BIOLOGY

NEET

CRASH COURSE

HUMAN REPRODUCTION AND REPRODUCTIVE HEALTH

SMART ACHIEVERS

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HUMAN REPRODUCTION

1. Human are sexually reproducing and viviparous.

   Male reproductive system consist of :

   (i) Pair of testes, (ii) Accessory ducts, (iii) Accessory glands, (iv) External genitalia

   Testes is covered by three coats - (i) Tunica vaginalis, (ii) Tunica albuginea, (iii) Tunica vasculosa

   - Each testis has about 250 testicular lobules.
   - Each lobule contains about 2-3 seminiferous tubules.
   - Seminiferous tubule is lined by spermatogonia and sertoli cells.
   - Spermatogonia produce sperms by meiosis while sertoli cells provide nutrition.
   - Leydig's cells present outside the seminiferous tubules secrete androgens.
   - Male external genital organ is called penis.

   Female reproductive system :

   (i) Pair of ovaries, (ii) Female accessory ducts (Pair of oviducts, Uterus, Vagina), (iii) External genitalia, (iv) Pair of mammary glands

   - Ovaries produce ovum and some steroid hormones.
   - Uterus is made of perimetrium, myometrium and endometrium.
2. Spermatogenesis is the formation of sperms in the testis.
3. Normal sperm has head, neck, middle piece and tail.
4. Oogenesis is the formation of ovum in the ovary.
5. The reporductive cycle of female primates is called menstrual cycle.
6. Only one ovum is released per menstrual cycle from either of the two ovaries.
7. The cyclical changes during menstural cycle are controled by pituitary and ovarian hormones.
8. Fertilization occurs at the junction of isthmus and ampulla of oviduct to form zygote.
9. Sex of the embryo is determined by presence of X or Y chromosome.
10. Zygote divides mitotically to form blastocyst that gets implanted in the uterus resulting in pregnancy.
11. After gestation period of nine months the foetus get ready for delivery.
12. Process of child birth is called parturition which is controlled by cortisol, estrogens and oxytocin.
13. Mammary glands secrete milk after child birth to feed the new born.
14. Colostrum is thick, pale yellow coloured milk secreted by mammary glands, soon after the birth of the baby for few days.
15. Colostrum is rich in antibodies that can provide passive immunity to the delicate new-born.

REPRODUCTIVE HEALTH

1. Reproductive health refers to total well-being of reproduction.
2. India was the first nation to initiate action plans at national level to attain reproductively healthy society.

3. Sex related awareness and education is the primary step of reproductive health.
4. Pre-natal, natal and post-natal care is another important aspect of the reproductive and child health care.
   - Improved reproductive health in our country is indicated by :

   (i) Reduced maternal and infant mortality rate.

   (ii) Early detection and cure of STDs.

   (iii) Assistance to infertile couples ..... etc.
5. Simultaneously population explosion necessitated intense propagation of contraceptive methods. They are :

   (i) Natural methods

   (ii) Barrier methods

   (iii) IUDs

   (iv) Pills

   (v) Injectibles

   (vi) Implants

   (vii) Surgical methods

   Contraceptives are not regular requirements for reproductive health but are used to avoid pregnancy or to delay or space pregnancies.
6. MTP is legalised in India. MTP is done under following conditions :

   (i) Rape

   (ii) When the continuation of pregnancy could be harmful.
7. Inability to conceive or produce children even after 2 years of unprotected sexual cohabitation is called infertility.
8. Infertility can be solved by IVF-ET that gives birth to test-tube baby.

EXERCISE

Q.1 The product of the first maturation division of germ cell in testis are known as
(1) Spermatids (2) Oocytes
(3) Secondary spermatocytes (4) Sperms

Q.2 The head of epididymis is called
(1) caput epididymis (2) cauda epididymis (3) gubernaculum (4) vas deferens

Q.3 If the vasa deferentia of a man are surgically cut or blocked
(1) sperms in the semen become nonmotile (2) spermatogenesis will not take place
(3) testosterone will disappear from blood (4) semen will be without sperms

Q.4 The duct which carries sperms from testis to epididymis is
(1) Vasa efferentia (2) Vasa differentia (3) Ureter (4) Seminiferous tubules

