
foodstuff / 'ʃudstʌʃ / τρόφιμα
salivary / 'sælɪvərɪ / σιελογόνος
saliva / sə'lɑɪvə / σίελος
bile / bɑɪl / χολή
store / stɔ / ἀποθηκεύω
empty / 'emptɪ / ἀδειάζω
secretion / sɪ'kriʃn / ἔκκριση
undergo / 'ʌndə'gəʊ / ὑφίσταμαι
eleborate / ɪ'læbrət / ἐπεξεργάζομαι
accelerate / ək'seləreɪt / ἐπιταχύνω.

5.2a **Study the following diagram:**



diag. 13

5.2b Complete the blanks in the following passage. You must draw your information from the diagram 13 and the paragraph 5.1c:

Food passes from the oral cavity to the - - - - - - - - and then to - - - - - - - - mixed with the secretion from the salivary - - - - - - - - called - - - - - - - - Then, it passes to the stomach where it undergoes further process. From there, and after hydrochloric - - - - - - - - and - - - - - - - - have been secreted by - - - - - - - - in the walls of the stomach, it passes to the small - - - - - - - - where secretions from the - - - - - - - - and the - - - - - - - - have been emptied in the - - - - - - - - through the - - - - - - - - and the pancreatic - - - - - - - - respectively.

Vocabulary

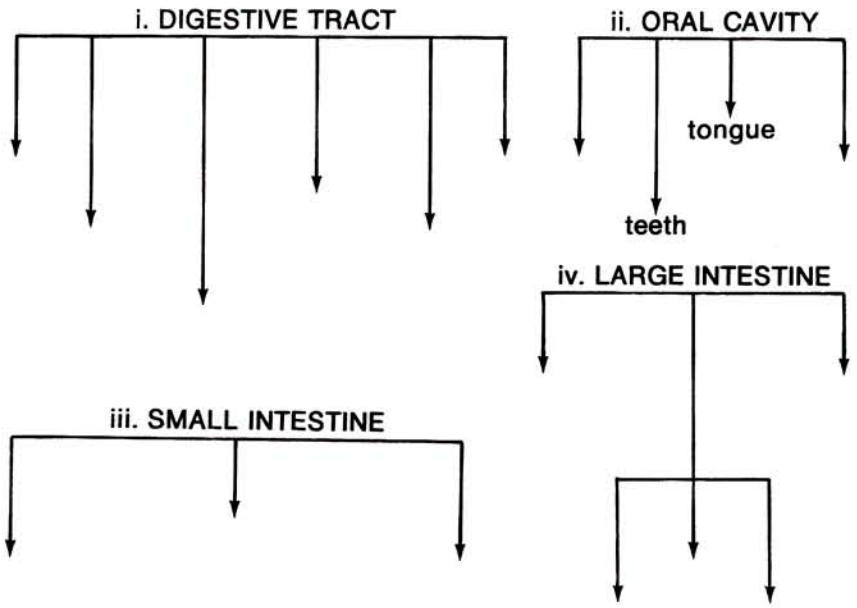
jejunum / dʒɪ'dʒunəm / νῆστις
ileum / 'ilɪəm / λαγόνιο ὀστό
pass / pɑs / διέρχομαι
respectively / rɪ'spektivlɪ / ἀντίστοιχα

EXERCISES

I. Answer the following questions using one complete sentence for your answer:

1. What is digestion?
2. What is the function of the glands?
3. What does liver produce?
4. What does the pancreas elaborate?
5. Where are the products of the pancreas emptied?

II. Complete the following drawings with the correct terms:



III. Study the following table and then fill the blanks in the sentences that follow it:

No	Name of organ	Name of secretion	Region	Purpose
1.	Salivary glands	Saliva	before esophagus	a. lubricate passage along it b. start breakdown process
2.	Liver	Bile	duodenum	digestion process of fats
3.	Stomach (wall)	a. hydrochloric acid b. enzymes	stomach	breakdown of proteins fats carbohydrates
4.	Stomach (cells)	hormones	gall bladder	help empty its contents into the duodenum
5.	Pancreas	enzymes	duodenum	accelerate breakdown of proteins fats carbohydrates

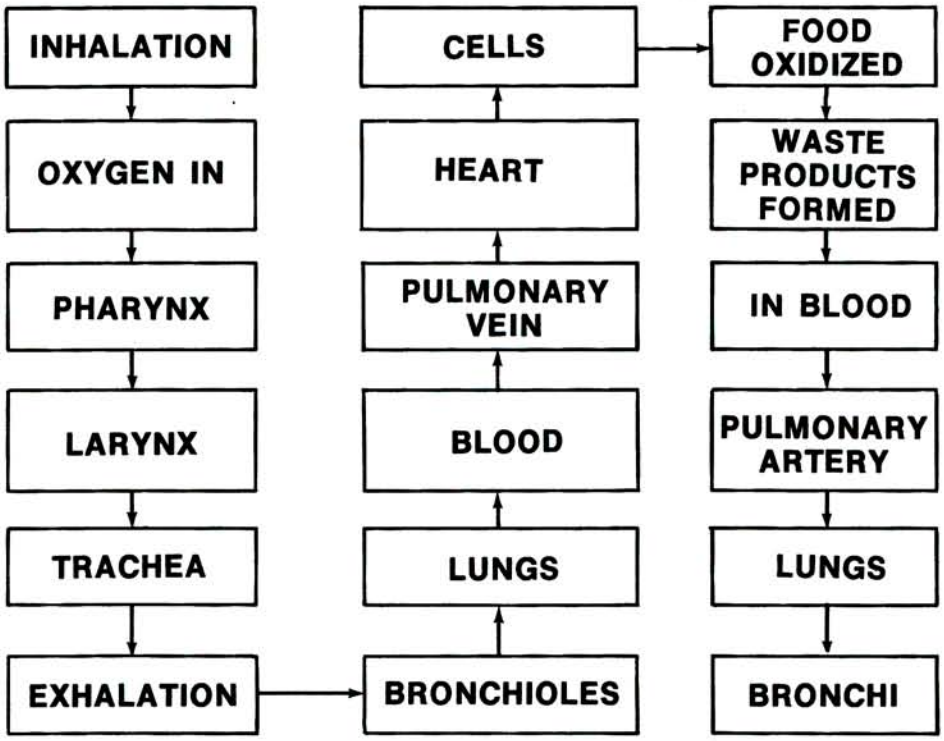
1. Secretions from the - - - - - - - - and the - - - - - - - - are emptied into the duodenum.
2. Some cells in the stomach produce - - - - - - - - to help the gall bladder - - - - - - - - the bile into the - - - - - - - -
3. Enzymes are secreted by - - - - - - - - and - - - - - - - - and accelerate the breakdown of - - - - - - - -, and fats.
4. Apart from enzymes the glands of the stomach wall secrete - - - - - - - - in the stomach.
5. The enzymes and the bile salts - - - - - - - - the breakdown of proteins, fats and carbohydrates.
6. The liver secretes - - - - - - - - and empties it through the gall bladder into the - - - - - - - - to help the digestion process of fats.
7. The pancreas secretes - - - - - - - - and empties them into the - - - - - - - - by means of the pancreatic duct.
8. The salivary glands act - - - - - - - - the esophagus.
9. The secretion of the - - - - - - - - lubricates the passage of food along the esophagus.
10. The secretion - - - - - - - - helps to start the - - - - - - - - process.

IV. Put the following organs which make up the digestive tract in their correct order:

rectum — esophagus — deodenum — stomach — pharynx — oral cavity

THE RESPIRATORY SYSTEM

6.1a Look at the following diagram:



diag. 18

6.1b Study the following statements:

a. When we *inhale* we draw in oxygen.
b. This *passes* through the pharynx and larynx to the trachea.
c. The trachea *branches* into two *bronchi* one for each lung.
d. The bronchi further branch into smaller and smaller tubes *the bronchioles.*
e. From the bronchi oxygen passes to the *lungs*
f. As blood passes through the lungs the *red blood cells* absorb oxygen.
g. *The pulmonary vein* carries this oxygenated blood back to the heart.
h. In the cells this blood *oxidizes* food and gives rise to the *formation* of *waste products,* i.e. carbon dioxide and water.
i. These waste products are now in the blood.
j. The *pulmonary artery* carries this blood to the lungs.

k. There it is *oxygenated* again.
l. What remains goes out during *exhalation.*

6.1c **Consider the following statements:**

a. The bronchial tubes are long *passages.*
b. The trachea is an *air passage.*
c. The esophagus is a *food passage.*
d. *Pharyngitis* is an inflammation of the mucous membrane of the pharynx.
e. *Laryngitis* is an inflammation of the larynx.
f. *Bronchial tubes* are the branches into which the trachea divides before entering the lungs.
g. The *bronchial asthma* is a chronic disease.
h. *Bronchitis* is an inflammation of the mucous membrane of the bronchi.
i. The lung cancer is a fatal disease.
j. Bronchitis and asthma are two serious *respiratory diseases.*
k. *A blood vessel* is a tube through which blood flows in the body i.e. a vein or an artery.
l. The pulmonary arteries *convey* blood to the lungs.

Vocabulary

inhalation / ɪnhə'leɪʃn / εἰσπνοή
bronchiole / 'broŋkɪəʊl / βρογχίλιον
lung / lʌŋ / πνεύμονας
pulmonary / 'pʌlmənərɪ / πνευμονικός
vein / veɪn / φλέβα
oxidize / 'oksɪdaɪz / ὀξειδώνω
waste / weɪst / ἀπορρίμματα
product / 'prodʌkt / προϊόν
artery / ɑtərɪ / ἀρτηρία
exhalation / 'ekshə'leɪʃn / ἐκπνοή
inhale / ɪn'heɪl / εἰσπνέω
branch / brɑntʃ / διακλαδώνω
absorb / əb'sɔb / ἀπορροφῶ
oxygenate / ok'sɪdʒə'neɪt / ὀξυγονῶ
bronchial / 'broŋkɪəl / βρογχικός
tube / tjub / σωλήνας
passage / 'pæsɪdʒ / δίοδος, διέλευση
pharyngitis / 'færɪn'dʒaɪtɪ's / φαρυγγίτις
mucous / 'mjukəs / βλεννογόνος
laryngitis / 'lærɪn'dʒaɪtɪs / λαρυγγίτις
asthma / 'æsmə / ἄσθμα
chronic / 'kronɪk / χρόνιος
vessel / *'vesl* / *ἀγγεῖο*
convey / kən'veɪ / διοχετεύω

6.2a Look at the following illustration and match the letters with the respective terms:

fig. 16

A. PHARYNX
B. LARYNX
C. TRACHEA (WINDPIPE)
D. LUNG
E. BRONCHUS
F. BRONCHIAL RAMUS
G. (ESOPHAGUS)

1. The letter "A" stands for the - - - - - - - -
2. The letter - - - - - - - - stands for the bronchial ramus.
3. The lungs are shown by the letter - - - - - - - -
4. The letter "C" refers to the - - - - - - - -
5. The bronchus is shown by the letter - - - - - - - -
6. The letter "B" stands for the - - - - - - - -

6.2b Look at the following drawings - - -

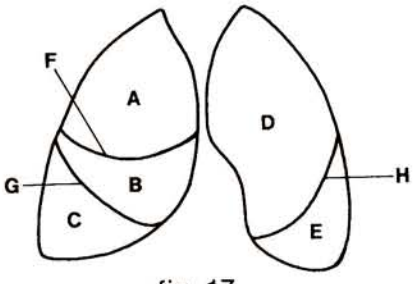


fig. 17

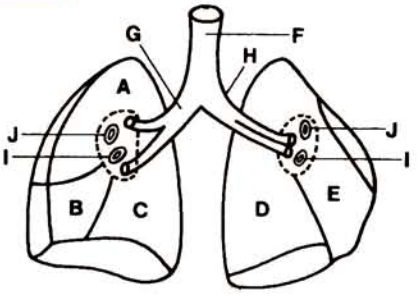


fig. 18

- - - and study these statements:

1. Figure 17 shows the *anterior surfaces* of both lungs.
2. The right lung has three lobes:
   i. the *upper lobe* (A)
   ii. the *middle lobe* (B), and
   iii. the *inferior lobe* (C).

3. Two fissures separate these lobes.
   i. the *horizontal fissure* (F) and
   ii. the *oblique fissure* (G).
4. The left lung consists of two lobes:
   i. the upper lobe (D) and
   ii. the lower lobe (E).
5. An oblique fissure (H) separates the two lobes.
6. In figure 18 *the trachea* (F) divides into the right bronchus (G) and the left bronchus (H).
7. In figure 18 we can also see the pulmonary vein (I) and the pulmonary artery (J).
8. The oval area where all the structures enter or leave the lung is the *lung root.*
9. There are quite a lot of *lymphatic vessels* in the lungs.
10. *The lymph glands* filter out any foreign particles in the air within our body.

6.2c **Complete the following table as in the examples:**

	Right lung	**Left lung**
1.lobes		**upper** **lower**
2. fissures	**horizontal**	**—**
3. bronchi	**1**	
4. vein		**1**
5. artery	**1**	

Table 5

Vocabulary

anterior / æn'tɪərɪə / ἐμπρόσθιος
surface / 'sɜfɪs / ἐπιφάνεια
lobe / ləʊb / λοβός
upper / 'ʌpə / ἀνώτερος
inferior / ɪn'fɪərɪə / κατώτερος
fissure / 'fɪʃə / σχισμή
separate / 'sepəreɪt / χωρίζω
horizontal / 'hɒrɪ'zɒntl / ὁριζόντιος
oblique / ə'blik / πλάγιος
oval / 'əʊvl / ὠοειδής
root / rut / βάση
lymph / lɪmf / λέμφος
lymphatic / lɪm'fætik / λεμφατικός
filter / 'fɪltə / φίλτρο
foreign / 'fɒrən / ξένος
particle / 'pɑtɪkl / μόριο

EXERCISES

I. Put the following terms in the right order as concerns the stages of the respiratory system from the moment of inhalation to the end of the process:

bronchi — blood — cells — lungs (oxygenated air) — larynx — waste products — inhalation — heart — oxygen in — pulmonary artery — pharynx — blood (with waste products) — trachea — bronchioles — lungs (carbon dioxide) — food oxidized — exhalation.

II. Answer the following questions using one complete sentence for your answer:

1. When do we draw in oxygen?
2. How does air come into the trachea?
3. How many bronchi are there in each lung?
4. Which is the function of the pulmonary vein?
5. What are the waste products?
6. What does a pulmonary artery do?
7. What are the bronchial tubes?
8. What is pharyngitis?
9. What is laryngitis?
10. What is bronchial asthma?

III. Fill in the blanks in the following illustrations with the appropriate terms:

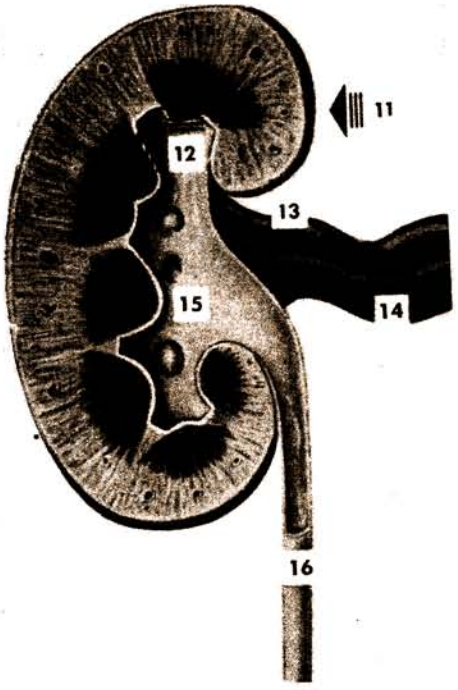


fig. 19

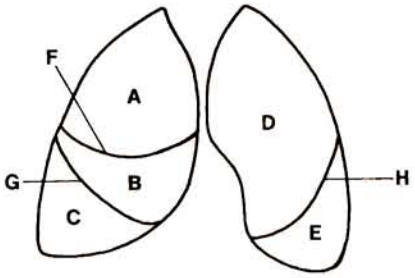


fig. 20

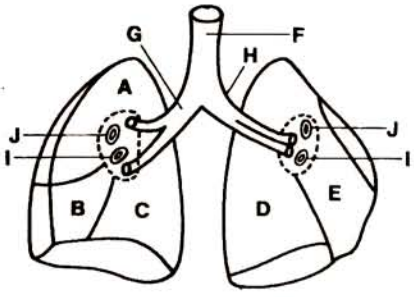


fig. 21

IV. Say whether the following statements are TRUE or FALSE according to the preceding paragraphs:

— 1. There is one bronchus for each lung.
— 2. There are three lobes in each lung.
— 3. Bronchioles branch into bronchi.
— 4. The red blood cells absorb oxygen as blood passes through the lungs.
— 5. The waste products go out during exhalation.
— 6. There is only one fissure in the right lung.
— 7. The trachea divides into bronchial tubes before entering the lungs.
— 8. The blood is oxygenated in the lungs.
— 9. The bronchial tubes are short passages.
— 10. Carbon dioxide is a waste product for a living organism.

