CBSE Class 12 Biology Compartment Answer Key 2015 (July 16, Set 2 - 57/2)

Question Paper code 57/2

Set II

Section A

Q nos 1-5 are of one mark each

Q1.

Identify the picture and mention the vegetative part that helps it to propagate.

Ans. Rhizome of ginger/ underground stem, axillary bud grows from the node ½ + ½ =1

Q.2 Name the type of interaction seen between fig and wasps.

Ans. Mutualism 1

Q.3 Write the two specific codons that a translational unit of mRNA is flanked by one on either sides.

Ans. Start codon-AUG, Stop codon- UAA, UAG, UGA ½ + ½

Q.4 Write the chromosomal defect in individuals affected with Klinefelter' s syndrome.

Ans. (Male) additional copy of X chromosome / XXY `1

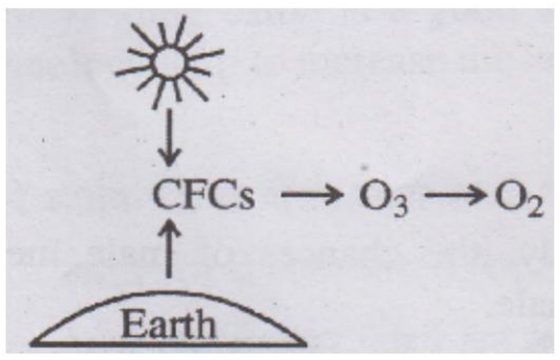
Q.5 Why do we add an inoculum of curd to milk for curdling it ?

Ans. Innoculum contains lactobacilli which curdles milk into curd with lactic acid 1

Section –B

Q nos 6-10 are of two marks each

Q.6



(a) Expand CFC. S
(b) How does it reduce ozone to oxygen ?

Ans. a) Chloroflurocarbons

b) It releases Chlorine atoms which degrades ozone to release oxygen 1+1

Q.7 Write the functions of
(a) cry 1AC gene
(b) RNA interference (RNAi)

Ans. It produces inactive protoxin in the host cell /produces proteins to control cotton bollworm

*These answers are meant to be used by evaluators

(b) It produces ds RNA which silences host mRNA/cellular defence mechanism/prevent infestation by nematodes 1+1

Q.8 Koel is clever enough to lay eggs in a Crow's nest. Write the reason for this peculiar behaviour. Name the type of interaction.

Ans. So that the crow can incubate the koel's eggs(too) 1

Brood parasitism 1

Q.9 What happens to corpus luteum in human female if the ovumis (i) fertilized, (ii) not fertilized ?

OR

Write the difference between the tender coconut water and the thick, white kernel of a mature coconut and their ploidy.

Ans. i) Corpus luteum continues to secrete progesterone to maintain pregnancy/ it persists and produces progesterone

ii) it disintegrates/ changes into corpus albicans 1+1

OR

Coconut water from the tender coconut has free nuclear endosperm, kernel has the cellular endosperm
Ploidy of the endosperms- 3n/ Triploid ½ + ½ + 1=2

Q.10 State the evolutionary relationship giving reasons between the thorn of Bougainvillea and tendril of cucurbit.

Ans. Divergent evolution/ Homologous organs,

Similar in origin but perform different function 1+1

Section –C

Q nos 11-22 are of three marks each

Q11 Why do hermaphrodite angiosperms develop out breeding devices ? Explain any two such devices with the help of examples.

Ans. To prevent in- breeding depression ½

Pollen is released before stigma becomes receptive / stigma becomes receptive much before the release of pollen / Anther and stigma are placed at different positions so that the pollen cannot come in contact with the stigma of same flower /Self – incompatibility (any two) 1+1

Eg. Castor , maize, ½

Q.12 What is ecological succession ? Where and why would the rate of succession be faster in newly created pond or a forest destroyed by a forest fire?

Ans. Gradual/predictable change in the species composition of a given area 1

Rate of succession would be faster in a forest destroyed by a forest fire 1

Q.13 High yielding cattle is a good solution for food enhancement. How does the MOET technology help to increase the herd size ?

