



BIOLOGY HSSC-I

SECTION – A (Marks 17)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ سیڈ پینل کا استعمال ممنوع ہے۔

Version No.				
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ROLL NUMBER						

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Answer Sheet No. _____

Invigilator Sign. _____

Fill the relevant bubble against each question according to curriculum:

Candidate Sign. _____

Question	A	B	C	D	A	B	C	D
1. When energy flows from one trophic level to the next, the amount of energy lost is about:	10%	50%	90%	100%	☐	☐	☐	☐
2. The part involved in detoxification of drugs is:	P	Q	R	S	☐	☐	☐	☐
3. The main function of progesterone in human female reproductive system is:	Ovulation	Follicle development	Endometrium development	Implantation of embryo	☐	☐	☐	☐
4. When RNA polymerase binds to promoter for transcription, the unit which detaches form it is:	α (Alpha)	β (Beta)	γ (Gamma)	θ (Theta)	☐	☐	☐	☐
5. Which one of the following sequence of reactions is correct regarding Calvin cycle?	3PGA $\rightarrow$ 1-3BPG $\rightarrow$ G3P	3PGA $\rightarrow$ G3P $\rightarrow$ RuP	G3P $\rightarrow$ RuBP $\rightarrow$ 3PGA	G3P $\rightarrow$ RuP $\rightarrow$ 3PGA	☐	☐	☐	☐
6. The stem cells which can differentiate into few cell types are:	Totipotent	Unipotent	Pluripotent	Oligopotent	☐	☐	☐	☐
7. The protein present in tendons and ligaments is:	Casein	Keratin	Elastin	Fibrinogen	☐	☐	☐	☐
8. The compound malonate is competitive inhibitor of:	Fumarate	Succinate	Succinic dehydrogenase	Histidine decarboxylase	☐	☐	☐	☐
9. The condition in which centromere of a chromosome is located slightly away from the center is termed as:	Acrocentric	Sub metacentric	Telocentric	Metacentric	☐	☐	☐	☐
10. Which fungus is poisonous?	Agaricus	Morchella	Aspergillus	Amanita	☐	☐	☐	☐
11. Hepatitis-D is caused by:	Bacteria	Virus	Prions	Viroids	☐	☐	☐	☐
12. Bark is produced by:	Cork cambium	Lateral meristem	Apical meristem	Intercalary meristem	☐	☐	☐	☐
13. The sex linked traits which are more common in males than female are:	Autosomal recessive	Y-linked dominant	X-linked dominant	X-linked recessive	☐	☐	☐	☐
14. The organism having Chlorophyll - a, Phycocyanin and Heterocyst may be a/an:	Bacterium	Cyanobacterium	Fungus	Alga	☐	☐	☐	☐
15. Which of the following structure is common to all chordate embryo?	Placenta	Notochord	Vertebral column	Lungs	☐	☐	☐	☐
16. Identify the trait which is NOT controlled by polygenes?	Intelligence	Height	Skin color	Tongue rolling	☐	☐	☐	☐
17. Which of the following is an example of homologous organs?	Wing of an insect & a bird	Forelimb of human & wing of a bat	Wing of an insect & a bat	Gills of fish & lungs of mammals	☐	☐	☐	☐

—1HA-I 25006 (B)—



BIOLOGY HSSC-I

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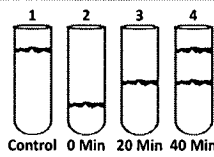
Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

SECTION – B (Marks 42)

Q. 2 Answers the following parts briefly.

(14 x 3 = 42)