V. Match a word or phrase from column A with a word or phrase from column B to form true and correct sentences:

A

1. The palmonary vein carries - - - - - - - -
2. The palmonary artery carries - - - - - -
3. The trachea is - - - - - - - -
4. The esophagus is - - - - - - - -
5. The bronchial asthma is - - - - - - - -
6. Bronchitis is - - - - - - - -
7. Oxygen passes from the larynx to - - - - - - - -
8. Laryngitis is an inflammation of - - - - - - - -
9. Pharyngitis is an inflammation of - - - - - - - -
10. During exhalation we give - - - - - - - -
11. During inhalation we take - - - - - - - -
12. A fatal disease is - - - - - - - -

B

a. a food passage.
b. a respiratory disease.
c. the pharynx.
d. the larynx.
e. carbon dioxide out.
f. the bronchi.
g. oxygenated blood to the heart.
h. an air passage.
i. the lung cancer.
j. oxygen in.
k. the pharynx.
l. blood to the lungs.
m. a chronic disease.
n. the trachea.

VI. Which is correct in the following: a, b or c?

1. In figure 22 "A" is the - - - - - - - -
   a. upper lobe.
   b. middle lobe.
   c. inferior lobe.
2. In figure 22 "D" is the - - - - - - - -
   a. lower lobe.
   b. middle lobe.
   c. upper lobe.

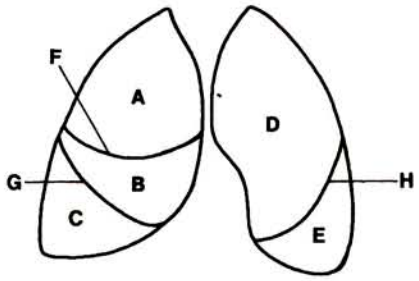
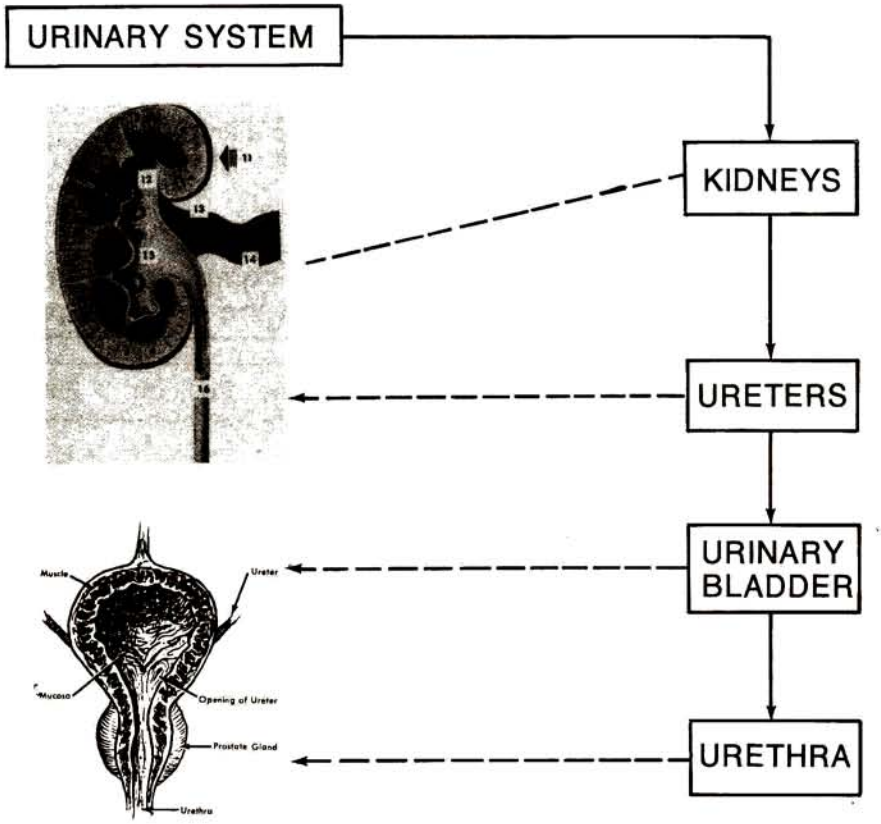


fig. 22

3. In figure 22 "C" is the - - - - - - - -
   a. upper lobe.
   b. middle lobe.
   c. inferior lobe.
4. In figure 22 "B" is the - - - - - - - -
   a. lower lobe.
   b. middle lobe.
   c. upper lobe.
5. In figure 22 "E" is the - - - - - - - -
   a lower lobe.
   b. middle lobe.
   c. upper lobe.
6. The fissures in the right lung are - - - - - - - -
   a. one horizontal — one oblique.
   b. two horizontal.
   c. two oblique.
7. There is - - - - - - - - fissure in the left lung.
   a. no
   b. one oblique
   c. one horizontal
8. The left lung has - - - - - - - -
   a. one lobe.
   b. two lobes.
   c. three lobes.
9. The right lung has - - - - - - - -
   a. one lobe.
   b. two lobes.
   c. three lobes.
10. There are - - - - - - - - lymphatic vessels in the lungs.
    a. no
    b. quite a few
    c. a few
11. The lymph glands filter out any foreign particles in the air - - - - - - - -
    a. outside our body
    b. within our body.
    c. both "a" and "b"

THE EXCRETORY SYSTEM

7.1a **Look at the following diagram:**



7.1b **Consider the following statements:**

a. *The urinary system* consists of the kidneys, the ureters, the urinary bladder and the urethra.
b. The kidneys are outside the *peritoneal cavity,* at the back of the abdominal cavity.
c. They are the *basic organs* of the urinary system.
d. They *remove* water and waste products from the blood and *form urine.*
e. They *control* the composition of the blood.
f. Their role is very important in the *condition* of high pressure of the blood or *hypertension.*
g. The kidneys are bean shaped and consist of a great number of *glomeruli,* coils of blood vessels, and small tubules.

h. Each *glomerulus* acts as a filter.
i. The small tubules form larger ducts which empty into the *renal pelvis*, in the upper part of the ureter.
j. *The ureters*, tubular in shape, convey the urine to the bladder. They run along the posterior abdominal wall.
k. The bladder, a membranous sack within the pelvis, *stores* the urine.
l. The wall of the bladder consists of involuntary muscle fibers mainly.
m. *The urethra* is the duct leading from the bladder to the outside of the body.
n. The male urethra is *curved and long* whereas the female is *short and straight.*
o. The male urethra consists of three parts:
   i. *the prostatic urethra* enclosed by the prostatic gland
   ii. *the membranous urethra* piercing the perineal membrane, and
   iii. the spongy urethra.
p. The size and shape of the bladder varies.

7.1c On the basis of the notes that follow complete this table. Supply only the reference numbers in the columns provided:

No.	Name of organ	Structure	Shape	Position	Function
1.	Kidneys				
2.	Glomeruli				
3.	Tubules				
4.	Rena pelvis				
5.	Ureters				
6.	Bladder				
7.	Urethra, male female				

A. STRUCTURE

1. A great number of glomeruli.
2. Small tubules.
3. Long excretory ducts.
4. Involuntary muscle fibers.
5. Coil of blood vessels.
6. Membranous sack.

B. SHAPE

1. Various.
2. Thread-like
3. Short and straight.
4. Long and curved.
5. Bean shaped.
6. Tubular.

C. POSITION

1. Below the bladder.
2. Within the pelvis.
3. The upper part of the ureter.
4. Along the posterior abdominal wall.
5. Part of the kidneys.
6. At the back of the abdominal cavity.
7. Outside the peritoneal cavity.

D. FUNCTION

1. To carry urine from pelvis to bladder.
2. To store urine.
3. To convey urine outside the body.
4. Act as filters.
5. To empty into renal pelvis.
6. To act as urine receptable before the bladder.
7. To convey urine from the kidneys to the renal pelvis.
8. To remove waste products from the blood.

Vocabulary

urinary / 'jʊərɪnrɪ / οὐρικός
kidney / 'kɪdnɪ / νεφρό
ureter / jʊə'ritə / οὐρητήρας
urethra / jʊə'riθrə / οὐρήθρα
peritoneal / 'perɪ'təʊnl / περιτονικός
abdominal / æb'dɒmɪnl / γαστρικός
remove / rɪ'muv / ἀφαιρῶ
form / fɔm / σχηματίζω
urine / 'jʊərɪn / οὖρος
control / kən'trəʊl / ἐλέγχω
composition / 'kɒmpə'zɪʃn / σύνθεση
pressure / 'preʃə / πίεση

condition / kən'dɪʃn / κατάσταση, περίπτωση
hypertension / 'haɪpə'tenʃn / ὑπέρτασηη
bean shaped / 'bin 'ʃeɪpt / σέ σχῆμα φασολιοῦ
glomerulus / glə'merjələs / σπείρωμα
coil / kɔɪl / ὀφιοειδής
tubule / 'tjubjul / σωλήνα
renal / rinl / νεφρικός
pelvis / 'pelvɪs / νεφρική πύελος, λεκάνη

posterior / pɒs'tɪərɪə / ὀπίσθιος
sack / sæk / σάκκος
store / stɔ / ἀποθηκεύω
male / meɪl / ἀρσενικός
curved / kɜvt / καμπυλωτός
whereas / weə-əz / ἐνῶ
female / 'fimeɪl / θηλυκός
prostatic / prɒ'steɪtɪk / τοῦ προστάτη
enclose / ɪn'kləʊz / περικλείνω
pierce / pɪəs / διαπερνῶ
perineal / perɪ'niəl / περινεϊκός
spongy / 'spʌndʒɪ / σπογγώδης

7.2a Look at the following illustrations and match the reference numbers with the relative terms:

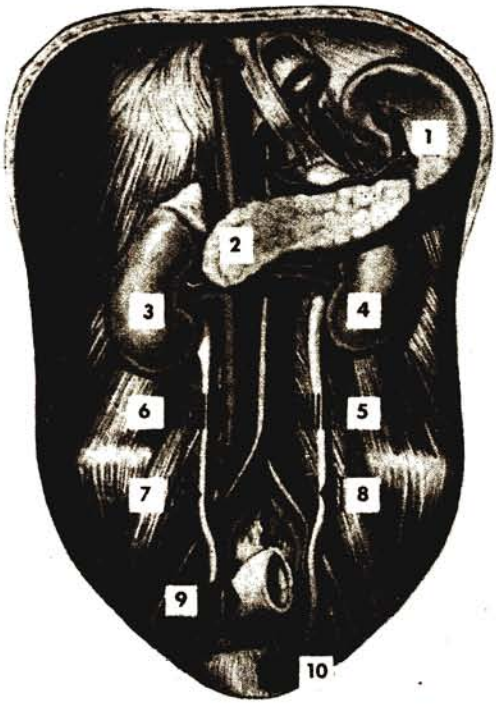


fig. 20

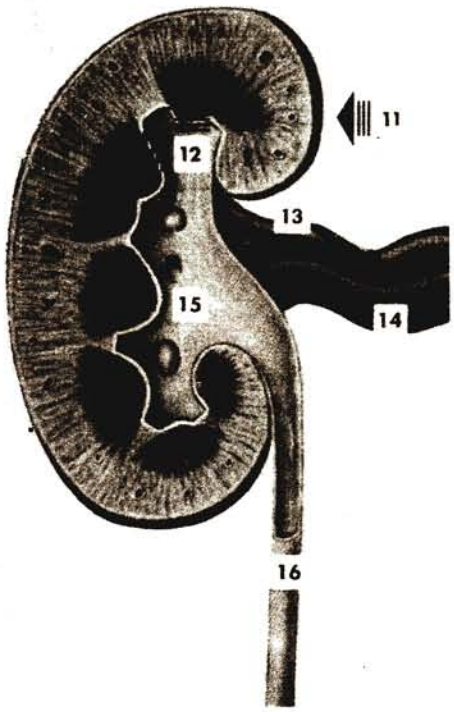


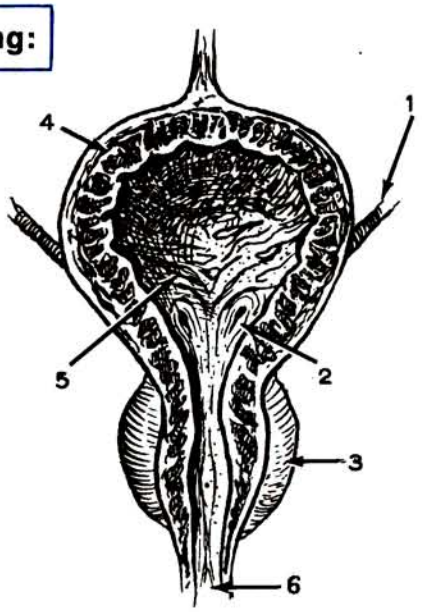
fig. 21

3. RIGHT KIDNEY
4. LEFT KIDNEY
7. RIGHT URETER
8. LEFT URETER
10. BLADDER
12. PYRAMIDS
13. RENAL ARTERY
14. RENAL VEIN
15. RENAL PELVIS
16. URETER

7.2b **Now complete the following sentences:**

1. Figure 20 is an illustration of the - - - - - - - - system.
2. Number three stands for the - - - - - - - - - - - - - - - - and number seven stands for the - - - - - - - - - - - - - - - -
3. Number four stands for the - - - - - - - - - - - - - - - - and number eight stands for the - - - - - - - - - - - - - - - -
4. The - - - - - - - - are the chief organs of the system.
5. The - - - - - - - - shown by number ten is another important organ.
6. Figure 21 shows a cross-section of - - - - - - - -
7. Number twelve stands for the - - - - - - - - They are of small tubules and form part of the inner layer of the kidney. The name of this layer is medulla.
8. The renal - - - - - - - - (number thirteen) supplies the kidneys with blood at high pressure.
9. Number fourteen stands for - - - - - - - - - - - - - - - - Veins lead from kidneys and return the blood to the inferior vena cava (number six).
10. Number fifteen stands for the - - - - - - - - - - - - - - - - It is an expansion of the upper end of the ureters.
11. Number sixteen stands for the - - - - - - - -

7.3a **Look at the following drawing:**

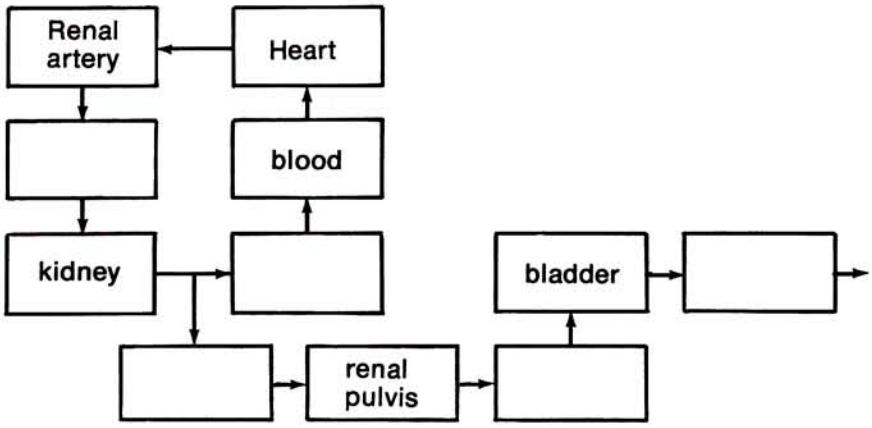


1. Ureter.
2. Opening of ureter.
3. Prostate gland.
4. Muscle.
5. Mucosa
6. Urethra

7.3b **Study the following statements:**

a. The two most important bladders are the gall and the *urinary bladder.*
b. The urinary bladder serves as a *receptacle* for the urine.
c. The urine reaches the bladder through the ureters from the kidneys and leaves it through the urethra.
d. *Cystitis,* either acute or chronic, is an inflammation of the bladder and results from micro-organisms.
e. *Calculi or stones* are quite common and are formed of various crystallized components of urine.
f. *Paralysis* of the bladder results to either the retention of urine or loss of control over urination.