Q.5 Seminal fluid has sperms and secretions of
(1) Follicles, ureters and prostate gland
(2) Prostate, Cowper's and Bartholin's gland
(3) Seminal vesicle, prostate and Cowper's glands
(4) Seminal vesicle, ureters and prostate gland

Q.6 The follicle that ruptures at the time of ovulation promptly fills with blood, forming
(1) corpus luteum (2) corpus albicans (3) corpus callosum (4) corpus haemorrhagicum

Q.7 Main function of corpus luteum is to
(1) secrete progesterone (2) facilitate ovulation
(3) facilitate fertilization (4) facilitate passage of ova in oviducts

Q.8 Fertilization of ovum takes place in rabbit, man and other placental mammals in
(1) ovary (2) fallopian tube (3) cervix (4) uterus

Q.9 Graafian follicles contain
(1) oogonial cells (2) corpus albicans
(3) corpus luteum (4) theca externa and theca interna

Q.10 Clitoris in female mammal is
(1) homologous to penis of male (2) analogous to penis of male
(3) non-functional (4) overgrown structure

Q.11 Acrosome aids the sperm to
(1) Find ovum (2) Swim
(3) Higher activity (4) Penetrate vitelline membrane of ovum

Q.12 Correct sequence of cell stages in spermatogenesis is
(1) spermatocytes, spermatids, spermatogonia, spermatozoa
(2) spermatogonia, spermatocytes, spermatids, spermatozoa
(3) spermatocytes, spermatogonia, spermatids, spermatozoa
(4) spermatogonia, spermatids, spermatocytes, spermatozoa

Q.13 The actual genetic part of a sperm is its
(1) Head (2) Middle piece (3) Acrosome (4) Tail

Q.14 Middle piece of a mammalian sperm contains
(1) centriole only (2) nucleus and mitochondria
(3) centriole and mitochondria (4) mitochondria only

Q.15 Conversion of spermatid into a spermatozoa is called
(1) Spermatogenesis (2) Vitellogenesis (3) Spermiogenesis (4) Cytokinesis

Q.16 How many sperms are produced from one primary spermatocyte ?
(1) 8 (2) 6 (3) 2 (4) 4

Q.17 Spermiogenesis changes
(1) Spermatogonium to primary spermatocyte
(2) Primary spermatocyte to secondary spermatocyte
(3) Secondary spermatocyte to spermatid
(4) Spermatid to sperm.

Q.18 In human females at the time of birth there are two million ova; how many of them normally reach maturity in the course of normal reproductive life?
(1) 500 (2) 1000 (3) 5000 (4) 2000

Q.19 Human females possess 44 + XX chromosomes. The secondary oocyte shall have-
(1) 44 + XX (2) 22 + X (3) 22 (4) 44

Q.20 The fertilization membrane is secreted because -
(1) It checks the entry of more sperms after fertilization
(2) It checks the entry of antigens in ovum
(3) It represents the left out tail of sperm
(4) It represents the plasma membrane of sperm

Q.21 In man the sperm released from the testis take the following route to reach the ureter-
(1) Vasa efferentia, Bidder canal, uriniferous tubules and nephrostome
(2) Vasa efferentia, epididymis, vas deferens and urethra
(3) Vasa efferentia, Bidder's canal, nephrostome
(4) Vasa efferentia, collecting tubules and bidder canals

Q.22 What is true about the process of fertilization ?
(1) Only acrosome of sperm enters the egg
(2) Two haploid nuclei fuse but the fusion nucleus divides immediately to form two haploid nuclei
(3) Entry of sperm activates the egg to complete meiosis
(4) Only one sperm enters an egg

Q.23 Egg is liberated from ovary in-
(1) Secondary oocyte stage (2) Primary oocyte stage
(3) Oogonial stage (4) Mature ovum stage

Q.24 If an unfertilized egg is pricked with a microneedle it will-
(1) Die immediately (2) Start dividing (3) Remain undivided (4) None of the above

Q.25 Determinate cleavage is found in-
(1) Coelentrates (2) Annelids (3) Nematodes (4) All the above

Q.26 During cleavage all divisions are-
(1) Equal (2) Reductional (3) Mitotic (4) Determinate

Q.27 A morula can be differentiated from blastula in-
(1) Presence of cavity (2) Presence of more yolk
(3) Presence of yolk (4) Absence of cavity