Ans. High yielding female administered with FSH ,6-8 eggs/ multiple eggs produced, inseminated, fertilised eggs recovered men surgically, at 32 cell stage , transferred to surrogate mother-

½ x 6=3

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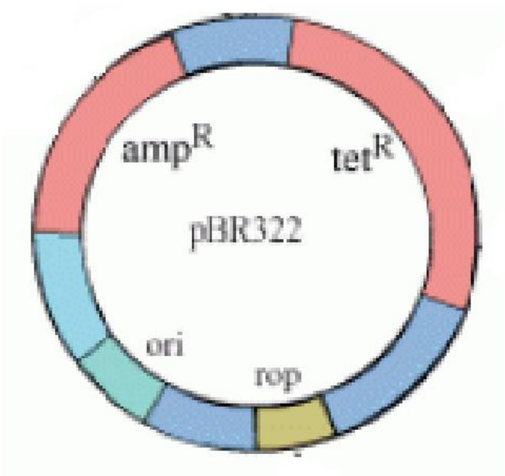
Q.14 Draw pBR 322 cloning vector. Label 'ORI', 'ROP' and any one antibiotic resistance site on it and state their functions.

Ans.



Labelling – Ori, Rop,Amp^R/tet^R, correct diagram ½ x 4=2

Ori-a sequence where replication starts/ responsible for creating copy number of the linked DNA,

Rop- codes for the proteins involved in the replication of the plasmid,

Amp^R / tet^R- ligation of alien DNA/ selection of recombinants. ½ x6=3

Q.15 If there is a history of haemophilia in the family, the chances of male members becoming haemophilic are more than that of the female.

(a) Why is it so?

(b) Write the symptoms of the disease.

Ans. a) Defective gene is on X chromosome, in case the carrier female (mother) passes X^h to the son he suffers, if she passes X^h to the daughter, she has the other X(from father) to make it heterozygous so the daughters escape as carriers ½ x4=2

b) The blood does not clot in the affected person after an injury or a small cut 1

Q.16 At what stage is *Plasmodium* picked up by the female Anopheles ? Describe the life cycle of the parasite in this insect.

Ans. Anopheles picks up gametocytes from the person with malarial fever, gametocytes develop in the RBCs, fertilisation in the mosquito, zygote develop in the wall of intestine, sporozoites develop and migrate to the salivary glands, can be injected into the next victim by the mosquito through bite. ½ x6=3

Q.17 Drinking water problem in our urban areas is caused mainly because we fail to protect our water bodies Explain how accelerated eutrophication chokes our water bodies to death.

Ans. Sewage and industrial wastes are added to the lake , nitrates and phosphates act as plant nutrients, promotes algal bloom, dissolved oxygen depletes, less oxygen and pollutants poison the aquatic life , decomposing remains choke the lake to death. ½ x6=3

Q.18 Explain the events in a normal woman during her menstrual on during the following days:

(a) Pituitary hormone levels from 8 to 12 days.

(b) Uterine events from 13 to 15 days.

(c) Ovarian events from 16 to 23 days.

Ans. a) FSH and LH levels–low 1

b) Endometrium is highly vascularised/ proliferative phase of uterine lining 1

c) Formation of corpus luteum/ secretion of progesterone 1

Q.19(a) Differentiate between benign and malignant tumours.

(b) Why is colostrum a boon to the newborn baby?

Ans. (a) Benign tumour-confined to original location/does not spread to other parts of the body 1

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Malignant tumour-mass of proliferating (neoplastic) cells that invade and damage surrounding tissues/cancerous tumour / tumour showing property of metastasis 1

(b) Colostrum contains antibodies/that provides resistance (immunity) to new born babies 1

Q.20 How does the study of fossils support evolution ? Explain.

OR

What does Hardy-Weinberg Principle of equilibrium indicate ? List any two factors that could alter the equilibrium. What would such an alteration lead to ?