7.3c **Study the following rough diagram with reference to the preceding paragraphs and fill in the blank squares with the appropriate terms:**



diag. 20

Vocabulary

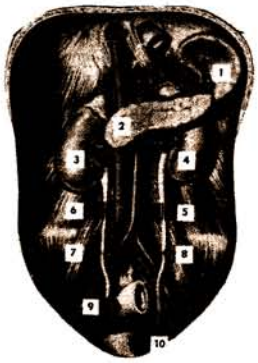
pyramid / 'pɪrəmɪd / πυραμίδα
closs-section / 'kros sekʃn / τομή
layer / 'leɪə / στρώση
medulla / mɪ'dulə / μυελός όστέων
supply / sə'plaɪ / τροφοδοτῶ
vena cava / 'vinə 'kævə / κοίλη φλέβα
expansion / ɪk'spænʃn / προέκταση
mucosa / mju'kəuzə / βλεννογόνος
receptacle / rə'septəkl / ὑποδοχή
cystitis / sɪ'staɪtəs / κυστίτιδα
micro-organism / 'maɪkrə - 'ɔgən-ɪzm / μικροοργανισμός
calculus / 'kælkjʊləs / πέτρα
crystallized / 'krɪstəlaɪzd / κρυσταλλωμένος
component / kəm'pəʊnənt / συστατικό
retention / r'ɪtenʃn / συγκράτηση
paralysis / pə'rælәsɪs / παράλυση
urination / 'jʊərɪ'neɪʃn / οὔρηση

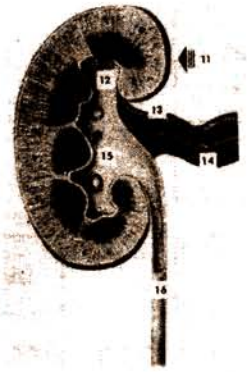
Exercises

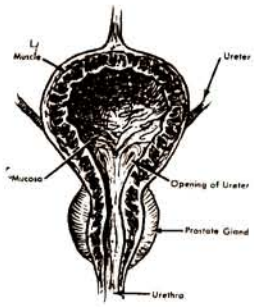
I. Answer the following questions using one complete sentence for each answer:

1. Which are the organs of the urinary system?
2. Which are the basic organs of this system?
3. What is hypertension?
4. What do kidneys consist of?
5. What do tubules empty into?
6. Which organ stores the urine?
7. Which is the shape of the female urethra?
8. Which are the parts of the male urethra?
9. Which is the size of the bladder?
10. What are the glomeruli?

II. Identify the parts of the organs shown in the following illustrations:







III. Following is a rough description of the operation of the urinary system. Put the sentences in the right order of sequence:

1. Formation of urine.
2. Bladder stores urine.
3. Filtration of blood.
4. Blood brought into kidney through renal artery.
5. Urine passes into tubules.
6. Filtered blood back to heart by means of renal vein.
7. Urine emptied into renal pelvis.
8. Urination.
9. Urine passes to urethra.
10. Ureters convey urine to bladder.

IV. Which is correct in the following a, b or c?

1. Kidneys consist of - - - - - - - -
   a. glomeruli.
   b. tubules.
   c. both "a" and "b".

2. Ureter is a - - - - - - - -
   a. long excretory duct.
   b. coil of blood vessels.
   c. membranous sack.

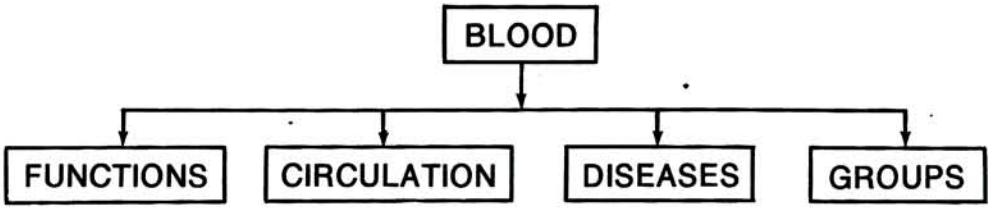
3. Bladder is a - - - - - - - -
   a. long excretory duct.
   b. coil of blood vessels.
   c. membranous sack.
4. The shape of the - - - - - - - - is various.
   a. ureters.
   b. bladder.
   c. urethra.
5. The kidney is - - - - - - - -
   a. long and curved.
   b. bean shaped.
   c. short and straight.
6. The male urethra is - - - - - - - -
   a. long and curved.
   b. bean shaped.
   c. short and straight.
7. The female urethra is - - - - - - - -
   a. long and curved.
   b. bean shaped.
   c. short and straight.
8. The ureters are - - - - - - - -
   a. below the bladder.
   b. within the pelvis.
   c. along the posterior abdominal wall.
9. The rena pelvis is - - - - - - - -
   a. below the bladder.
   b. the upper part of the ureter.
   c. along the posterior abdominal wall.
10. The bladder is - - - - - - - -
   a. within the pelvis.
   b. the upper part of the ureter.
   c. outside the peritoneal cavity.
11. The function of the kidneys is - - - - - - - -
   a. to store urine.
   b. to convey urine to the pelvis.
   c. to remove waste products from the blood.
12. The kidneys are - - - - - - - -
   a. within the pelvis.
   b. below the bladder.
   c. at the back of the abdominal cavity.
13. The function of the bladder is - - - - - - - -
   a. to store urine.
   b. to convey urine to the pelvis.
   c. to filter blood.
14. The function of the glomeruli is - - - - - - - -
   a. to store urine.
   b. to convey urine to the pelvis.
   c. to filter blood.
15. The function of the tubules is - - - - - - - -
   a. to store urine.
   b. to convey urine to the pelvis.
   c. to filter blood.

16. The function of the ureters is to - - - - - - - -
    a. carry urine to bladder.
    b. act as filters.
    c. convey urine outside the body.
17. The function of the urethra is to - - - - - - - -
    a. carry urine to bladder.
    b. act as filters.
    c. convey urine outside the body.
18. Chronic cystitis is an inflammation of - - - - - - - -
    a. the kidneys.
    b. the bladder.
    c. the ureters.
19. Paralysis of the bladder results to - - - - - - - -
    a. retention of urine only.
    b. loss of control over urination only.
    c. either "a" or "b".

UNIT M. 8

THE CIRCULATORY SYSTEM

8.1a Look at the following diagram:

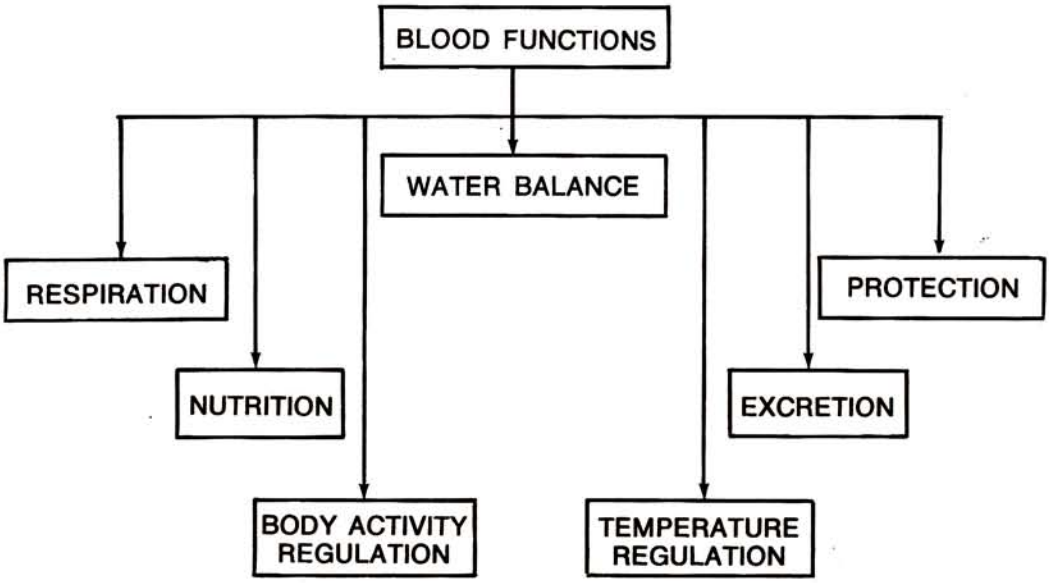


diag. 21

8.1b Read the following notes:

i. Blood is *vital* to all complex animals.
ii. Blood is *composed* of cells and fluid (plasma). The *red* blood *cells* carry *oxygen to the tissues;* the *white* blood *cells* are used *against infection.*
iii. The *plasma* contains over 90% water. It also contains proteins, minerals, organic substances (i.e. cholesterol), fats, sugar, amino acids, enzymes and hormones.
iv. The *heart* keep the blood moving constantly. It is this circulation that enables blood perform its essential function.
v. *Diseases* in blood sometimes may be fatal. They are generally caused either by excess or by deficiency of the materials in the blood.
vi. A large number of problems necessitated the distinction of *blood* into *groups.* An application of this knowledge concerns the relationship between blood groups and disease.
This information is also important in blood *transfusion.*

8.1c Study the following diagram and the statements referring to it:



diag. 22

a. In the *respiration system* blood plays an important role. The red blood cells carry oxygen from the lungs to the tissues. They also carry carbon dioxide from the tissues to the lungs.
b. The *blood plasma* carries to the tissues the necessary food, that is glucose (sugar), fats and amino acids.
c. *Water* is a very important constituent in every human organism. The continual *exchange of water* between the blood stream and the tissue spaces keeps the necessary balance.
d. Blood acts as a *heat storage and distributor.* By shifting from the skin to the organs and vice versa it regulates the temperature of the body.
e. The thyroid and other glands secrete substances very important in the basic bodily functions. However, it is *blood* that *carries* these *hormones.*
f. Blood stream carries *urea, uric acid and creatine* outside the body.
g. Blood provides *protection against infection.* The white blood cells destroy disease-producing organisms. The blood fluid also contains antibodies to certain germs.

8.1d Fill the blanks in the following sentences referring to the preceding paragraphs:

1. The red blood cells carry - - - - - - - - to the tissues.
2. The white blood cells protect the organism against - - - - - - - -
3. The - - - - - - - - contains 90% water.
4. The distinction of blood to groups is also essential for blood - - - - - - - -
5. The red blood cells also carry - - - - - - - - from the tissues to the - - - - - - - -

6. The blood also acts as a - - - - - - - - storage and regulates the - - - - - - - - of the body.
7. The white blood cells provide protection against - - - - - - - -

Vocabulary

vital / 'vaɪtl / ζωτικός
fluid / 'fluɪd / ύγρό
plasma / 'plæzmə / πλάσμα
infection / ɪn'fekʃn / μόλυνση
cholesterol / ko'ləstərol / χοληστερίνη
amino acid / 'amɪno'æsɪd / άμινοξύ
constantly / 'konstəntlɪ / σταθερά
excess / ɪk'ses / περίσσεια
deficiency / dɪ'fɪʃnsɪ / ανεπάρκεια
necessitate / nɪ'sesɪteɪt / επιβάλλω
distinction / dɪ'stɪŋkʃn / διάκριση
application / 'æplɪ'keɪʃn / εφαρμογή
relationship / rɪ'leɪʃnʃɪp / σχέση
transfusion / træns'fjuʒn / μετάγγιση
nutrition / nju'trɪʃn / θρέψη
balance / 'bæləns / ισορροπία
temperature / 'temprətʃə / θερμοκρασία
regulation / regjʊ'leɪʃn / ρύθμιση
activity / æk'tɪvətɪ / δραστηριότητα
protection / prə'tekʃn / προστασία
glucose / 'glukəʊs / γλυκόζη
continual / kən'tɪnjʊəl / συνεχής
exchange / ɪks'tʃeɪndʒ / ανταλλαγή
stream / strim / ροή
distributor / dɪ'strɪbjutə / διανομέας
shift / 'ʃɪft / μετατοπίζομαι
skin / skɪn / δέρμα
vice versa / 'vaɪs 'vɜsə / αντίστροφα
thyroid / 'θaɪrɔɪd / θυρεοειδής
uric acid / 'jʊərɪk 'æsɪd / ουρικό όξύ
creatine / 'krɪətaɪn / κρεατινίνη
destroy / dɪ'strɔɪ / καταστρέφω
produce / prə'djus / παράγω
antibody / 'æntɪbodɪ / αντισώμα
germ / dʒɜm / μικρόβιο

8.2a By using the following illustration and reference table identify the various components of the circulatory system.

1. JUGULAR VEIN
2. CAROTID ARTERY
3. AORTA
4. ANTERIOR VENA CAVA
5. RIGHT PULMONARY ARTERY
6. LEFT PULMONARY VEIN
7. HEART
8. LEFT LUNG
9. HEPATIC PORTAL VEIN
10. POSTERIOR VENA CAVA
11. RENAL VEIN
12. COELIAC ARTERY
13. DORSAL AORTA
14. LEFT KIDNEY

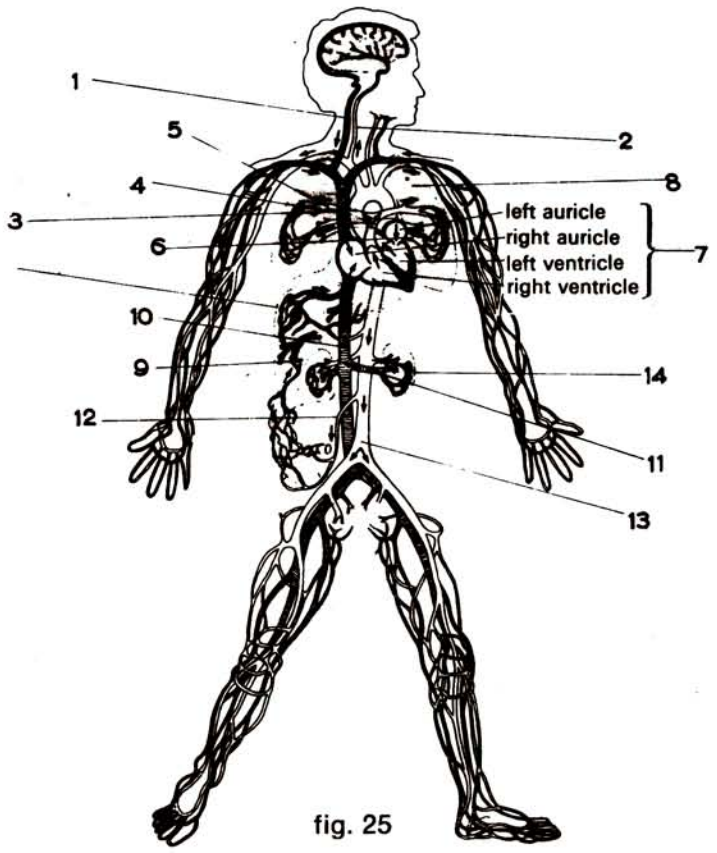


fig. 25

1. The aorta is under number - - - - - - - -
2. The - - - - - - - - aorta is number thirteen.
3. The anterior - - - - - - - - - - - - - - - - - and the - - - - - - - - vena cava are shown by numbers four and - - - - - - - -
4. There are four kinds of veins in the diagram:
   i. The - - - - - - - - vein is number one.
   ii. The hepatic portal vein is number two.
   iii. Number eleven is the - - - - - - - - , and
   iv. The left - - - - - - - - - - - - - - - - is number six.
5. The arteries shown in the diagram are:
   i. The - - - - - - - - artery under number two.
   ii. The right - - - - - - - - artery is number five.
   iii. The - - - - - - - - artery is number twelve.