Q.28 Blastopore is
(1) Opening of neural tube
(2) Opening of gastrocoel
(3) Future anterior end of embryo
(4) Found in blastula

Q.29 Morphogenetic movement involve-
(1) Movement of organs
(2) Movement of small cell masses
(3) Movement of large cells masses
(4) Differentiation of cells

Q.30 Vertebral column develops from-
(1) Notochord (2) Nerve cord (3) Mesoderm (4) Endoderm

Q.31 Archenteron begins forming in
(1) Early gastrula (2) Late gastrula (3) Early morula (4) Blastula

Q.32 Gastrulation involves the differentiation of
(1) Ectoderm and endoderm
(2) Ectoderm, endoderm and mesoderm
(3) Ectoderm and mesoderm
(4) Mesoderm and endoderm.

Q.33 Termination of gastrulation is indicated by -
(1) Obliteration of blastocoel
(2) Obliteration of archenteron
(3) Closure of blastopore
(4) Closure of neural tube

Q.34 True coelom is lined by
(1) Mesoderm
(2) Mesoderm and ectoderm
(3) Endoderm
(4) Ectoderm

Q.35 Foetal membranes produced by trophoblast are-
(1) Chorion and allantois
(2) Chorion and amnion
(3) Amnion and allantois
(4) Allantois and yolk sac

Q.36 Amnion is helpful to embryo in
(1) Nutrition
(2) Protection from shock
(3) Excretion
(4) Respiration.

Q.37 Allantosis of the mammalian embryo helps in
(1) Respiration (2) Excretion (3) Protection (4) Nutrition

Q.38 Umblical cord contains -
(1) Umblicus (2) Placenta (3) Discus proligerus (4) Allantoic artery and vein

Q.39 Chorionic gonadotropin is secreted by -
(1) Pituitary (2) Ovary (3) Placenta (4) Uterus

Q.40 Placenta is -
(1) Channel for providing essential requirement for growth of embryo
(2) Storage organ
(3) Conductor for nerve impulse
(4) Meant for protecting the embryo from shocks

Q.41 Parasitic mode of nutrition occurs in
(1) Amphibian embryo
(2) Mammalian embryo
(3) Avian embryo
(4) Reptilian embryo.

Q.42 Menopause occurs in females at the age of-
(1) 55-60 years (2) 50-55 years (3) 45-50 years (4) 37-42 years

Q.43 In menstrual cycle ovum is released during-
(1) Beginning (2) Midway (3) End (4) Any time

Q.44 Menstrual cycle is controlled by -
(1) Estrogen and progesterone of ovary (2) FSH and LH of pituitary
(3) Both 1 and 2 (4) FSH of pituitary

Q.45 Lutea phase is the other name of -
(1) Follicular phase (2) Proliferative phase
(3) Menstrual flow phase (4) Secretory phase

Q.46 The delivery of child or child birth is called -
(1) Labour (2) Parturition (3) Implantation (4) Insemination

Q.47 Gestation period in human is -
(1) 10 weeks (2) 28 weeks (3) 32 weeks (4) 38 weeks

Q.48 Autotomy is recorded in –
(1) Legs in crabs (2) Tail of lizards
(3) Viscera in holothurian (4) All of the above

Q.49 Morphallaxis is –
(1) Reconstruction of the whole body (2) Growth of lost limb
(3) Healling of injury (4) Regeneration with the help of blastema

Q.50 Identify the wrong statement from the following:
(1) High levels of estrogen triggers the ovulatory surge.
(2) Oogonial cells start to proliferate and give rise to functional ova in regular cycles from puberty onwards.
(3) Sperms released from seminiferous tubules are poorly motile / non-motile.
(4) Progesterone level is high during the post ovulatory phase of menstrual cycle.