Ans. Fossils are remains/ hard parts of life forms, found in sedimentary rocks, some of them appear similar to modern organisms /some represent extinct organisms, study of fossils in different sedimentary layers indicates the geological period in which they existed (provides palaentological evidence) 1+1+1

OR

Allele frequencies are stable and constant from generation to generation /the gene pool (total genes and their alleles in a population) remains a constant/ sum total of all allelic frequencies is one 1 Factors– Gene migration, gene flow, genetic drift, mutation, genetic recombination, natural selection (any two) ½ + ½

Leads to –Evolution 1

Q.21 Why is predation important and required in a community with rich biodiversity ? Explain with the help of suitable examples.

Ans. Transfer energy from one trophic level to the next , keeps the prey population under control, biological control, helps maintain species diversity. 1½

Same points explained with the help of an example 1½

Q.22(a) Differentiate between exons and introns.

(b) What is a plasmid ? Why is it selected as a vector ?

Ans. a) Exons are the coding or expressed sequences that appear in mature or processed RNA, introns are intervening sequences that do not appear in mature or processed RNA// Exons are codons that code for amino acid sequence, introns do not code for amino acids 1

b) Autonomously replicating circular DNA/ extra chromosomal DNA, exclusively present in bacteria ½+ ½

It takes in alien DNA/acts as vector, and delivers is into a host cell ½+ ½

Section –D

Q nos 23 is of four marks each

Q.23 Peer pressure plays a. negative role in triggering smoking habits in adolescents. As a school captain list any two activities you would like to organize with the help of senior students of your school and any other two activities you would like your school authorities to organize for the students to tackle this problem. Explain how these activities will help in doing so.

Ans. Students activities- Poster making , slogan writing , essay writing , processions , display of banners , highlighting its ill- effects during assembly, power-point presentation on harmful effects of tobacco

(any two= ½ + ½)

School activities – Seminars, workshops, talks-by doctors, counsellors , psychologists, government officials, vigilant supervision, value education through class teachers (any two= ½ + ½)

*These answers are meant to be used by evaluators

This will help in bringing about awareness/ prevent diseases associated with smoking/provide alternatives/help the smokers in doing away with this habit(Any other relevant point to be evaluated) (any two =1+1)

Section –E

Q nos 24- 26 is of five marks each

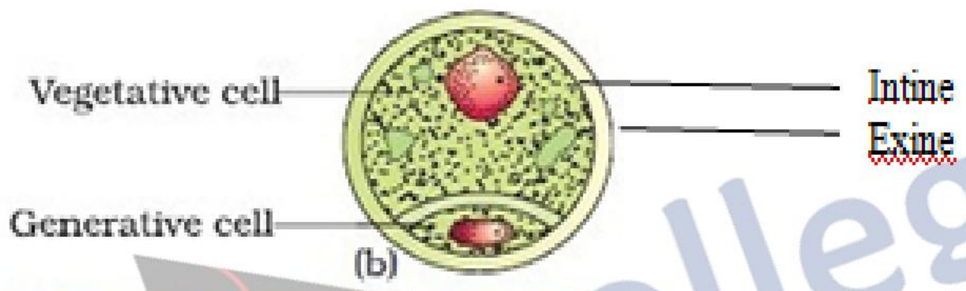
Q.24 (a) Describe in sequence the process of microsporogenesis in angiosperms.
(b) Draw a labelled diagram of a two celled final structure formed

OR

(a) Draw a sectional view of a seminiferous tubule of human. Label sertoli cell, spermatagoma and leydig cell on it and write their functions.
(b) Explain the role of pituitary and sex hormones in the process of spermatogenesis.