8.2b(i) **Study these statements:**

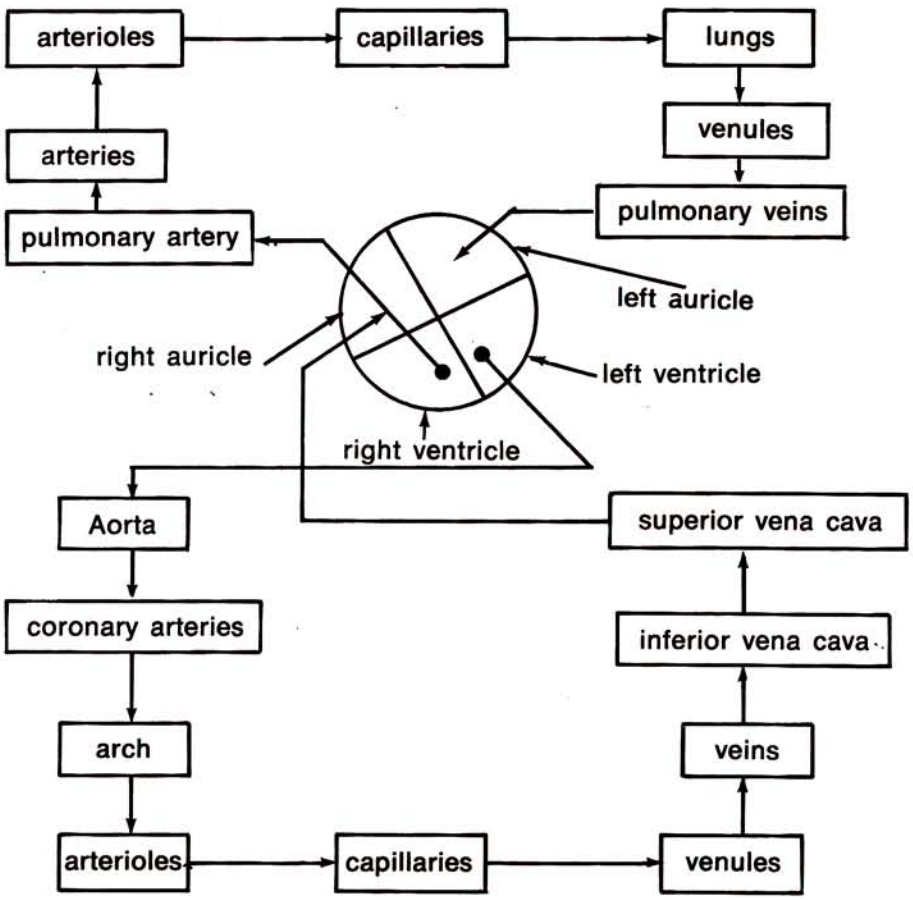
a. The circulatory system consists of a *pump* and a *network* of blood vessels.
b. The *heart* is the pump and all *arteries, capillaries* and *veins* form the network.
c. All *arteries* take blood *from* the heart and all *veins* bring blood *to* it.
d. When blood reaches the lungs *carbon dioxide goes out* through exhalation and *oxygen comes in* through inhalation.

e. There are two major circulatory systems. *Systemic circulation* transports blood *from the heart* to every part of the body *and back to it. Pulmonic circulation* transports blood *from the heart to the lungs* and *back* to it.

f. The systemic circulation is the greater circulation in the system. There are other minor circulations as well. For example the hepatic circulation, through the liver, the cerebral circulation, through the brain, etc.

g. The *septum* divides the *heart* into *two halves,* the left and the right one. Each *chamber* divides into an upper chamber — *the auricle* — and a lower chamber — *the ventricle.*
The auricles *receive* blood *from the veins.* The ventricles *pump* blood *into the arteries.*

(ii) And now follow this chart carefully. It describes a complete cycle of blood circulation:



diag. 23

(ai) There are three arterial branches from the top of the arch. They are:
i. the innominate artery
ii. the left carotid artery and
iii. the left subclavian artery.
Blood flows through them to the head, neck, upper limbs and chest.
(aii) From the descending part of the aortal arch blood flows to the intestines, kidneys and other organs and further through the iliac arteries to the legs.
(b) The capillaries act as connecting means. They connect arteries and veins between them.
(c) Capillaries allow tissue fluid to mix with blood and also fluid to pass from the blood and mix with the tissue fluid.

8.2c Look at the following sketch and describe the circulation of blood by filling in the blanks in the following passage:

L — lungs
H — heart
V — veins
C — capillaries

v — venules
a — arterioles
A — aorta
P — pulmonary artery

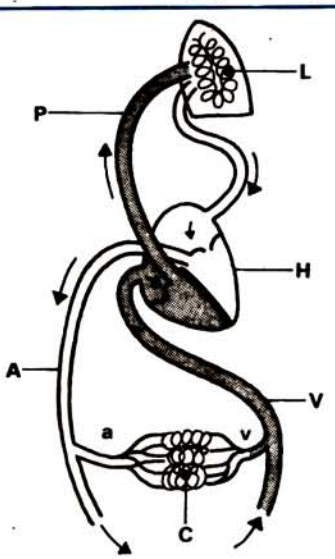


fig. 27

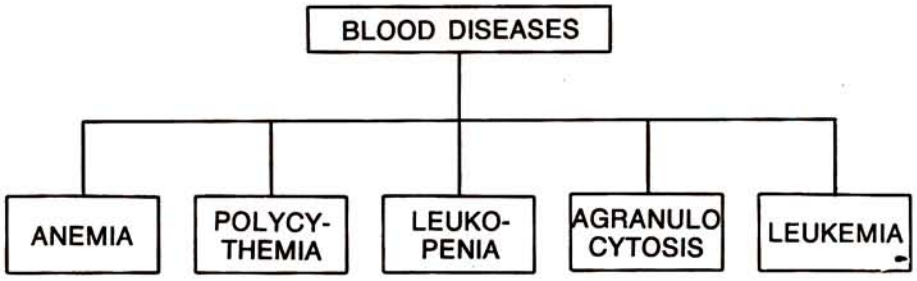
When the - - - - - - - - (H) contracts, the - - - - - - - - (P) carries blood to the - - - - - - - - There the red cells give up carbon dioxide and take up oxygen. The veins from the lungs return the oxygenated blood to the left side of the heart. The ventricle pumps the blood into the - - - - - - - - (A). The vessels - - - - - - - - (a) receive blood from the arteries and pump it to the - - - - - - - - networks (C). The - - - - - - - - (v) collect blood from the capillaries and pump it into the - - - - - - - - (V). Eventually the blood reaches the right side of the heart and returns to the lungs through the pulmonary artery.

Vocabulary

jugular / 'dʒʌgjʊlə / τραχηλικός
carotid / kərotid / καρωτίδα
pulmonary / 'pʌlmənərɪ / πνευμονικός
hepatic / he'pætɪk / ήπατικός
portal / 'pɔtl / πύλη (τοῦ ήπατος)
coeliac / 'silɪək / κοιλιακός

dorsal / dɔsl / νωτιαῖος
pump / pʌmp / ἀντλία
network / 'netwɜk / δίκτυο
major / 'meɪdʒə / μείζων
systemic / sɪs'temɪk / γενική (κυκλοφορία)
transport / 'trans'pɔt / μεταφέρω
pulmonic / pʌl'monɪk / πνευμονικός
minor / 'maɪnə / λιγότερος
cerebral / 'serəbrl / ἐγκεφαλικός
septum / 'septəm / διάφραγμα
divide / dɪ'vaɪd / διαιρῶ
chamber / 'tʃeɪmbə / θάλαμος
auricle / 'ɔrɪkl / καρδιακός κόλπος
ventricle / 'ventrɪkl / κοιλία
coronary / 'korənrɪ / στεφανιαῖος
arch / ɑtʃ / τόξο
capillary / kə'pɪlərɪ / τριχοειδές ἀγγεῖο
artery / 'ɑtərɪ / ἀρτηρία
vein / veɪn / φλέβα
arteriole / ɑ'terɪəʊl / ἀρτηρίδιο
venule / 'venjʊl / φλέβιο
inferior / ɪn'fɪərɪə / κατώτερος
superior / sə'pɪərɪə / ἀνώτερος
aorta / eɪ'ɔtə / ἀορτή
innominate / ɪ'nɔmɪnet / ἀνώνυμος
subclavian / sʌb'kleɪvɪən / ὑποκλείδιος
allow / ə'laʊ / ἐπιτρέπω
mix / mɪx / ἀναμιγνύω
contract / kən'trækt / συστέλλομαι
eventually / ɪ'ventʃʊlɪ / τελικά

8.3a **Look at this diagram:**



diag. 24

8.3b **Study these statements:**

a. There are two types of *anemia*. The *hemolytic* and the *pernicious*.
b. *Polycythemia* is another blood disease that has to do with *red blood cells*.
c. *Leukopenia, agranutocytosis and leukemia* are blood diseases that have to do with *white blood cells*.

d. *Anemia* is generally the *reduction of the number of red blood cells.* A general cause is bleeding or inadequate iron content in the diet and may result to palpitation and breath shortness.
e. *Hemolytic* anemia is caused by *disturbance* in the *production* of *red blood cells* and results to pallor. The destruction of blood is another cause for hemolytic anemia.
f. *The inability* of the organism *to absorb vitamin B12* causes *pernicious* anemia and results to fatigue and mental disturbance.
g. *Polycythemia* is due *to excess* production of *red blood cells* caused by deficiency of oxygen. As a result the blood gets thick, circulation decreases and headaches, dizziness and itching follow.
h. In *leukopenia* the number of white blood cells is too little as a result mainly of *disorders of the spleen.* This leads to decrease of red cells and platelets.
i. *Agranulocytosis* is a blood disorder which is due to the *decline* of the number of a particular type of white blood cells named *granulocytes.*
j. *Leukemia* is an overproduction of white blood cells in the bone marrow. White blood cells manufacturing tissues replace blood producing tissues and this results to underproduction of blood and platelets.
k. The results of agranulocytosis are fever, blood infections and ulcerations of mouth, rectum and vagina.

8.3c **Complete the following table by giving particulars of the various blood diseases. You can draw your information from the preceding diagram and statements:**

No	Name of diseare	Characteristic	Cause	Result
1.	Anemia			
2.	hemolytic			
3.	pernicious			
4.	Polycythemia			
5.	Leukopenia			
6.	Agranulocytosis			
7.	Leukemia			

Table 7

Vocabulary

anemia / ə'nimɪə / ἀναιμία
polycythemia / 'polɪsaɪ'θimɪə / πολυκυτταιμία
leukopenia / lukə'penɪə / λευκοπενία
agranulocytosis / 'ægrənjulosaɪ'tosis / ἀκοκκιοκυττάρωση
leukemia / lu'kimɪə / λευχαιμία
hemolytic / himə'lɪtɪk / αἱμολυτικός
pernicious / rɪ'dʌkʃn / μείωση
reduction / blidɪŋ / κακοήθης
bleeding /pə'nɪʃəs / αἱμορραγία
inadequate / ɪn'ædɪkwət / ἀνεπαρκής
diet / 'daɪət / δίαιτα
palpitation / 'pælpɪ'teɪʃn / παλμός

shortness / 'ʃɔtnɪs / βραχύτητα
disturbance / dɪ'stɜbəns / ἀνωμαλία, διαταραχή

production / prədʌkʃn / παραγωγή
pallor / 'pælə / χλωμάδα
destruction / dɪ'strʌkʃn / καταστροφή
inability / ɪnə'bɪlətɪ / ἀδυναμία
absord / ə'bsɔb / ἀπορροφῶ
fatigue / fə'tig / κούραση
mental / 'mentl / πνευματικός
deficiency / dɪ'fɪʃnsɪ / ἀνεπάρκεια

decrease (v) / *dɪ'kris* / *μειώνω*
headach / 'hedeɪk / πονοκέφαλος
dizziness / 'dɪzɪnɪs / ἴλιγγος
itching / 'ɪtʃɪŋ / φαγούρα
disorder / dɪs'ɔdə / ἀνωμαλία
decrease (n) / dikris / μείωση
platelet / 'pleɪtlet / θρομβοκύτταρο
decline / dɪklaɪn / ἐλάττωση

granulocyte / 'grænjʊlo'saɪt / κοκκιοκύτταρο
overproduction / 'əʊvəprədʌkʃn / ὑπερπαραγωγή
replace / rɪ'pleɪs / ἀντικαθιστῶ
ulceration / 'ʌlsə'reɪʃn / ἕλκωση
vagina / və'dʒaɪnə / κολεός

8.4a **Study the following tables:**

Table I - Normal values of the blood

Total blood volume	
Adult male	5.000 ml.
Adult female	4.000 ml.
Red blood cell volume	
Adult male	2.250 ml.
Adult female	1.800 ml.
Plasma volume	
Adult male	2.750 ml.
Adult female	2.200 ml.
Hematocrit	
(% volume of red cells)	45%
Hemoglobin	
Adult male	12g to 17g per 100 ml.
Adult female	11 g to 15g per 100 ml.
Red blood cell count	
Adult male	4.500.000-6.000.000 per mm^3
Adult female	4.000.000-5.500.000 per mm^3
White blood cell count	5.000- 10.000 per mm^3
Platelet count	200.000-400.000 per mm^3
Differential count of the white blood cells	
Neutrophils	60% - 70%
Lymphocytes	20% - 30%
Monocytes	2% - 6%
Eosinophils	1% - 4%
Basophils	0% - 1%
Bleeding time	1 - 3 min.
Coagulation time (venous blood)	6-10 min.

Table 8

Table II - Blood groups

Red Cell Blood Group	Antigen on red cells	Antibody in serum: O anti A anti B	A anti B	B anti A	AB none
O	none	—	—	—	—
A	A	+	—	+	—
B	B	+	+	—	—
AB	A and B	+	+	+	—

Note: + means agglutination
— means no agglutination
type O is a universal donor
type AB is a universal recipient

Table 9

8.4b Consider the following statements referring to or supplementing the information of the tables:

a. Blood consists of two *phases;* one includes the *red cells, white cells* and *platelets* and the other the *plasma.*
b. Blood separates into a *solid clot* and *liquid serum.*
c. The red cells carry also a number of *antigenic* substances.
d. Antigen is the substance that *reacts* under certain conditions with another substance. This latter substance is its *antibody.*
e. *Antibodies* are present *in plasma.*
f. The reaction between an *antigen* and its *antibody* takes several *forms.*
g. *Agglutination* is such a reaction during which red cells clump together.
h. We take this reaction into consideration when we determine the blood groups.
i. For blood *transfusion* the blood of the donor must be *compatible* with that of the recipient. Otherwise, agglutination occurs which may result to death.

8.4c Underline the correct information given by the words in parenthesis:

1. The total volume of blood in a male and a female organism (is equal — is not equal)
2. This means there are (more — less) red blood cells in females than in males.
3. The plasma volume, on the other hand, is (greater — smaller) in males than in females.
4. However, the percentage of red cells in both organisms is (the same — different)
5. The content of hemoglobin in male adults is between 12g and 17g per (100 millilitres - 100 litres)
6. The blood of an adult (woman only — human being) contains 5.000 to 10.000 white blood cells per cubic millimetre.
7. However, the amount of red blood cells is (the same — different) for males and females.

8. There are about 500.000 red blood cells per cubic millimetre (more- less) in females.
9. The bleeding time (is exact-varies).