(i)	How does Golgi complex play role in Cell secretion and Cell division?	03	OR	Compare the characteristics of Cofactors of enzymes with one example of each.	03																
(ii)	Write any three main features of Bryophytes.	03	OR	Enlist any three physical methods used to control bacteria with their mechanisms.	03																
(iii)	Justify the statement "Water is a universal solvent".	03	OR	Endospore formation is a mechanism in bacteria to survive under unfavorable conditions. Justify.	03																
(iv)	List the Accessory glands associated with male reproductive system with their respective locations.	03	OR	What is incomplete dominance? Explain with a suitable example.	1+2																
(v)	Why and how cyclic Photophosphorylation occurs in light reactions?	1+2	OR	Write steps of lytic cycle in bacteriophage.	03																
(vi)	What is mycorrhiza? Differentiate between its types.	1+2	OR	What is point mutation? How it causes sickle cell anaemia?	1+2																
(vii)	Compare apoplast and symplast pathways involved in uptake of water by roots in plants.	03	OR	Molecular biology provides evidence of evolution. Justify the statement with reference to any three examples.	03																
(viii)	Write about de-nitrification and assimilation processes in nitrogen cycle.	1.5 + 1.5	OR	Write about the structure and functions of ovary and oviduct in female reproductive system.	2+1																
(ix)	What is Y-linked inheritance? How these traits are transmitted? Also give two examples.	1x3	OR	Name and briefly explain Growth Phases of bacteria. (Any three)	03																
(x)	Complete the table with reference to enzymes: <table><tr><th></th><th>Enzyme</th><th>Mechanism of action</th><th>Example</th></tr><tr><td>a</td><td></td><td>Break large molecules with water</td><td></td></tr><tr><td>b</td><td>Lyases</td><td></td><td></td></tr><tr><td>c</td><td></td><td></td><td>Cytochrome oxidase</td></tr></table>		Enzyme	Mechanism of action	Example	a		Break large molecules with water		b	Lyases			c			Cytochrome oxidase	03	OR	Coat color in <i>Labrador retriever</i> shows epistasis. If a black(BbEe) and a chocolate (bbEe) <i>Labradors retrievers</i> are crossed: a. Show genotypes and phenotypes of offspring(s). b. Calculate the probability of black and yellow coat color.	2+1
	Enzyme	Mechanism of action	Example																		
a		Break large molecules with water																			
b	Lyases																				
c			Cytochrome oxidase																		
(xi)	Illustrate the conversion of pyruvic acid to acetyl CoA as link reaction between glycolysis and Krebs cycle.	03	OR	Interpret the results of Meselson and Stahl experiment when they grew bacteria in N_{15} and then in N_{14} medium for tube 2, 3 and 4. 	03																
(xii)	Write difference in flower, stem and seed of dicots and monocots.	03	OR	Name any three enzymes with their functions involved in DNA replication.	03																
(xiii)	Elaborate the endosymbiont theory regarding evolution of chloroplast and mitochondria.	03	OR	How is maltose different from sucrose in glycosidic linkage, monosaccharide units and specific role?	1x3																
(xiv)	What are the limitations of Lamarckism?	03	OR	Write characteristics of angiosperms with reference to vascular tissues and alternation of generation.	03																

SECTION – C (Marks 26)

Attempt the following questions.

Q.3	Explain the steps of life cycle of Human Immunodeficiency Virus (HIV). Also draw its life cycle.	5+2	OR	Explain different stages of xerarch succession on bare rock starting from lichens to flowering plants.	07
Q.4	Explain translation process starting from initiation complex till termination. Also draw diagram of initiation complex and elongation steps.	2+2 + 1+2	OR	How electrons move through electron transport chain till they reach final acceptor? Explain. Draw diagram of electron transport chain.	5+2
Q.5	Describe the pathways involved in moving signals from outside to inside the cell with their diagrams.	4+2	OR	Elaborate the structures and roles of steroids and prostaglandins as important group of lipids.	3+3
Q.6	Explain the mechanism of photoperiodism.	06	OR	Write three distinguishing characteristics and one example of each of the phylum Cnidaria Arthropoda and Mollusca.	2x3



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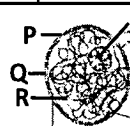
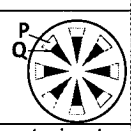
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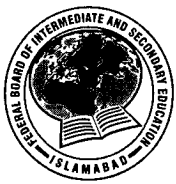
Answer Sheet No. _____

Invigilator Sign. _____

Fill the relevant bubble against each question according to curriculum:

Candidate Sign. _____

Question	A	B	C	D	A	B	C	D
1. In tRNA molecule, the main function of middle loop is to:	Recognize enzyme activity	Bind codon on mRNA	Recognize binding site on ribosome	Attach amino acid to CCA	☐	☐	☐	☐
2. Prostaglandins are derivatives of:	Amino acids	Steroids	Archidonic acid	Nucleic acids	☐	☐	☐	☐
3. What is correct for protein signaling? I Water soluble II Binds receptor on plasma membrane III Lipophilic IV Do not require cAMP	I & II	II & III	III & IV	I & IV	☐	☐	☐	☐
4. Which labelled part in nucleus is responsible for ribosome synthesis? 	P	Q	R	S	☐	☐	☐	☐
5. Which enzymes break specific covalent bonds without hydrolysis?	Oxidoreductases	Hydrolases	Transferases	Lyases	☐	☐	☐	☐
6. Viroids cause:	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	☐	☐	☐	☐
7. Type of flagella arrangement shown in bacteria is: 	Lophotrichous	Peritrichous	Amphitrichous	Monotrichous	☐	☐	☐	☐
8. Genetic material moves from donor to recipient bacterium in:	Binary fission	Conjugation	Transduction	Transformation	☐	☐	☐	☐
9. Mutualistic fungi which grows between root cells of plants and does not penetrate cells is:	Lichens	Endomycorrhiza	Ectomycorrhiza	Epiphytes	☐	☐	☐	☐
10. Growth movements shown by climbing plants with a supporting structure is:	Phototropism	Geotropism	Thigmotropism	Chemotropism	☐	☐	☐	☐
11. During unwinding of DNA double helix, the hydrogen bonds between base pairs are broken by enzyme:	Helicase	Primase	Polymerase	Gyrase	☐	☐	☐	☐
12. Radial symmetry and water vascular system are found in phylum:	Hemichordata	Echinodermata	Chordata	Vertebrata	☐	☐	☐	☐
13. Uterine lining in female starts breaking due to less concentration of:	Progesterone	Estrogen	Luteinizing hormone	FSH	☐	☐	☐	☐
14. A forest was completely destroyed by fire. After about hundred year, a new forest was evolved. The type of succession shown is:	Primary and xerarch	Secondary and xerarch	Primary and hydrarch	Secondary and hydrarch	☐	☐	☐	☐
15. Holandric traits show all of the following characteristics EXCEPT:	Sons of affected father are affected	Show Y-linked inheritance	Porcupine man is an example	Daughters of affected father are carriers	☐	☐	☐	☐
16. In TS of a dicot stem, which substances are expected to pass through labelled parts P and Q respectively? 	Water and sucrose	Sucrose and amino acids	Sucrose and water	Water and amino acids	☐	☐	☐	☐
17. The structures which help bacteria to survive under unfavorable conditions include:	Flagella and pili	Pili and akinetes	Endospores and plasmid	Flagella and heterocyst	☐	☐	☐	☐



BIOLOGY HSSC-I

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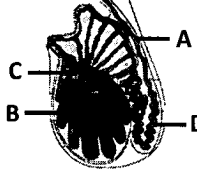
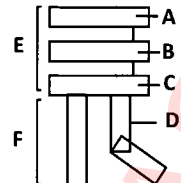
Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

SECTION – B (Marks 42)

Q. 2 Answers the following parts briefly.

(14 x 3 = 42)