Ans. Microsporogenesis-Each microspore mother cell divides meiotically, to form 4 haploid cells or tetrad, each microspore divides into two unequal cells- large vegetative cell and smaller generative cell; at this 2-celled stage the pollen grains are shed. Sometimes the generative cell divides mitotically to give rise to two haploid male gametes , that are shed at 3 - celled stage ½x6=3

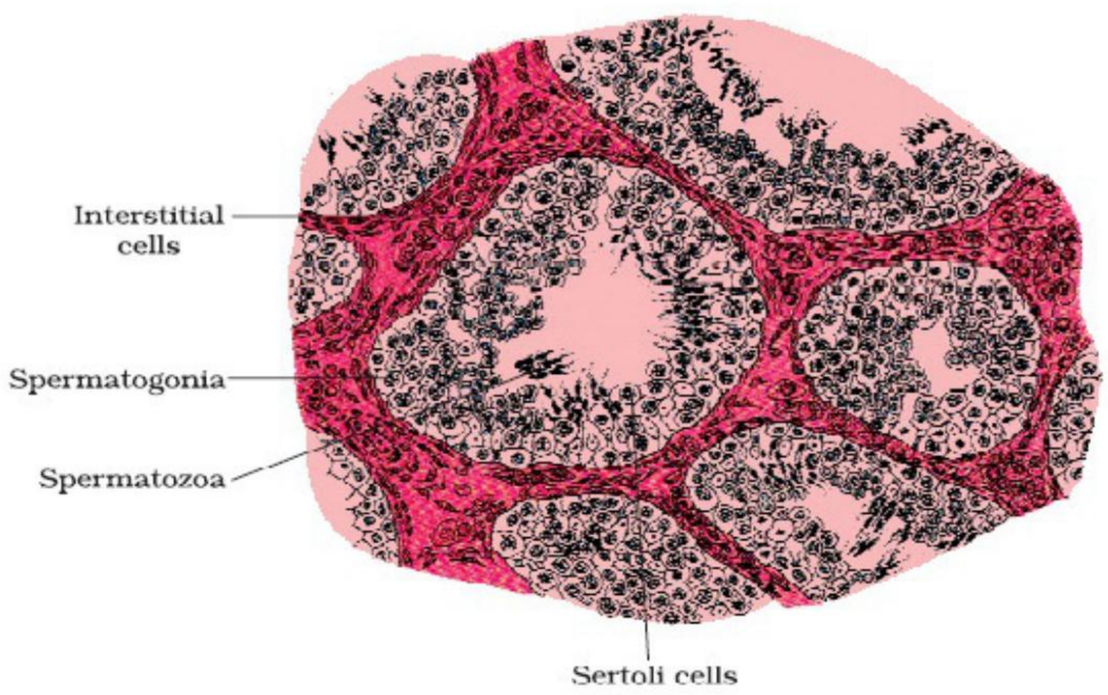
b)



Labelling –exine, intine , vegetative cell , generative cell

½ x4=2

OR



Label- sertoli cells, spermatogonia, Leydig cells ½ x3=1 ½

Functions – Sertoli cells -secrete factors which help in the process of spermiogenesis/ provide nutrition to germ cells ½
Spermatogonia-divide to produce spermatids /sperms ½
Leydig cells-synthesis or secretion of androgens/testosterone ½

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b) Pituitary hormones – LH/luteinising hormone- acts on Leydig cells and stimulates synthesis and secretion of androgens, FSH/follicle stimulating hormone-acts on Sertoli cells and stimulates secretion of some factors that help in spermiogenesis ½ + ½

Sex hormone –(Androgen/testosterone) stimulate process of spermatogenesis 1

Q.25 Explain the application of rDNA technology to produce insulin.