Q.51 Spermiation is the process of the release of sperms from:
(1) Seminiferous tubules (2) Vas deferens
(3) Epididymis (4) Prostate gland

Q.52 Acrosomal reaction of the sperm occurs due to:
(1) Its contact with zona pellucida of the ova
(2) Reactions within the uterine environment of the female
(3) Reactions within the epididymal environment of the male
(4) Androgens produced in the uterus

Q.53 Match the following and choose the correct options:

A. Trophoblast	i. Embedding of blastocyst in the endometrium
B. Cleavage	ii. Group of cells that would differentiate as embryo
C. Inner cell mass	iii. Outer layer of blastocyst attached to the endometrium
D. Implantation	iv. Mitotic division of zygote

Options:
(1) A-ii, B-i, C-iii, D-iv (2) A-iii, B-iv, C-ii, D-i
(3) A-iii, B-i, C-ii, D-iv (4) A-ii, B-iv, C-iii, D-i

Q.54 Morula is a developmental stage :
(1) Between the zygote and blastocyst (2) Between the blastocyst and gastrula
(3) After the implantation (4) Between implantation and parturition

Q.55 The method of directly injecting a sperm into ovum in assisted by reproductive technology is called:
(1) GIFT (2) ZIFT (3) ICSI (4) ET

Q.56 Following statements are given regarding MTP. Choose the correct options given below:
i. MTPs are generally advised during first trimester
ii. MTPs are used as a contraceptive method
iii. MTPs are always surgical
iv. MTPs require the assistance of qualified medical personnel
(1) ii and iii (2) ii and iii (3) i and iv (4) i and ii

Q.57 Condoms are one of the most popular contraceptives becuase of the following reasons:
(1) These are effective barriers for insemination
(2) They do not interfere with coital act
(3) These help in reducing the risk of STDs
(4) All of the above

Q.58 Choose the correct statement regarding the ZIFT procedure:
(1) Ova collected from a female donour are transferred to the fallopian tube to facilitate zygote formation.
(2) Zygote is collected from a female donour and transferred to the fallopian tube
(3) Zygote is collected from a female donour and transferred to the uterus
(4) Ova collected from a female donour and transferrerd to the uterus

Q.59 Diaphragms are contraceptive devices used by the females. Choose the correct option from the statements given below:
i. They are introduced into the uterus
ii. They are placed to cover the cervical region
iii. They act as physical barriers for sperm entry
iv. They act as spermicidal agents
(1) i and ii, (2) i and iii, (3) ii and iii, (4) iii & iv

AIIMS Special

Instructions for following questions (Q.60 to Q.114).

(1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).

Q.60 **Assertion :** Scrotum provides optimum temperature conditions for spermatogenesis.
Reason : Dartos and cremaster muscles in scrotum contract and relax involuntarily in response to temperature.

Q.61 **Assertion :** The process of reproduction does not suffer if one ovary is removed.
Reason : The other ovary enlarges to take over the function of the missing ovary too.

Q.62 **Assertion :** "Nothing lives forever, but life continues".
Reason : Death keeps the population growth under check.

Q.63 **Assertion :** Placenta is connected to the foetus by an umbilical cord.
Reason : Foetal components of the placenta are derived from the endometrium.

Q.64 **Assertion :** Placenta is contra-deciduate and even the foetal placenta is absorbed in mole.
Reason : Mole's egg contains abundant yolk in ooplasm.

Q.65 **Assertion :** Polar bodies have small amount of cytoplasm.
Reason : It is formed by unequal mitotic division.

Q.66 **Assertion :** Ovulation takes place when blood level of luteinizing hormone is high.
Reason : Leutinizing hormone is responsible for ovulation.

Q.67 **Assertion :** Umbilical cord contains 100% foetal blood.
Reason : It has single umbilical artery and single umbilical vein.

Q.68 **Assertion :** Activation of sperm is called capacitation.
Reason : Capacitation takes about 5-6 hours.

Q.69 **Assertion :** Before fusion spermatozoa has to penetrate egg membrane.
Reason : The activated spermatozoa undergoes acrosomal reactions and release sperm lysin.

Q.70 **Assertion :** In post natal life, oocyte development occurs in mature follicle.
Reason : After ovulation, graafian follicle transforms in corpus luteum.

Q.71 **Assertion :** Placenta is combined structure of foetal tissue & maternal tissue.
Reason : Placenta formation is completed before 6 week

Q.72 **Assertion :** Seminal vesicle is called as accessory sex organ of male.
Reason : Seminal vesicle conserve sperm energy & provide fuel to sperm.

Q.73 **Assertion :** Testes are retroperitoneal organ in man.
Reason : Peritoneal layer covers the testes on dorsal side.