(i)	The diagram shows the section through testis: a) Identify the parts A & B. b) Write functions of C & D. c) What is the function of inhibin hormone in males?		1x3	OR	Write the major points of theory of natural selection. (Any three)	03																
(ii)	Compare any three adaptations for osmotic adjustments in hydrophytes and mesophytes.		03	OR	Why post-transcriptional modifications occur in eukaryotic mRNA? Summarize the changes which occur during mRNA processing.	1+2																
(iii)	Write about the structure of prions. Enlist two diseases caused by them.		2+1	OR	Write any three distinguishing characteristics of vascular plants.	03																
(iv)	What are the homologous organs? Write an example. Which type of evolution is caused by them?		1x3	OR	Write any three chemical methods with their mechanisms used to control bacteria.	1x3																
(v)	Complete the table: <table><tr><th></th><th>Group</th><th>Character</th><th>Example</th></tr><tr><td>a)</td><td>Bryophytes</td><td></td><td></td></tr><tr><td>b)</td><td></td><td>Seedless plants</td><td></td></tr><tr><td>c)</td><td></td><td></td><td>Rose</td></tr></table>		Group	Character	Example	a)	Bryophytes			b)		Seedless plants		c)			Rose		03	OR	Name the type of pattern of sex determination in humans. Also write mechanism of sex determination in man.	1+2
	Group	Character	Example																			
a)	Bryophytes																					
b)		Seedless plants																				
c)			Rose																			
(vi)	Write the difference between leaf, seed and root of monocots and dicots.		03	OR	Write down any three roles of smooth endoplasmic reticulum in a cell.	03																
(vii)	Peroxisomes are more abundant in liver cells. Justify.		03	OR	Outline the process of non-cyclic photophosphorylation with the help of a labelled flow sheet.	03																
(viii)	The diagram shows molecule of Lecithin: a) Identify parts A, B, C & D. b) Mention the polarity of E & F.		2+1	OR	Following is the diagram of HIV: a) Identify the parts A, B & C. b) Write the functions of protein gp40, gp120 and enzyme integrase in HIV.	03																
(ix)	Differentiate between absorption spectrum of Chlorophyll- a, b and Carotenoids.		03	OR	How can a virus survive under unfavorable conditions outside the host?	03																
(x)	Justify that O ^{-ve} persons are universal donors and AB ^{+ve} are universal recipients of blood.		03	OR	How is photosynthesis in Cyanobacteria different from Bacteria? (any three differences)	03																
(xi)	How are Starch and Glycogen different from each other although both are polysaccharides?		03	OR	Why Lysosomes are also called suicidal bags?	03																
(xii)	Enlist any three fungal diseases in humans with one symptom each.		03	OR	Name the types of chromosomes on the basis of position of centromere mentioning its location in each type. (Any three)	03																
(xiii)	Write about the structure and function of each of the three layers of uterus.		03	OR	How evolution of Giraffe neck can be explained on the basis of Lamarckism?	03																
(xiv)	Write down the sources of mutagens with their examples. (Any three)		03	OR	Name any three main greenhouse gases and their sources of emission.	03																

SECTION – C (Marks 26)

Attempt the following questions.

Q.3	Explain Meselson–Stahl experiment and results to prove that DNA replication is semi conservative. Also draw the diagram.	3+2 +2	OR	Explain how the movement of protons across mitochondrial membrane is involved in ATP synthesis. Also draw diagram showing movement of electrons.	5+2
Q.4	Describe Nitrogen Fixation, Ammonification and Nitrification stages involved in Nitrogen cycle. Also draw labelled Nitrogen cycle flow sheet.	5+2	OR	Explain mechanism of enzyme action through 'induced fit' and 'lock and key' models.	4+3
Q.5	Epistasis is different from dominance. Explain with the example of coat color in <i>Labrador retriever</i> .	06	OR	Identify and explain the properties of water which enable it to: a) Act as temperature stabilizer b) Help organisms to live in warm environment c) Help organisms to live under ice	2x3
Q.6	Describe the components of theory explaining the ascent of sap in plants. Also draw the diagram.	4+2	OR	Write three distinguishing characteristics and one example of each of the phylum Porifera, Platyhelminthes and Annelida.	2x3



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(Old Curriculum 2006)
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Answer Sheet No. _____

ہر سوال کے سامنے دیے گئے، کریکولم کے مطابق درست دائرہ کو پر کریں۔
Invigilator Sign. _____

Fill the relevant bubble against each question according to curriculum: Candidate Sign. _____