Vocabulary

normal / 'nɔml / κανονικός
value / 'vælju / ἀξία
volume / 'voljum / ὄγκος
male / meɪl / ἀρσενικός
female / fimeɪl / θηλυκός
millilitre / 'mɪlɪ'litə / 1/1000 λίτρου
hematocrit / 'himətokrɪt / αἱματοκρίτης
hemoglobin / 'himəgləubɪn / αἱμοσφερίνη
count / kaunt / μέτρηση
differential / 'dɪfə'renʃl / ξεχωριστός
neutrophil / 'njutrəfaɪl / οὐδετερόφιλο (κύτταρο)
lymphocyte / 'lɪmfəsaɪt / λεμφοκύτταρο
monocyte / 'monəusaɪt / μονοκύτταρο
eosinophil / ɪə'sɪnofɪl / ἐοζινόφιλος
bleeding / 'blidɪŋ / αἱμορραγία
coagulation / 'kəuægju'leɪʃn / πήξη
venous / 'vinəs / φλεβικός

Exercises

I. Insert in the following drawings the appropriate terms:

(i)

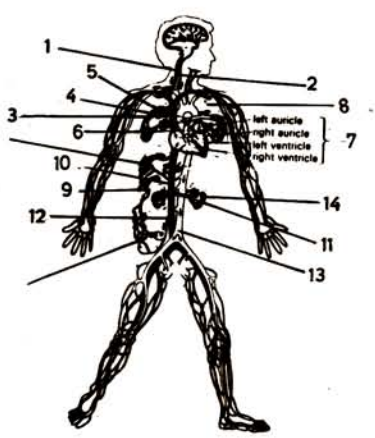


fig. 28

(ii)

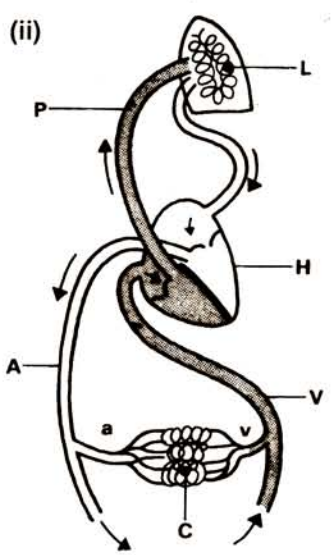
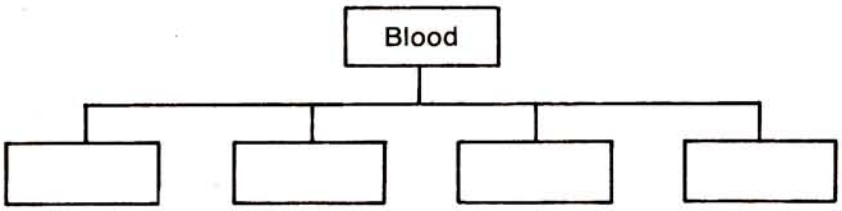


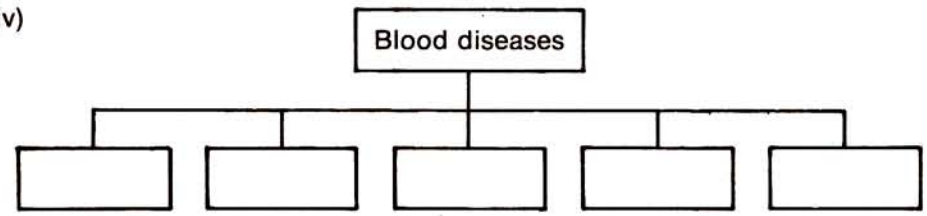
fig. 29

(iii)



diag. 25

(iv)



diag. 26

II. Indicate in the following table the cases of blood agglutination (+) and no agglutination (—).

Blood	Antibody in serum			
Group	O	A	B	AB
O				
A				
B				
AB				

Table 10

III. Say whether the following sentences are TRUE or FALSE according to the information of the unit:

— 1. Blood is composed of plasma only.
— 2. Systemic circulation transports blood from the heart to every part of the body.
— 3. Blood flows from the iliac arteries to the head.
— 4. Anemia is a white cells disease.
— 5. Red blood cells carry oxygen to the tissues.
— 6. Leukemia is an underproduction of blood.
— 7. The volume of blood in males is bigger than that in females.
— 8. The number of white blood cells varies from 5.000 to 10.000 per cubic millimetre.
— 9. Agglutination is not a very important matter.

IV Match a word or phrase from column "A" with a word or phrase from column "B" to form true and correct sentences:

A	B
1. Blood is vital	a. goes out through exhalation.
2. The white blood cells	b. bring blood to the heart.
3. All arteries	c. pump blood into the arteries.
4. Carbon dioxide	d. results to pallor.
5. Oxygen	e. results to mental disturbance.
6. The auricles	f. destroy disease producing organisms.
7. Hemolytic anemia	g. comes in through exhalation.
8. All veins	h. receive blood from the veins.
9. The red cells	i. take blood from the heart.
10. The ventricles	j. carry antigenic substances.
	k. comes in through inhalation.
	l. to all complex animals.

V. Put the following statements describing the circulation of blood to the correct sequence of operation: Start from the contract of HEART:

1. Blood reaches the right side of the heart through the veins.
2. The arterioles receive blood from the arteries.
3. The venules pump blood into the veins.
4. The veins return the blood from the lungs to the left side of the heart.
5. The pulmonary artery carries blood to the lungs.
6. The ventricle pumps the blood into the aorta.
7. It returns to the lungs through the pulmonary artery.
8. The arterioles pump blood to the capillaries.
9. The red cells take up oxygen.
10. The heart contracts.
11. The venules collect blood from the capillaries.
12. The red cells give up carbon dioxide

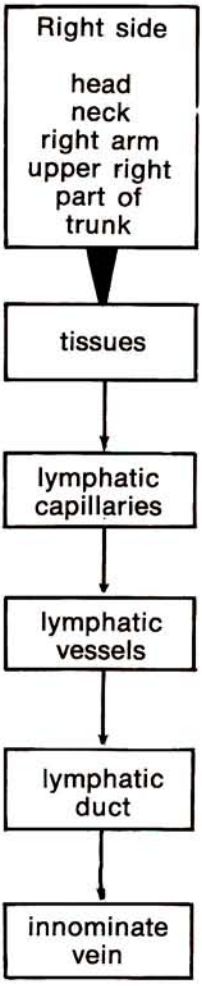
VI. Which is correct in the following a, b or c?

1. Diseases in blood are - - - - - - - -
   a. unimportant.
   b. always fatal.
   c. sometimes fatal.
2. The red blood cells carry - - - - - - - -
   a. oxygen from the lungs to the tissues.
   b. carbon dioxide from the tissues to the lungs.
   c. both "a" and "b".

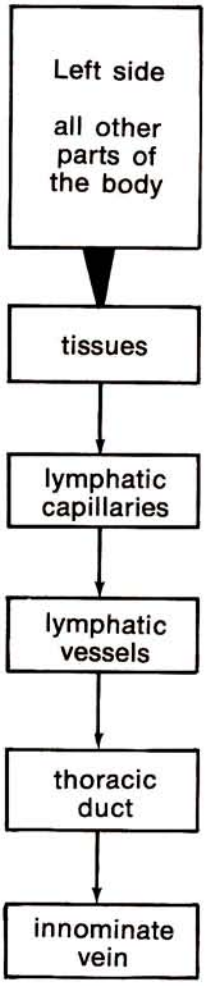
3. The greater circulation in the system is - - - - - - - -
   a. the hepatic.
   b. the systemic.
   c. the cerebral.
4. The septum divides the heart into - - - - - - - -
   a. two halves.
   b. four parts.
   c. three parts.
5. The capillaries connect - - - - - - - -
   a. only arteries.
   b. only veins.
   c. arteries and veins.
6. Anemia is the reduction of- - - - - - - -
   a. red blood cells.
   b. white blood cels.
   c. both "a" and "b"
7. In leukopenia the number of - - - - - - - -
   a. red cells is too little.
   b. white cells is too little.
   c. white cells is too big.
8. Agglutination results from the transfusion of blood from an "A" type donor to - - - - - - - -
   a. an A type recipient.
   b. a B type recipient.
   c. an AB type recipient.
9. Universal donor is the - - - - - - - -
   a. "B" type
   b. "O" type.
   6U "AB" type.
10. Universal recipient is the - - - - - - - -
   a. "B" type.
   b. "O" type.
   c. "AB" type.
11. Antigen is the substance that reacts with its antibody - - - - - - - -
   a. under certain conditions.
   b. under no conditions.
   c. under all conditions.
12. One phase of blood includes - - - - - - - -
   a. red cells, platelets and plasma.
   b. red cells, white cells and plasma.
   c. red cells, white cells and platelets.
13. Antibodies are present - - - - - - - -
   a. in red cells.
   b. in plasma.
   c. in white cells.
14. Antigen is present in - - - - - - - -
   a. red cells.
   b. white cells.
   c. plasma.

THE LYMPHATIC SYSTEM

9.1a **Look at the following diagrams:**



diag. 27



diag. 28

9.1b **Study the following statements:**

a. The *lymphatic* system is a *circulatory* system.
b. It carries a fluid called *lymph.*
c. Lymph *resembles* blood plasma.
d. *Lacteals* are lymphatics originating from the villi of the intestines.
e. During meals lacteals are full of a milky white emulsion, the *chyle,* consisting of small fatty molecules from the breakdown of fatty foods.
f. The lymphatic vessels *drain* chyle into the blood system.

g. In most of the larger lymph vessels there are structures called *lymph nodes.*
h. Lympth nodes vary in size.
i. Lymph nodes consist of *lymphocytes* and *phagocytes.*
j. Lymphocytes are *white blood cells.*
k. Phagocytes *absorb* microbes.
l. Lymph nodes are *effective filters.*

9.1c Fill in the blanks in the following sentences with one of these words:

porous	remove	lower
the spleen	arteries	intestinal wall
valves	tonsils	colourless
lymph	capillaries	system

1. Lymph resembles blood plasma but its protein content is - - - - - - - -
2. Lymphatic capillaries are not connected to a system of - - - - - - - -
3. They are much more - - - - - - - - than ordinary capillaries.
4. The lymph nodes - - - - - - - - bacteria from the blood stream.
5. The lymph nodes and the lymphoid tissues of - - - - - - - - - - - - - - - - - -, the - - - - - - - - - - - - - - - - and - - - - - - - - produce lymphocytes.
6. Alike blood plasma, lymph is - - - - - - - -
7. Lymph vessels have - - - - - - - - which open and direct the flow of - - - - - - - - away from the - - - - - - - -
8. The lymphatic system is connected with the blood - - - - - - - -

Vocabulary

lymphatics / lɪm'fætɪks / λεμφικά ἀγγεῖα
lymphatic / lɪm'fætɪk / λεμφικός
lymph / lɪmf / λέμφος
resemble / rɪ'zembl / μοιάζω
lacteal / 'læktɪəl / γαλακτοφόρος
originate / ə'rɪdʒɪneɪt / προέρχομαι
villus / 'vɪləs / λάχνη (τοῦ λεπτοῦ ἐντέρου)
milky / 'mɪlkɪ / γαλακτώδης
emulsion / ɪ'mʌlʃn / γαλάκτωμα
chyle / kɪl / χωλός, λέμφος (στά ἔντερα)
fatty / 'fætɪ / λιπαρός
drain / dreɪn / ἀδειάζω
node / nəʊd / κόμβος, ἐξόγκωμα
lymphocyte / 'lɪmfosɪt / λεμφοκύτταρο
phagocyte / 'fəgosɪt / φαγοκύτταρο
porous / 'pɔrəs / πορώδης
remove / rɪ'muv / ἀφαιρῶ
bacterium / bæk'tɪərɪəm / βακτηρίδιο
spleen / splin / σπλήνα
alike / ə'laɪk / ἀντίθετα ἀπό
colourless / 'kʌləlɪs / ἄχρωμος
valve / vælv / βαλβίδα

EXERCISES

I. Answer the following questions using one complete sentence for each answer:

1. Which is the difference between blood plasma and lymph in contents?
2. Which is the difference between blood plasma and lymph in colour?
3. Which are the differences between lymphatic capillaries and blood capillaries?
4. What do the lymph nodes do?
5. What do the valves in the lymph vessels do?

II. Match a word or phrase from column A with a word or phrase from column B to form TRUE and CORRECT sentences:

A	B
1. The lymphatic system is a - - - - - - - -	a. parts of lymph nodes.
2. Lymph resembles - - - - - - - -	b. effective filters.
3. During meals lacteals are - - - - - - - -	c. chyle into blood.
	d. absord microbes.
4. Lacteals are - - - - - - - -	e. full of chyle.
5. The lymphatic vessels drain - - - - - - - -	f. white blood cells.
	g. circulatory system.
6. Lymph nodes - - - - - - - -	h. blood plasma.
7. Lymphocytes and phagocytes are - - - - - - - -	i. empty.
	j. vary in size.
8. Lymphocytes are - - - - - - - -	k. lymphatics.
9. Phagocytes are - - - - - - - -	l. vary in shape.
10. Lymph nodes are - - - - - - - -	

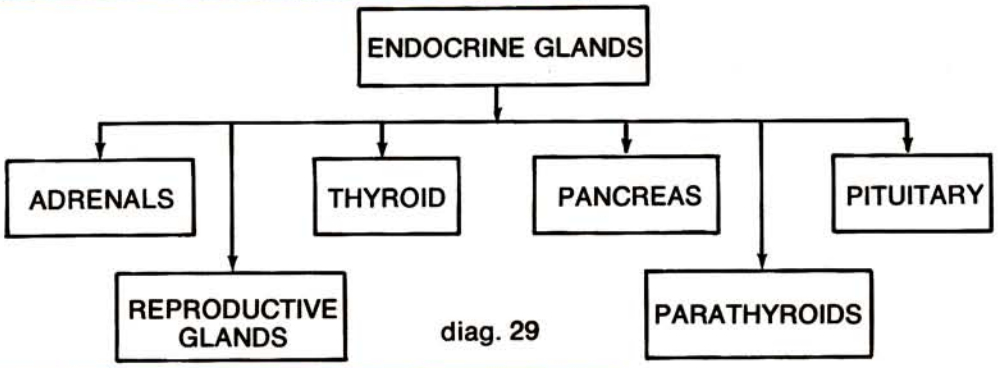
III. Say whether the following statements are TRUE or FALSE according to the context:

— 1. Lacteals originate from intestines.
— 2. Lacteals are always full of milky emulsion.
— 3. The blood system drains chyle into the lymphatics.
— 4. We find lymph nodes in all vessels.
— 5. Nodes vary in size.
— 6. Lymphocytes are white blood cells.
— 7. Plasma is colourless.
— 8. Lymph vessels have valves.