Q.74 **Assertion :** Cervix contain most weak sphincter muscle in the body.
Reason : Cervix open into fallopian by os-external.

Q.75 **Assertion :** In ovarian cycle corpus luteum is exocrine gland.
Reason : It secretes the pheromones.

Q.76 **Assertion :** Failure of testes to descend into the scrotum causes sterility in man.
Reason : Higher temperature of the abdomen than in the scrotum is suitable for sperm development

Q.77 **Assertion :** Primary mammalian follicle are called graffian follicle.
Reason : These were discovered & described by graaf.

Q.78 **Assertion :** Corpus albicans is inactive structure which found in the ovary.
Reason : Corpus albicans secretes the progesteron hormone after ovulation.

Q.79 **Assertion :** Placenta functions as a temporary endocrine gland during development of embryo
Reason : Placenta produces pheromones.

Q.80 **Assertion :** Menarche starts at the age of puberty.
Reason : After birth oocyte is matured and developed in Graffian follicle.

Q.81 **Assertion :** Corpus leuteum present in proliferative phase of menstrual cycle.
Reason : High concentration of present in proliferative phase.

Q.82 **Assertion :** Testes are situated in the extra abdominal cavity.
Reason : Spermatogenesis process required less temperature as compared to body temperature.

Q.83 **Assertion :** Up to morula stage, the cells divide without any increase in size.
Reason : Zona pellucida remains intact till cleavage is complete.

Q.84 **Assertion :** A sperm sticks to an egg for fertilization.
Reason : Interaction of surface receptor's, fertilizen on the egg and antifertilization on the sperm head, makes them, adhere together.

Q.85 **Assertion :** Zona pellucida disappears when blastocyst reaches the uterus.
Reason : Role of zona pellucida is to check the implantation of the blastocyst at an improper site.

Q.86 **Assertion :** All members of bee society are diploid except the drones.
Reason : Drones are produced parthenogenetically.

Q.87 **Assertion :** Testes originates in the abdomen but later descend in to the scrotum under the influence of testesterone.
Reason : The interstial cells of the testes secretes male sex harmone the testosterone.

Q.88 **Assertion :** A woman passes out HCGH in the urine during pregnancy.
Reason : Excess hormones are excreted by the kidneys presence of HCGH in urine is the basis for pregnancy test.

Q.89 **Assertion :** Cervix contains the largest and the most powerful sphincter muscles in the body.
Reason : Cervix opens into the vagina by external O.S.

Q.90 **Assertion :** The fate of germ layers is same in all triploblastic animals.
Reason : There is a close relationship Among all triploblastic animals due to their evolution from common source.

Q.91 **Assertion :** Foetal blood & maternal blood are in direct contact.
Reason : The placenta works as a link between them.

Q.92 **Assertion :** Twins may arise from a single egg or from two eggs..
Reason : One egg gives rise to identical twins by separtion of blastomeres, and two eggs produce nonidentical twins.

Q.93 **Assertion :** In a graffian follicles, the primary oocyte and the follicle cells may be regarded sibling cells.
Reason : Both arise from the same parent cell, the oogonium by mitotic division.

Q.94 **Assertion :** A tadpole whose thyroid gland has been removed does not metamorphore into adult.
Reason : Calcitonin and thyroxine are produced from thyroid gland ; these hormones stimulate protein synthesis for the development and growth of tadpole larva.

Q.95 **Assertion :** Emboly involves the invagination and involution.
Reason : Emboly is exhibited by the formation, elongation.

Q.96 **Assertion :** Amniotic fluid serves as a protective cushion.
Reason : It breaks the mechanical shocks and lessens the effect of changes of temperature.

Q.97 **Assertion :** The middle part of sperm term as energy chamber.
Reason : Mitochondria of middle part provide the energy for activation of sperm.

Q.98 **Assertion :** There is generally monospermy in most animals.
Reason : Vitelline membrane of ovum checks polyspermy.

REPRODUCTIVE HEALTH

Q.99 **Assertion :** Population of India crossed one billion in May 2000.
Reason : It is the result of rapid decline in death rate, maternal mortality rate (MMR) and infant mortality rate (IMR) as well as an increase in number of people in reproducible age.

Q.100 **Assertion :** Intrauterine devices (IUDs) are very effective contraceptive method.
Reason : IUDs don't allow sperms to enter uterus.