	Question	A	B	C	D	A	B	C	D
1.	Pick the organelle which is NOT membrane bounded:	Mitochondria	Endoplasmic reticulum	Nucleolus	Lysosome	☐	☐	☐	☐
2.	Which one of the following defines polysomes?	Lysosomal aggregation on Golgi bodies	Multiple units of ribosomes assembled on ER	Attachment of many mRNA to ribosomes	Attachment of many ribosomes to a common mRNA	☐	☐	☐	☐
3.	Five corners ring in mono-saccharides is generally known as:	Furanose	Pyranose	Thiophenose	Aldose	☐	☐	☐	☐
4.	Vitamin-A is an example of:	Steroids	Terpenes	Neutfal lipid	Phospholipid	☐	☐	☐	☐
5.	What is an Apo enzyme?	It is the protein portion of an enzyme without cofactor	It is the non-protein part of an enzyme	It is a complete, biologically active enzyme	It is a prosthetic group attached to coenzyme	☐	☐	☐	☐
6.	Which one of these is NOT the product of light reaction?	Oxygen	NADPH	ATP	Glucose	☐	☐	☐	☐
7.	The TCA cycle starts with the condensation of oxaloacetate with:	Citrate	Acetyl group	Ethanol	Pyruvate	☐	☐	☐	☐
8.	Which two hepatitis are transmitted through oro-fecal route?	Hepatitis A & B	Hepatitis B & C	Hepatitis A & E	Hepatitis C & D	☐	☐	☐	☐
9.	Pick the correct statement about the mesosome of bacterial cell.	Invagination of cell membrane involved with cell division	Exospore which protect a bacterial cell from dessication	Outer layer of cell wall help bacteria in variability	Invagination of cell membrane involved with pathogenicity	☐	☐	☐	☐
10.	Ascomycota is characterized by:	Coenocytic hyphae	Lengthy dikaryotic phase	Conjugation of compatible hyphae	Motile zoospore for reproduction	☐	☐	☐	☐
11.	Dominant gametophyte and dependent sporophyte is found in:	Bryophytes	Pterido phytes	Gymnosperms	Angiosperms	☐	☐	☐	☐
12.	Both radial and bilateral symmetries are found in phylum:	Porifera	Cnidaria	Mollusca	Echinodermata	☐	☐	☐	☐
13.	Which one of the following is the adaptation of plants to cope with extremely cold climate?	Increasing unsaturated fats in their membrane	Increasing saturated fatty acid in cell wall	Increasing the rate of transpiration	Keeping stomata open throughout the day	☐	☐	☐	☐
14.	Proteins digestion occur in:	Oral cavity and intestine	Oral cavity and stomach	Stomach and intestine	Oral cavity, stomach and intestine	☐	☐	☐	☐
15.	In ECG strip QRS represents:	Atrial depolarization	Ventricular depolarization	Atrial repolarization	Ventricular repolarization	☐	☐	☐	☐
16.	They mainly kill, cancerous and virally infected cells in body:	B-lymphocyte cells	Helper T lymphocyte cells	Macrophages	Natural killer cells	☐	☐	☐	☐
17.	People were vaccinated all over the world in order to keep them safe against the covid virus. It is an example of:	Natural active immunity	Natural passive immunity	Artificial active immunity	Artificial passive immunity	☐	☐	☐	☐



BIOLOGY HSSC-I

(Old Curriculum 2006)

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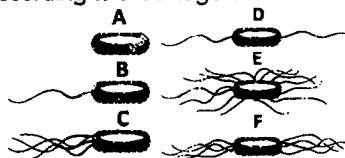
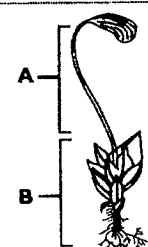
Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

SECTION – B (Marks 42)

Q. 2 Answers the following parts briefly.

(14 x 3 = 42)