UNIT M. 10

THE ENDOCRINE SYSTEM

10.1a Look at the following diagram:



diag. 29

10.1b Study the following statements:

a. *The blood stream* carries the secretion of glands to all parts of the body.
b. We call *hormones* the substances produced by endocrine glands.
c. Hormones *affect* the action and development of the various parts of the body.
d. *Adrenals* are two small ductless glands at the top of each kidney producing very important hormones.
e. *The reproductive glands* consist of the *ovaries* for the human female and the *testes* for the human male. Ovaries are in either side of pelvis and testes in scrotum.
f. Apart from producing *ova,* the ovaries are essential for the production of *hormones* necessary to reproduction.
g. Analogous to those are the testes in the males, which produce *spermatozoa.*
h. *The thyroid gland* lies beneath the muscles of the neck and partially encloses the larynx and the upper part of the trachea.
i. The secretion of the thyroid is quite important for *the growth and metabolism* in all persons.
j. Deficient secretion leads to *hypothyroidism* whereas excessive production leads to *hyperthyroidism.*
k. *Iodine* is an essential element of the thyroid hormone.
l. *Pancreas* resembles a bunch of grapes in shape. It lies behind the stomach with the larger end in the curve of the duodenum.
m. Pancreas has two secretions: The *pancreatic juice* flows into the duodenum through the pancreatic duct and has to do with digestion. It contains enzymes. The other secretion is *insulin* and has to do with carbohydrate metabolism.
n. *Parathyroids* are four small bodies. Two of them lie behind the thyroid gland on either side of the neck.
o. There is *no functional relationship* between thyroid and parathyroid glands.
p. The parathyroid glands manufacture a hormone *controlling* the amount of *calcium* in the body.
q. *The pituitary gland* is at the base of the brain. It consists of two main lobes, the anterior and the posterior.

r. It is *the master gland* of the endocrine system.
s. It secretes *hormones regulating* the thyroid, gonads, adrenal cortex and other glands.
t. Adrenal secretions present a variety of *vital functions.*

10.1c With reference to the preceding paragraphs complete the following table:

Glands	Location	Secretion	Function
Adrenals			
Ovaries			
Testes			
Thyroid			
Pancreas			
Parathyroids			
Pituitary			

Table 11

Vocabulary

adrenal / ə'drinl / ἐπινεφρίδιος
reproductive / 'riprə'dʌktɪv / ἀναπαραγωγικός
thyroid / 'θaɪrɔɪd / θυρεοειδής
parathyroid / 'pærə'θaɪrɔɪd / παραθυρεοειδής
pituitary / pɪ'tjuɪtərɪ / βλεννογόνος
gland / glænd / ἀδένας
ductless / 'dʌktlɪs / ἐνδοκρινής
ovary / 'əuvərɪ / ὠοθήκη
testis (πληθ. testes) / 'testɪs / ὄρχις
pelvis / 'pelvɪs / λεκάνη
scrotum / 'skrəutəm / ὄσχεον
ovum / (πληθ. ova) / 'əuvəm / ὠάριο
reproduction / 'riprə'dʌkʃn / ἀναπαραγωγή
analogous / ə'næləgəs / ἀνάλογος
spermatozoa / 'spɜmətə'zəuə / σπερματοζωάρια
beneath / bɪ'niθ / ἀπό κάτω
partially / 'paʃlɪ / μερικά
enclose / ɪn'kləuz / περικλείνω
growth / grəuθ / αὔξηση
metabolism / mɪ'tæbəlɪzm / μεταβολισμός
deficient / dɪ'fɪʃnt / ἀνεπαρκής
hypothyroidism / 'haɪpo'θaɪrɔɪdɪsm / ὑποθυρεοειδισμός
hyperthyroidism / 'haɪpə'θaɪrɔɪdɪsm / ὑπερθυρεοειδισμός
iodine / 'aɪədin / ἰώδιο
bunch / bʌntʃ / τσαμπί
grape / greɪp / σταφύλη
juice / dʒus / χυμός
insulin / 'ɪnsjulɪn / ἰνσουλίνη
control / kən'trəul / ἐλέγχω
master / 'mastə / βασικός
gonad / 'gonəd / γεννητικός ἀδένας
cortex / 'kɔteks / φλοιός

10.2a **Identify the various glands in the following illustration:**

A is the - - - - - - - -
B is the - - - - - - - -
C are the - - - - - - - -
D are the - - - - - - - -
E is the - - - - - - - -
F are the - - - - - - - - in females.
G are the - - - - - - - - in males.

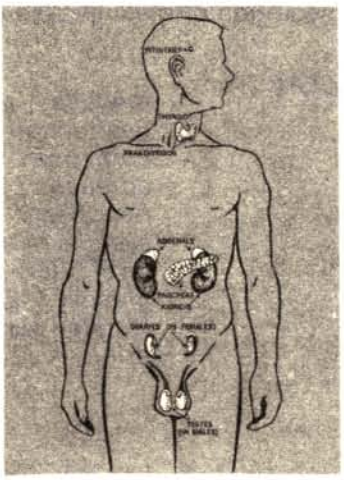


fig. 30

10.2b **Relate the following statements to the above.**

a. The anterior part of the - - - - - - - - secretes at least six active principles. The posterior part secretes two hormones.
b. The - - - - - - - - hormone affects the metabolism of all the tissues of the body.
c. The - - - - - - - - glands keep balance of the calcium content in the body.
d. The - - - - - - - - are rather small glands.
e. The - - - - - - - - secretes the hormone insulin and digestive ferments.

10.2c **Study the following drawing and the statements that follow it:**

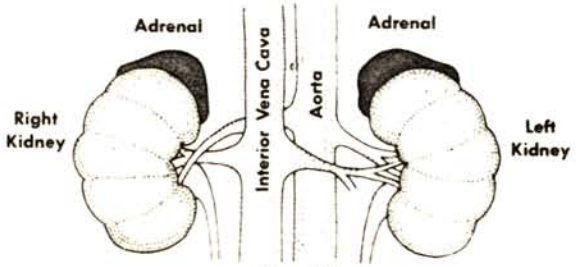


fig. 31

a. The adrenal gland consists of two parts: The outer part or *cortex* and the inner part or *medulla.*
b. The *cortex* is very important to life and its destruction is fatal.
c. The cortex secretes *hormones* essential in the *metabolism of carbohydrates and proteins.*
d. One of the most important of these hormones is *cortisone.*
e. The medulla is not so important.
f. It is under *nervous control.*

g. The medulla secretes two hormonal substances. *Adrenalin* is the one that increases the heartbeat, the systolic blood pressure and the levels of glucose and lactate in blood.
h. The secretion of medulla also seems to have a *protective function.*

Vocabulary

medulla / 'midulə / μυελώδης ουσία
destruction / dɪ'strʌkʃn / καταστροφή
cortizone / 'kɔtɪzəun / κορτιζόνη
adrenalin / ə'drinəlɪn / αδρεναλίνη
heartbeat / 'hɑt'bit / κτύπος καρδιάς
systolic / sɪs'tolɪk / συστολικός
level / 'levl / στάθμη, ποσοστό
glucose / 'glukəus / γλυκόζη
lactate / læk'teɪk / γάλα
principle / 'prɪnsəpl / στοιχείο

Exercises

I. Which is correct in the following a, b or c?

1. The blood stream carries the secretion of glands to - - - -
   a. the heart.
   b. the lungs.
   c. all parts of the body.
2. Adrenals are two glands - - - - - - - -
   a. at the top of kidneys.
   b. in pelvis.
   c. in scrotum.
3. Ovaries are located - - - - - - - -
   a. at the top of kidneys.
   b. in pelvis.
   c. in scrotum.
4. Testes are situated - - - - - - - -
   a. at the top of kidneys.
   b. in pelvis.
   c. in scrotum.
5. The ovaries produce - - - - - - - -
   a. only ova.
   b. ova and hormones.
   c. only hormones.
6. The thyroid gland lies - - - - - - - -
   a. beneath the muscles of the neck.
   b. behind the stomach.
   c. at the base of the brain.
7. Pancreas lies - - - - - - - -
   a. at the base of the brain.
   b. beneath the muscles of the neck.
   c. behind the stomach.
8. The pituitary gland lies - - - - - - - -
   a. behind the stomach. b. at the base of the brain.
   c. beneath the muscles of the neck.

9. Iodine is an essential element of the - - - - - - - -
   a. pancreatic juice.
   b. pituitary gland.
   c. thyroid hormone.
10. The pancreatic juice has to do with - - - - - - - -
   a. metabolism.
   b. digestion.
   c. reproduction.

II. Match a word or phrase from column A with a word or phrase from column B to form true and correct sentences:

A	B
1. Endocrine glands produce	a. adrenalin.
2. The cortex secretes	b. hyperthyroidism.
3. Ovaries produce	c. spermatozoa.
4. Deficient secretion leads to	d. medulla.
5. The outer part of the adrenal gland is the	e. stomach.
6. The pancreatic juice flows into the	f. hormones.
7. The medulla secretes	g. blood.
8. Excessive secretion leads to	h. hypothyroidism.
9. The inner part of the adrenal gland is the	i. ova.
10. Testes produce	j. cortex.
	k. cortisone.
	l. duodenum.

UNIT M. 11

THE NERVOUS SYSTEM

11.1a **Look at the following illustration and identify the various parts of the nervous system:**

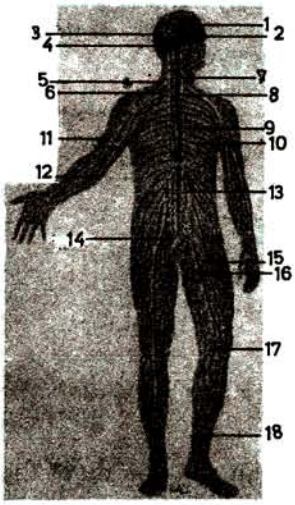


fig. 32

1. FRONTAL LOBE
2. TEMPORAL LOBE
3. OCCIPITAL LOBE
4. CEREBELLUM
5. CERVICAL PLEXUS
6. BRACHIAL PLEXUS
7. SYMPATHETIC TRUNK
8. SPINAL CORD
9. VAGUS NERVE
10. ESOPHAGEAL PLEXUS
11. RADIAL NERVE
12. ULNAR NERVE
13. LUMBAR PLEXUS
14. SACRAL NERVES
15. FEMORAL NERVE
16. SCIATIC NERVE
17. TIBIAL NERVE
18. SURAL NERVE

a. Numbers one, two and three show three of the four parts of the hemispheres.
b. Number four is the - - - - - - - -
c. There are some networks, plexes, in the nervous system. They are: number five the - - - - - - - -, number six the - - - - - - - -, number ten the - - - - - - - -, and number thirteen the - - - - - - - -.
d. The sympathetic trunk is number - - - - - - - -.
e. Number eight is the - - - - - - - - and the vagus nerve is number - - - - - - - -.
f. The - - - - - - - - nerve has number eleven.
g. Number fourteen are the - - - - - - - - nerves.
h. The - - - - - - - - nerve is number twelve and the - - - - - - - - nerve is number fifteen.
i. The - - - - - - - - nerve, number sixteen, and the - - - - - - - - nerve, number eighteen are two other areas of the network.
j. Number seventeen is the - - - - - - - - nerve.

11.1b **Study the following statements:**

a. The nervous system is the *most complex* of the systems of the body.
b. The nervous system is *a communication network.* The nerve fibres carry *messages* in the form of *impulse* from various parts of the body to the central nervous system.
c. The nerve fibres *transmit* messages to muscles and glands.
d. The basic unit of the nervous system is *the nerve cell* or neuron.
e. The nerve cell consists of a *cell body,* with a nucleus, and a number of threadlike processes, the *dendrites* and *axons.*
f. The dendrites are short. The axon is long and very thin. Each cell has only one axon.
g. Nerve fibres transmitting impulses from various parts of the body to the brain or spinal cord are called *afferent fibres* or *sensory fibres.*
h. Nerve fibres transmitting impulses from the brain or spinal cord to the various parts of the body are called *efferent fibres* or *motor fibres.*
i. *The myelin sheath,* a white tissue, covers many of the nerve fibres within the spinal cord and brain.
j. There is a *fluid membrane* between the myelin sheath and the nerve fibre.
k. This membrane *conducts* the impulses, and the axon and cell *record* them.
l. Sometimes, the *stimulation* of a *receptor* organ causes an involuntary muscular contraction. We call this contraction *reflex.*
m. The complete path of the impulse is the *reflex arc.*

11.1c **Fill the blanks in the following passage using these words:**

afferent	receptor	neuron
impulse	central	nervous
axon	efferent	processes
system		

The reflex arc consists of three parts:
1. The - - - - - - - - limb consists of two parts. The - - - - - - - - organ that creates the impulse and the - - - - - - - - which carries the - - - - - - - - to the central - - - - - - - - system.
2. The reflex center in the - - - - - - - - nervous system is made up of the - - - - - - - - of the afferent neuron and its junction with its cell body.

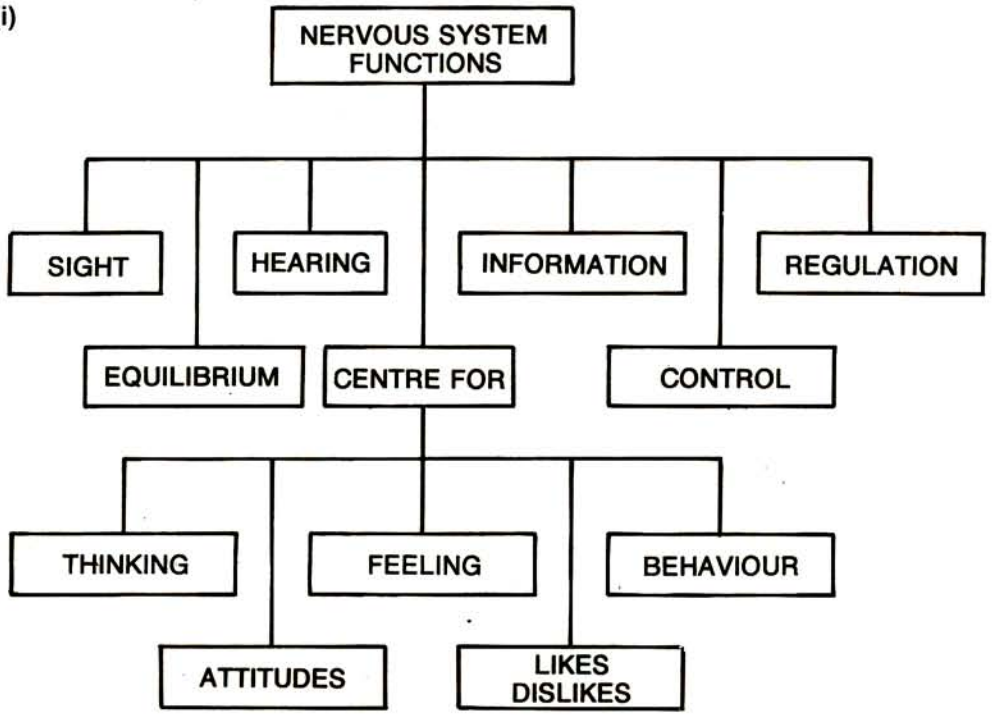
3. The - - - - - - - - limb consists of two parts as well. The efferent neuron and its - - - - - - - - These processes carry impulses from the central nervous - - - - - - - - to a muscle or gland.