Q.101 **Assertion :** Surgical method blocks gamete transport & thereby prevents conception.
Reason : Surgical method used in the male for this purpose is called vasectomy.

Q.102 **Assertion :** In test-tube baby programme, ova from wife/donor (female) and sperms from the husband/ donor (male) are collected and are induced to form zygote under simulated conditions in laboratory.
Reason : Embryos with more than 8 blastomeres are then transferred to fallopian tube (ZIFT) to complete its further development.

Q.103 **Assertion :** Surgical methods of contraception are practiced to space the successive two conceptions.
Reason : During surgical methods ovaries from females or testes from males are removed.

Q.104 **Assertion :** Natural methods are based on menstrual cycle and the life of sperms.
Reason : Natural methods often fail to contracept.

Q.105 **Assertion :** Sexually transmitted diseases get transmitted from the infected to the normal person, only during sexual contact.
Reason : All sexually transmitted diseases can be cured by antibiotics.

Q.106 **Assertion :** In 1900 world population was 2000 million.
Reason : Indian population crossed 2000 million mark in May 2000.

Q.107 **Assertion :** Marriageable age of Indian female and male is 18 and 21 years respectively.
Reason : Under normal condition a girl-child will release around 450 ova in her life time.

Q.108 **Assertion :** HIV infected person may die without symptoms.
Reason : HIV is a dangerous bacterium.

Q.109 **Assertion :** IVF-ET leads to a test-tube baby.
Reason : Durga is the first Indian test-tube baby.

Q.110 **Assertion :** One in every six persons in the world is an Indian.
Reason : In India, there are more females than males.

Q.111 **Assertion :** In India, IUDs like placement of copper-T is one of the most widely accepted methods of contraception.
Reason : Sterilisation procedure in the male is called vasectomy.

Q.112 **Assertion :** Sex education in schools is not necessary.
Reason : Sex education may increase certain myths and mis-conceptions in the students.

Q.113 **Assertion :** Now a days, there are less childless couples.
Reason : A number of measures are now available by which even infertile couples can have child.

Q.114 **Assertion :** Over population causes a number of socio-economic problems.
Reason : A number of bacterial and viral diseases have been controlled.

ANSWER KEY

Q.1	3	Q.2	1	Q.3	4	Q.4	1	Q.5	3	Q.6	1	Q.7	1
Q.8	2	Q.9	4	Q.10	1	Q.11	4	Q.12	2	Q.13	1	Q.14	3
Q.15	3	Q.16	4	Q.17	4	Q.18	1	Q.19	2	Q.20	1	Q.21	2
Q.22	4	Q.23	1	Q.24	2	Q.25	4	Q.26	3	Q.27	4	Q.28	2
Q.29	2	Q.30	1	Q.31	1	Q.32	2	Q.33	1	Q.34	1	Q.35	2
Q.36	2	Q.37	2	Q.38	4	Q.39	3	Q.40	1	Q.41	2	Q.42	3
Q.43	2	Q.44	3	Q.45	4	Q.46	2	Q.47	4	Q.48	1,4	Q.49	1
Q.50	2	Q.51	1	Q.52	1	Q.53	2	Q.54	1	Q.55	3	Q.56	3
Q.57	4	Q.58	2	Q.59	3	Q.60	2	Q.61	3	Q.62	2	Q.63	3
Q.64	3	Q.65	3	Q.66	1	Q.67	3	Q.68	2	Q.69	2	Q.70	2
Q.71	3	Q.72	1	Q.73	4	Q.74	4	Q.75	4	Q.76	3	Q.77	4
Q.78	3	Q.79	3	Q.80	2	Q.81	4	Q.82	1	Q.83	2	Q.84	1
Q.85	1	Q.86	1	Q.87	2	Q.88	1	Q.89	2	Q.90	1	Q.91	4
Q.92	1	Q.93	1	Q.94	1	Q.95	1	Q.96	1	Q.97	1	Q.98	3
Q.99	1	Q.100	3	Q.101	2	Q.102	3	Q.103	4	Q.104	1	Q.105	4
Q.106	3	Q.107	2	Q.108	3	Q.109	1	Q.110	3	Q.111	2	Q.112	4
Q.113	1	Q.114	2										