(i)	Which organelle removes old and damaged mitochondria from cell? Give its name, and briefly explain the process.	03	OR	Separate the following mono saccharides as aldo and keto sugar: Ribulose, Glucose, Fructose, Ribose, Dihydroxyacetone, Glyceraldehyde	03									
(ii)	Name the three types of cytoskeletal proteins, their diameter and one function in the cell.	03	OR	Give the distinctive features of apicomplexan group. Write one example of the group.	03									
(iii)	Where is the glyoxisome organelle found? State its role in those cell where it is found.	03	OR	Name the nucleosides and nucleotides found in DNA.	03									
(iv)	Why pepsinogen is secreted by stomach cells in inactive form? How it is activated then?	03	OR	Depict the reaction of alcoholic fermentation done by yeast cell.	03									
(v)	How chemiosmosis is done in chloroplast?	03	OR	Why opportunistic diseases often attack the AIDS patients? Give any two examples of such diseases.	03									
(vi)	Is virus living or non-living? Justify your answer with reason.	03	OR	Differentiate between bacteria and cyanobacteria in terms of their photosynthetic properties.	03									
(vii)	Suggest the appropriate name for the following bacteria according to their flagella distribution. 	03	OR	Complete the table related to inhibitors: <table border="1" data-bbox="907 999 1451 1156"><tr><th>Name of inhibitor</th><th>Competitive or non-Competitive inhibitor</th><th>Name of enzyme inhibited</th></tr><tr><td>Melionate</td><td></td><td></td></tr><tr><td>Cyanide</td><td></td><td></td></tr></table>	Name of inhibitor	Competitive or non-Competitive inhibitor	Name of enzyme inhibited	Melionate			Cyanide			03
Name of inhibitor	Competitive or non-Competitive inhibitor	Name of enzyme inhibited												
Melionate														
Cyanide														
(viii)	Justify the names of slime molds and water molds. Give one example of each group.	03	OR	Give any three differences between naked seed plants and enclosed seed plants.	03									
(ix)	The three amino acid given in diagram are glycine, alanine and serine. Display the peptide bonds in them to make a tripeptide molecule. $\begin{array}{ccccccc} H & O & & CH_3 & O & & CH_2OH & O \\ & & & & & & & \\ NH_2 - C - C - OH & ' & NH_2 - C - C - OH & ' & NH_2 - C - C - OH \\ & & & & \\ H & & H & & H \end{array}$	03	OR	Name the parts A and B of the given plant. Write one difference between the two parts. 	03									
(x)	What are the acoelomate, pseudocoelomate and coelomate animals? Mention at least one animal each belonging to each group.	03	OR	How the plants living in saline soil osmoregulate?	03									
(xi)	What advancements are shown by reptile over amphibians?	03	OR	Classify the plants on the basis of photo period and give one example of each class.	03									
(xii)	Enlist human teeth, in their correct order with their function.	03	OR	Outline the inflammatory response of body when skin is pricked.	03									
(xiii)	Mention the different parts of conduction system of heart with their accurate order.	03	OR	Which blood cell is called antigen presenting cell? Why antigen presenting cell is important in immune response?	03									
(xiv)	Differentiate cell mediated immunity from humoral immunity.	03	OR	Make the flow chart of pulmonary circuit.	03									

SECTION – C (Marks 26)

Attempt the following questions.

Q.3	a) Explain the detail structure of chloroplast, and show arrangement of photosynthetic pigment in it. b) Draw only label sketch of C3 cycle.	4+3	OR	What is lymph? How lymph is returned back to blood? Explain the detailed structures of lymphatic system.	1+2 +4
Q.4	a) How stomach function is regulated by nervous and endocrine systems? b) Explain the different types of gastric gland cells and their role in chemical digestion of food in stomach. (Do not draw stomach diagram)	3+4	OR	Explain the life cycle of fern plant. Show the alternation of generation with the help of diagram.	5+2
Q.5	Explain pressure flow mechanism that describe the translocation of organic solutes in plants.	06	OR	Write any two general characteristics of class zygomycetes. Explain the method of sexual and asexual reproduction in rhizopus. Draw diagram.	2+2 +2
Q.6	Explain the mechanism of photo periodism with reference to the inter conversion of phytochromes in flowering plants.	06	OR	Write down the general characteristics of pouched and placental mammals and give their examples.	06