Vocabulary

frontal / frʌntl / μετωπιαῖος
lobe / ləʊb / λοβός
temporal / tempərl / κροταφιαῖος
occipital / ok'sipɪtl / ἰνιακός
cerebellum / 'serɪbeləm / παρεγκεφαλίδα
cervical / sɜ'vaɪkl / αὐχενικός, τραχηλικός
plexus / 'pleksəs / πλέγμα
brachial / 'brakɪəl / βραγχιονώδης
sympathetic / 'sɪmpə'θetɪk / συμπαθητικόν
trunk / trʌnk / κορμός
vagus / 'veɪgəs / πνευμονογαστρικό νεῦρο
nerve / nɜv / νεῦρο
radial / 'reɪdɪəl / κερκιδικός
ulnar / 'ʌlnə / ὠλενικός
lumbar / 'ʌmbə / ὀσφυϊκός
sacral / 'sækrəl / ἱερός
femoral / 'femərə / μηριαῖος
sciatic / saɪ'ætɪk / ἰσχιακός
tibial / 'tɪbɪəl / κνημιαῖος
sural / 'sjʊərəl / γαστροκνήμιος
nervous / 'nɜvəs / νευρικός
system / 'sɪstəm / σύστημα
complex / 'kompleks / σύνθετος
communication / kə'mjunɪ'keɪʃn / ἐπικοινωνία
network / 'netwɜk / δίκτυο
fibre / 'faɪbə / ἴνα
carry / 'kærɪ / μεταφέρω
message / 'mesɪdʒ / μήνυμα
impulse / 'ɪmpʌls / ἐρέθισμα, διέγερση
transmit / trænz'mɪt / μεταδίδω
neuron / 'njʊərən / νευρικό κύτταρο
dendrite / 'dendraɪt / δενδρίτης
axon / 'æksən / ἀξονική ἀποφυάδα νεύρου
afferent / 'aferənt / προσαγωγός
sensory / 'sensərɪ / αἰσθητήριος
efferent / 'ɜferənt / ἀπαγωγός
motor / 'məʊtə / κινητικό νεῦρο
myelin / 'maɪəlɪn / μυελίνη
sheath / ʃiθ / περίβλημα
conduct / kən'dʌkt / ὁδηγῶ
record / rɪ'kɔd / καταγράφω
stimulation / 'stɪmjʊleɪʃn / διέγερση, ἐρέθισμα
receptor / rɪ'septə / ὑποδοχέας
involuntary / ɪn'voləntrɪ / ἀκούσιος
contraction / kən'trækʃn / συστολή
reflex / 'rifleks / ἀντανακλαστικός
are / ak / τόξο

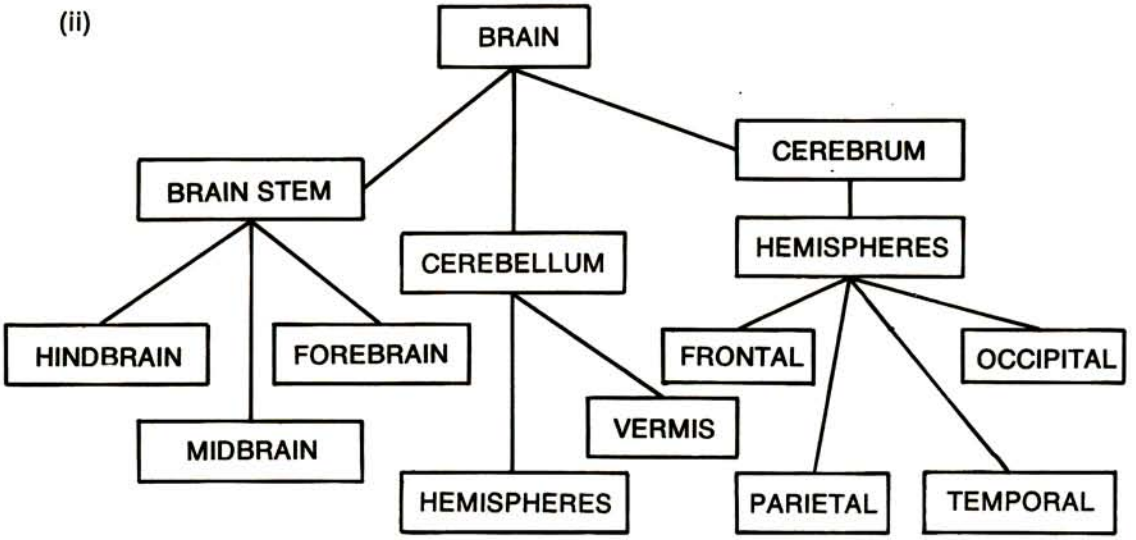
11.2a **Study the following diagrams:**

(i)



diag. 30

(ii)



diag. 31

11.2b **Relate the following statements to the preceding diagrams:**

a. It is the nervous system that keeps us in *contact* with our environment.
b. The *sight organs* enable us see everything around us.
c. The *hearing organs* allow us to distinguish certain sounds.
d. Special *responses* tell us that we are tired or hungry or thirsty; that we are hot, warm or cold.
e. The nervous system *regulates* and *coordinates* the functions of the other systems in our body and keeps us in *equilibrium* constantly.
f. It *controls* the muscles of our limbs so that we can perform various movements.
g. It is the *governing centre* for our thinking, feeling, behaviour, attitudes and expressions of likes and dislikes.

11.2c **Fill the blanks in the following passage:**

The brain consists of - - - - - - - - parts: The - - - - - - - - stem, the - - - - - - - - and a number of structures, the cerebral - - - - - - - - or cerebrum. The brain stem, in turn, consists of three parts: the - - - - - - - - (next to the spinal cord) the - - - - - - - - and the - - - - - - - -. The cerebrum consists of two hemispheres. Each hemisphere consists of four lobes: the - - - - - - - -, the - - - - - - - -, the - - - - - - - - and the occipital. The cerebellum is in the rear part of the skull cavity. The central part is the - - - - - - - - and there are two large sections on either side of it, the cerebellar - - - - - - - - .

Vocabulary

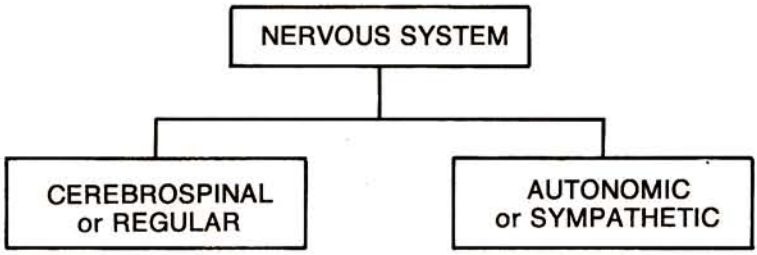
sight / saɪt / ὅραση
hearing / 'hɪərɪŋ / ἀκοή
information / 'ɪnfə'meɪʃn / ἐνημέρωση, πληροφόρηση
regulation / 'regjʊ'leɪʃn / ρύθμιση
equilibrium / 'ikwɪ'lɪbrɪəm / ἰσορροπία
control / kən'trəʊl / ἐλέγχω
thinking / 'θɪŋkɪŋ / σκέψη
feeling / 'filɪŋ / ἀφή, αἴσθηση
behaviour / bɪ'heɪvɪə / ἀντιδράσεις
attitude / 'ætɪtjud / συμπεριφορά, διάθεση
like / laɪk / προτίμηση
deslike / dɪs'laɪk / ἀντιπάθεια
stem / 'stem / στέλεχος
hindbrain / 'haɪnd'breɪn / ὀπίσθιος ἐγκέφαλος
midbrain / 'mɪd'breɪn / μεσαῖος ἐγκέφαλος
forebrain / 'fɔ'breɪn / πρόσθιος ἐγκέφαλος
vermis / 'vɜmɪs / σκωληκοειδής
cerebrum / 'serəbrəm / ἐγκέφαλος

contact / 'kontækt / ἐπαφή
response / rɪ'spons / ἀπόκριση
tired / 'taɪəd / κουρασμένος
hyngry / 'hʌngrɪ / πεινασμένος
thirsty / 'θɜstɪ / διψασμένος

regulate / 'regjʊleɪt / ρυθμίζω
coordinate / 'kəʊ'ɔdəneɪt / συντονίζω
equilibrium / 'ikwɪ'lɪbrɪəm / ἰσορροπία
control / kən'trəʊl / ἐλέγχω
governing / 'gʌvnɪŋ / ρυθμιστικός

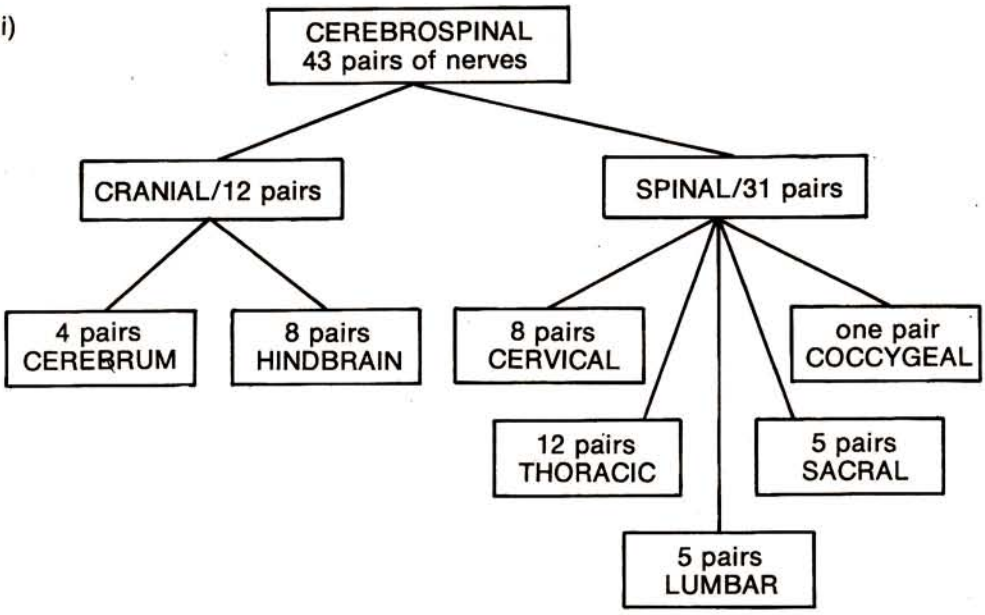
11.3a **Look at the following diagrams:**

(i)



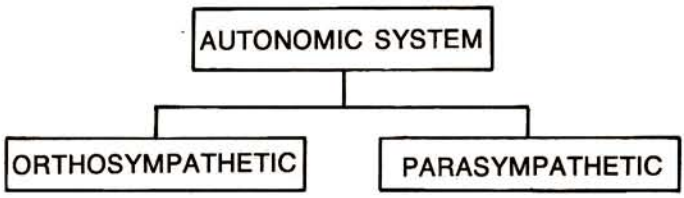
diag. 32

(ii)



diag. 33

(iii)



11.3b **Study these statements:**

a. The cerebrospinal nerves *extend* to the muscles, skin, joints and sense organs.
b. They *lead* from the brain and spinal column to other parts of the body.
c. The cranial nerves *supply* the areas about the head, face and upper part of the neck.
d. The first four cervical nerves *make up* the cervical plexus. It *innervates* the skin of the head and neck and muscles of the tongue, neck and shoulder.
e. The first thoracic nerves and the last four cervical nerves *form* the brachial plexus. It *supplies* nerves to the chest, shoulder and arm.
f. Divisions of the lumbar, sacral and coccygeal nerves *make up* the lumbosacral plexus. It supplies the lower body and the legs.
9. The autonomic system *acts* upon smooth muscles and glands. It *services* the alimentary canal, lungs, heart, glands and urinary bladder.
h. In both divisions of the autonomic system ganglia *serve* as connecting links.

11.3c **Complete the following illustration (fig. 33) and table 12 with the appropriate terms:**

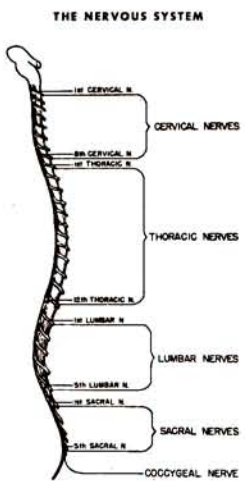


fig. 33

Pairs of nerves	
Names	Function
Olfactory	
Optic	
Oculomotor	
Trochlear	
Trigeminal	
Abducents	
Facial	
Auditory	
Glossopharyngeal	
Vagus	
Spinal accessory	
Hypoglossal	

Table 12

Reference Organ or area	function	nerve pair
nose	smell	olfactory
eye	sight	optic
	movement	oculomotor
		trochlear
		abducens
jaws	movement	trigeminal
face	sensation	trigeminal
	muscles	facial
tongue		
front	taste	facial
back	taste	glossopharyngeal
whole	movements	hypoglossal
ear	hearing	auditory
throat	sensation	glossopharyngeal
	movement	glossopharyngeal
neck	movement	spinal accessory
shoulder	movement	spinal accessory
heart	motor to it	vagus
larynx	motor to it	vagus
esophagus	motor to it	vagus
stomach	motor to it	vagus
intestines	motor to it	vagus

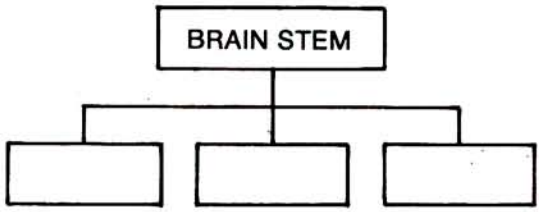
Vocabulary

cerebrospinal / ˈserəbroˈspaɪnl / ἐγκεφαλόνωτιαῖος
regular / ˈregjʊlə / κανονικός, τακτικός
autonomic / əʊtoˈnəmɪk / αὐτόνομος
sympathetic / ˈsɪmpəˈθetɪk / συμπαθητικός
orthosympathetic / ˈɔθəˈsɪmpəˈθetɪk / ὀρθοσυμπαθητικός
parasympathetic / ˈpærəˈsɪmpəˈθetɪk / παρασυμπαθητικός
extend / ɪkˈstend / ἐκτείνω
lead / lid / ὁδηγῶ
supply / səˈplaɪ / τροφοδοτῶ
innervate / ˈɪnəveɪt / ἐφοδιάζω (μέ νεῦρα)
lumbosacral / ˈlʌmbəˈseɪkrəl / ὀσφυοϊερός
service / ˈsɜvɪs / ἐξυπηρετῶ
alimentary / ˈælɪˈmentrɪ / θρεπτικός
alimentary canal / πεπτικός σωλήνας
ganglia / ˈgʌŋgliə / γάγγλια
olfactory / olˈfæktərɪ / ὀσφρητικός
optic / ˈoptɪk / ὀπτικός
oculomotor / ˈokjʊləˈməʊtə / ὀφθαλμοκινητικό (νεῦρο)
trochlear / ˈtroklɪə / τροχιλιακός
trigeminal / trɑɪˈdʒemɪnl / τρίδυμο (νεῦρο)
facial / feɪʃl / προσωπικός
auditory / ˈɔdɪtrɪ / ἀκουστικός

EXERCISES

I. Identify the various parts in the following illustration and fill the boxes in the diagrams:

(i)



(ii)

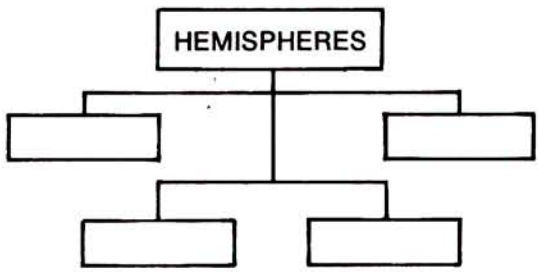


fig. 34

II Match a word or phrase from column A with a word or phrase from column B to form true and correct sentences:

A	B
1. The nervous system is a - - - - - - -	a. the brain.
2. The nerve fibres transmit - - - - - -	b. see something.
3. The dendrites are - - - - - - - -	c. 4 pairs of nerves.
4. The axon is - - - - - - - -	d. 12 pairs of nerves.
5. Afferent fibres transmit impulses to - - - - - - - -	e. stimulations.
	f. long.
6. Efferent fibres transmit impulses to - - - - - - - -	g. 8 pairs of nerves.
	h. 5 pairs of nerves.
7. The sight organs enable us - - - -	i. communication network.
8. The hearing organs enable us - -	j. one pair of nerves.
9. The cerebrum consists of - - - - - -	k. taste something.
10. The cervical consists of - - - - - - -	l. hear sounds.
11. The thoracic consists of - - - - - - -	m. the parts of the body.
12. The lumbar consists of - - - - - - -	n. short.
13. The coccygeal consists of - - - - -	o. messages.

III. Which is correct in the following a, b or c?

1. The nerve cell consists of - - - - - - - -
   a. a cell body.
   b. dendrites and axons.
   c: both "a" and "b"

2. Sensory fibres transmit impulses from the - - - - - - - -
   a. brain to the parts of the body.
   b. parts of the body to the brain.
   c. both "a" and "b"
3. The brain consists of - - - - - - - - parts.
   a. two
   b. three
   c. four
4. Each hemisphere consists of - - - - - - - - parts.
   a. two
   b. three
   c. four
5. The cerebrospinal system is made up of - - - - - - - -
   a. the cranial system.
   b. the cerebrum.
   c. the cranial and spinal systems.
6. There are - - - - - - - - pairs of nerves in the sacral.
   a. five
   b. four
   c. eight
7. The cerebrum consists of - - - - - - - - pairs of nerves.
   a. five
   b. four
   c. eight
8. The hindbrain consists of - - - - - - - - pairs of nerves.
   a. five
   b. four
   c. eight
9. The cervical consists of - - - - - - - - pairs of nerves.
   a. five
   b. four
   c. eight
10. The olfactory pair refers to the - - -
    a. taste.
    b. smell.
    c. sight.
11. The glossopharyngeal refers to the - - -
    a. taste.
    b. smell.
    c. sight.
12. The hypoglossal refers to movements of the - - - - - - - -
    a. front tongue.
    b. whole tongue.
    c. back tongue.
13. The oculomotor pair refers to movement of the - - - - - - - -
    a. eyes.
    b. ears.
    c. nose.
14. The trochlear pair refers to movement of the - - - - - - - -
    a. eyes.
    b. ears.
    c. nose.
15. Auditory refers to - - - - - - - -
    a. sight organs.
    b. taste organs.
    c. hearing organs.
16. The optic nerves refer to - - - - - - - -
    a. sight.
    b. movement of eyes.
    c. both "a" and "b"

MICROBIOLOGY

12.1a The opposite picture shows a microbiologist working with his microscope. Microbiology is the study of microorganisms and the application of the relative knowledge to the fields of medicine, agriculture, food industry, sanitation, antibiotic manufacture, space travel and other industries.

There are six major groups of microorganisms:

i. protozoa
ii. algae
iii. fungi
iv. bacteria
v. viruses
vi. cells of multicellular plants and animals.

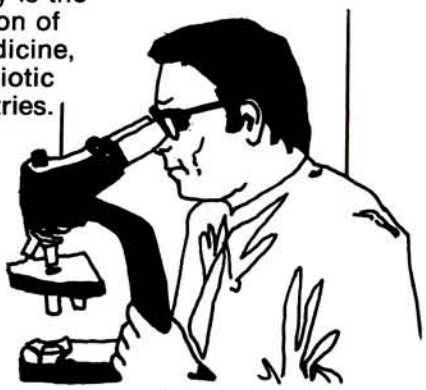


fig. 35

We classify algae and fungi as plants and we consider protozoa to be animals. All the algae and some of the bacteria obtain their energy from sunlight. The fungi and most of the protozoa and bacteria derive energy from chemical reactions, as for example respiration and fermentation.

12.1b **Study the following diagram:**

Biological research requirements and procedure

collections of living organisms	i.e.	culture
grown on special preparations	i.e.	medium
sterilization	in	autoclave
living organisms destroyed	by	steam under pressure
preparation solidified	in	test tube or flat plate
microorganisms diluted	in	sterile fluid
microorganisms spread	to	medium
preparation placed	in	chamber
small spots developed	on	preparation
colonies of millions of microorganisms	for	study or research.

12.1c Fill the blanks in the following passage.

To make a biological - - - - - - - - we need a collection of - - - - - - - - organisms This - - - - - - - - grows on special preparations called the - - - - - - - -. Sterilization is the following step and is quite important. It takes place in an - - - - - - - - - where living organisms are - - - - - - - - by - - - - - - - - under pressure. When we take the medium out of the - - - - - - - - we - - - - - - - - it in a test - - - - - - - - or - - - - - - - - plate. Then the - - - - - - - - we want to study are - - - - - - - - in a - - - - - - - - fluid and then - - - - - - - - to the medium. The preparation is placed in a - - - - - - - - and small - - - - - - - - begin to develop on the preparation. These spots are colonies of millions of the - - - - - - - - we want to study.

Vocabulary

microbiologist / 'maɪkrəubaɪ'ɔlədʒɪst / μικροβιολόγος
microscope / 'maɪkrəskəup / μικροσκόπιο
microbiology / 'maɪkrəubaɪ'ɔlədʒɪ / μικροβιολογία
microorganism / 'maɪkrəu'ɔgənɪzm / μικροοργανισμός
autoclave / 'ɔtəuklеɪv / κλίβανος άποστειρώσεως

application / 'æplɪ'keɪʃn / έφαρμογή
sanitation / 'sænɪ'teɪʃn / ύγιεινή
antibiotic / 'æntɪbaɪ'ɔtɪk / άντιβιοτικό
algae / 'ældʒi / άλγαι, φύκη
fungi / 'fʌŋgaɪ / μύκητες
virus / 'vaɪərəs / ίός
derive / dɪ'raɪv / άντλῶ
respiration / 'respə'reɪʃn / άναπνοή
fermentation / 'fɜmen'teɪʃn / ζύμωση
reasearch / rɪ'sɜtʃ / ἔρευνα
requirement / rɪ'kwaɪəmənt / άπαίτηση
procedure / prə'sidʒə / πορεία
culture / 'kʌltʃə / καλλιέργεια

preparation / 'prepə'reɪʃn / παρασκεύασμα
medium / 'midɪəm / μέσον, φορέας
sterilization / 'sterɪlaɪzeɪʃn / άποστείρωση
destroy / dɪ'strɔɪ / καταστρέφω
solidify / sə'lɪdɪfaɪ / στερεοποιῶ
dilute / daɪ'ljut / διαλύω
sterile / 'steraɪl / άποστειρωμένος
fluid / 'fluɪd /ύγρό
spread / spred / άπλώνω
chamber / 'tʃeɪmbə / θάλαμος
spot / spot / στίγμα, κηλίδα
colony / 'kolənɪ / άποικία

EXERCISES

I. Answer the following questions using one complete sentence for your answer:

1. What is microbiology?
2. What is the basic instrument of a microbiologist?
3. How many major groups of microorganisms are there?
4. Where do algae obtain their energy from?
5. Where do protozoa obtain their energy from?
6. What is culture?
7. What is an autoclave used for?
8. What happens to living organisms placed in an autoclave?

II. In column "A" there are some steps in the procedure of biological research and in column "B" the relative instruments or media. Match a number from column "A" with the corresponding letter from column "B" to make sense.

A	B
1. Sterilization	a. chamber
2. Destruction of living organisms	b. sterile fluid
3. Solidification of preparation	c. autoclave
4. Dilution of microorganisms	d. test tube
	e. steam

FINAL TEST

I. Answer the following questions using one complete sentence for each answer:

1. What is a cell?
2. What does biology deal with?
3. What is the function of the cytoplasm?
4. What is mitosis?
5. How many phases are there in mitosis?
6. What is the epithelium?
7. What is the function of the skeletal muscle?
8. How many bones are there in the body?
9. What is digestion?
10. Where are the products of the pancreas emptied?
11. Which are the three parts of the male urethra?
12. Which are the two most important bladders?
13. What is leukemia?
14. What is the cause of polycythemia?
15. What is antigen?
16. What is a basic requirement in blood transfusion?
17. What is the function of the lymphatic system?
18. What are hormones?
19. Where are ovaries located?
20. What do ovaries produce?

II. Fill in the blanks in the following sentences with one of the words:

isolated	chromosomes	axial
transmit	enzymes	move
bean	straight	bile
transfusion	breathing	tightenings
mitosis	curved	bladder
tissues	lumbar	storage
red	systemic	white
ventricles	distributor	reduction
lymph	ductless	reproductive
thyroid	pancreas	functional

1. The basic characteristic of - - - - - - - - is that the number of - - - - - - - - is the same in the parent and daughter cells.
2. The different systems of the body are not - - - - - - - - from one another.
3. The - - - - - - - - bones protect the cavities of the body.
4. The axial bones - - - - - - - - weight.
5. The ribs are very important in the - - - - - - - - process.
6. Some muscles - - - - - - - - our mouth.
7. The skeletal - - - - - - - - are striped.
8. Cramps are painful - - - - - - - - of the muscles.
9. Lumbago is a muscular pain in the - - - - - - - - region.
10. The - - - - - - - - and the - - - - - - - - salts accelerate the breakdown of proteins.

11. The kidneys are - - - - - - - - shaped.
12. The - - - - - - - - stores the urine.
13. The male urethra is - - - - - - - -.
14. The female urethra is - - - - - - - -.
15. The information about blood groups is very important in - - - - - - - -.
16. Blood acts as a heat - - - - - - - - and - - - - - - - -.
17. The - - - - - - - - blood cells destroy disease producing organisms.
18. It is the - - - - - - - - circulation that transports blood from the heart to every part of the body.
19. The - - - - - - - - pump blood into the arteries.
20. Anemia is generally the - - - - - - - - of the number of red blood cells.
21. Lymphocytes and phagocytes make up the - - - - - - - - nodes.
22. The - - - - - - - - glands consist of the ovaries for the human female and the testes for the human male.
23. Adrenals are two small - - - - - - - - glands.
24. Iodine is an essential element of the - - - - - - - - hormone.
25. One of the - - - - - - - - secretions is insulin.
26. There is no - - - - - - - - relationship between thyroid and parathyroid glands.

III. Match a word or phrase from column "A" with a word or phrase from column "B" to form true and correct sentences:

A	B
1. In the centre of the cell	
2. Daughter cells have	
3. Around the cell	
4. The inner part of the cytoplasm is the	a. endoplasm.
5. Bases combine with acids to form	b. similar cells.
6. Nonliving things do not have	c. various cells.
7. Tissues are combined to form	d. ectoplasm.
8. Organs are grouped together to form	e. there is a membrane.
9. The outer part of the cytoplasm is the	f. systems.
10. Tissues consist of group of	g. there is a nucleus.
11. The bones are the body's	h. equal number of chromosomes with parent cells.
12. Red blood cells are manufactured in	i. organs.
13. Red blood cells store	j. there is a nucleolus.
14. The motion of the parts of the body	k. protoplasm.
15. The salivary glands secrete	l. salts and water.
16. The pulmory artery carries blood to the	m. in groups.
17. The trachea is	n. bile.
18. Muscles always act	o. heart.
19. The esophagus is a	p. food passage.
20. The pulmonary vein carries blood to	q. framework.
21. Laryngitis is an	r. varies.
22. The liver produces	s. mineral calcium.
23. The bronchial asthma is a	t. lungs.
24. The size of the bladder	u. chronic disease.
	v. the bones.
	w. an air passage.
	x. depends on muscles.
	y. saliva.
	z. inflammation of the larynx.

IV. Which is correct in the following a, b or c?

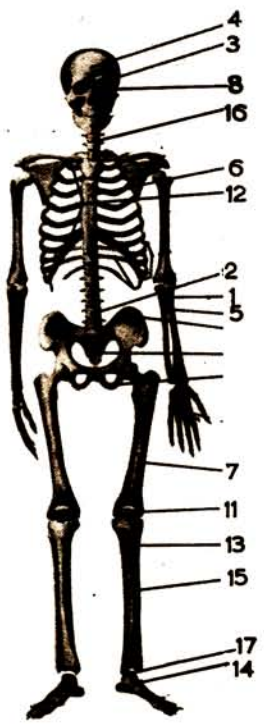
1. The nucleus of the cell transforms the food into - - - - - - - -
   a. nucleolus.
   b. energy.
   c. tissues.
2. The nervous tissue is the most important element in the - - - - - - - -
   a. brain.
   b. heart.
   c. windpipe.
3. The connective tissue is predominant in the - - - - - - - -
   a. brain.
   b. heart.
   c. windpipe.
4. All systems in the body are connected with the - - - - - - - -
   a. circulatory system.
   b. respiratory system.
   c. digestive system.
5. The kidneys are - - - - - - - - the peritoneal cavity.
   a. inside.
   b. into.
   c. outside.
6. Blood is composed of - - - - - - - -
   a. cells.
   b. plasm.
   c. both "a" and "b".
7. The septum - - - - - - - -
   a. divides the heart into two.
   b. does not divide the heart.
   c. divides the heart in three parts.
8. There are - - - - - - - - arterial branches from the top of the aortal arch.
   a. two.
   b. three.
   c. four.
9. Blood consists of - - - - - - - - phases.
   a. four.
   b. three.
   c. two.
10. Parathyroids are - - - - - - - - small bodies.
    a. four.
    b. three.
    c. two.
11. The - - - - - - - - gland is the master gland of the endocrine system.
    a. parathyroid.
    b. pituitary.
    c. thyroid.
12. The adrenal gland consists of - - - - - - - -
    a. cortex.
    b. medulla.
    c. both "a" and "b".
13. The - - - - - - - - system is the most complex system of the body.
    a. circulatory. b. nervous. c. respiratory.

V. Say whether the following sentences are TRUE or FALSE

— 1. The glands in the wall of the stomach secrete enzymes.
— 2. When we inhale we draw oxygen out.
— 3. The right lung consists of two lobes.
— 4. The male urethra is straight.
— 5. The female urethra is short.
— 6. Cystitis is an inflammation of the bladder.
— 7. The plasma contains 10% water.
— 8. The heart keeps the blood moving constantly.
— 9. The blood is very important in the respiration system.
—10. Blood does not provide protection against infection.
—11. All arteries take blood from the heart.
—12. Pulmonic circulation transports blood from the lungs to the heart.
—13. The auricles receive blood from the arteries.
—14. The capillaries connect only arteries between them.
—15. In leukopenia the number of white blood cells is too big.
—16. Antibodies are present in plasma.

V. Identify in the following illustrations the various numbered parts with the relative terms:

(i)



A Frontal bone
B occipital bones
C neck vertebrace
D parietal bone
E sternum
F thoracic vertebrae
G calcaneus
H radius
I ulna
J lumbar vertebral
K coccyx
L pubis
M femur
N patella
O tibia
P fibula
Q calcaneus
R tarsal bones

fig. 36

(ii)

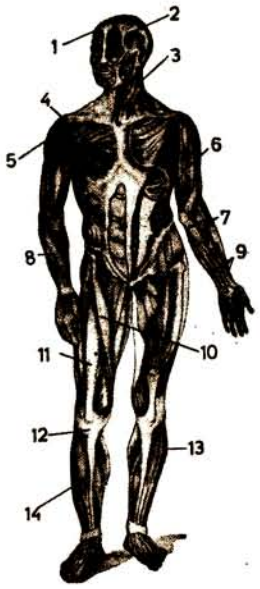


fig. 37

A trapezius
B muscles that turn the head
C muscle of the back
D three-headed muscle
E muscle of the buttocks
F two-headed femur muscle
G gastrocnemius
H soleus
I Achilles' tendon

(iii)

A oral cavity
B esophagus
C stomach
D liver
E gall bladder
F pancreas
G duodenum
H small intestine
I appendix
J caecum
K ascending colon
L transverse colon
M descending colon
N rectum

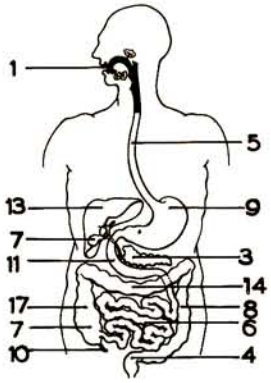


fig. 38

(iv)

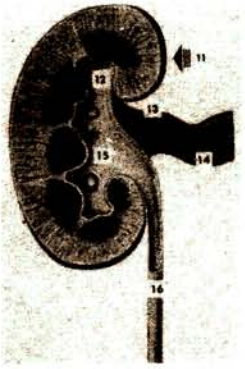
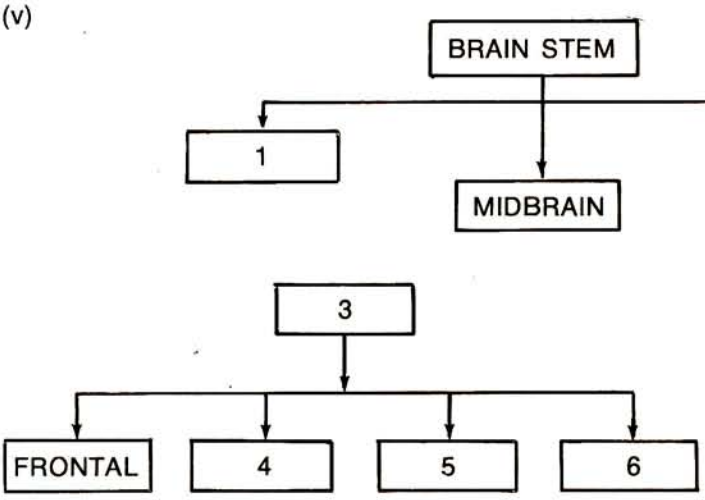


fig. 39

A pyramids
B renal artery
C renal vein
D renal pelvis
E ureter

(v)



A. hindbrain
B. forebrain
C. hemispheres
D. parietal
E. temporal
F. occipital