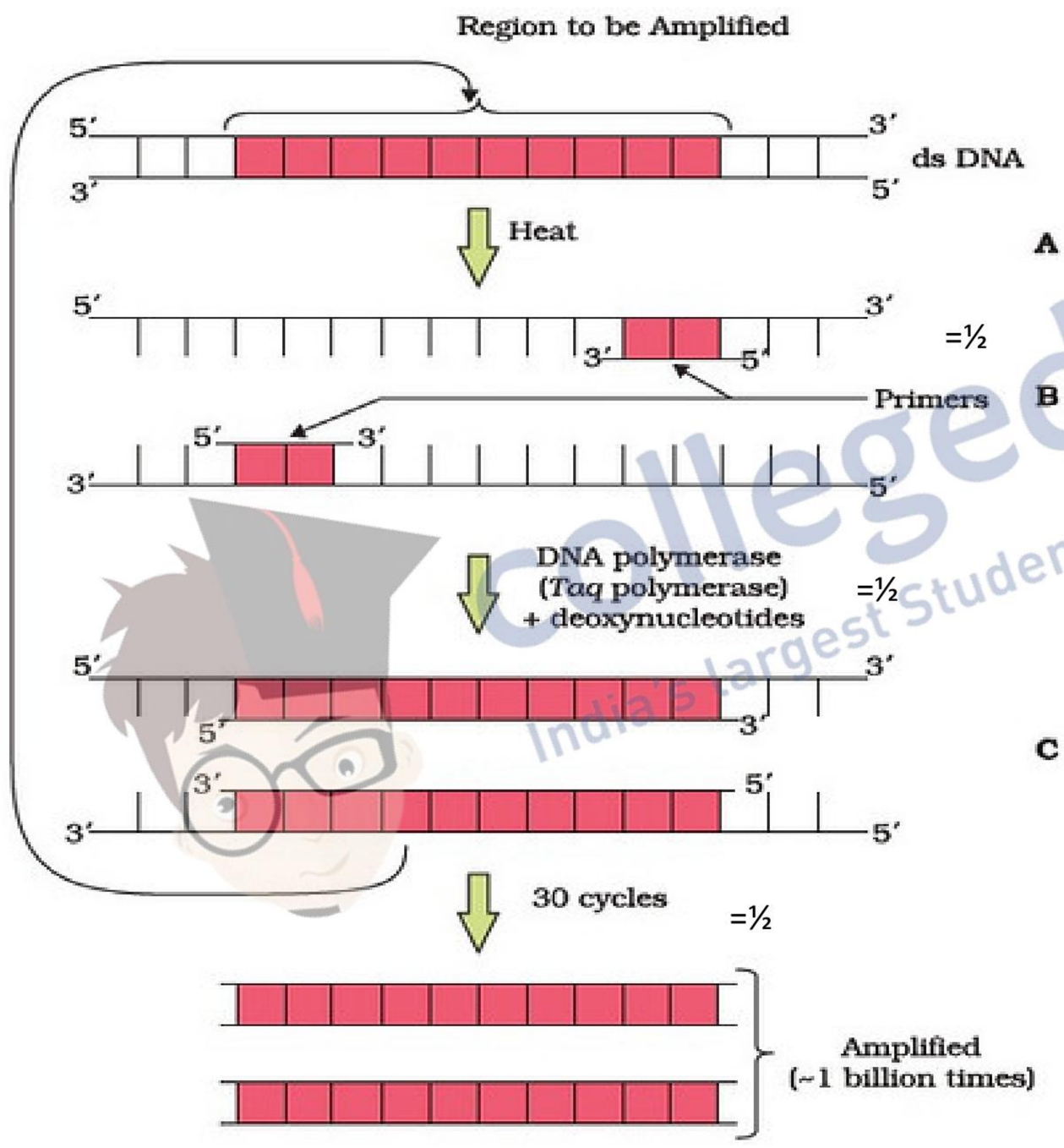
OR

(a) Describe the different steps in one complete cycle of PCR.

(b) State the purpose of such an amplified DNA sequence.

Ans. Human insulin is synthesised as a pro- hormone, the pro-hormone contain an extra C- peptide. The C-peptide is not present in mature insulin and is removed during maturation.Eli-Lily-an American company prepared two DNA sequences, corresponding to A and B chains of human insulin, and introduced them in plasmids of E .coli to produce insulin chains. Chain A and B were produced separately ,extracted and combined ,by creating disulphide bonds ½ x 10=5

OR



Denaturation = ½

Annealing = ½

Extension = ½

(Same value points to be awarded in an explanation) ½ x6=3

Purpose –used to ligate with a vector for further cloning/ detection of bacteria or virus by amplification of their DNA/detection of HIV in AIDS patients/to detect mutation in genes in suspected cancer patients. (Any two) 1 + 1

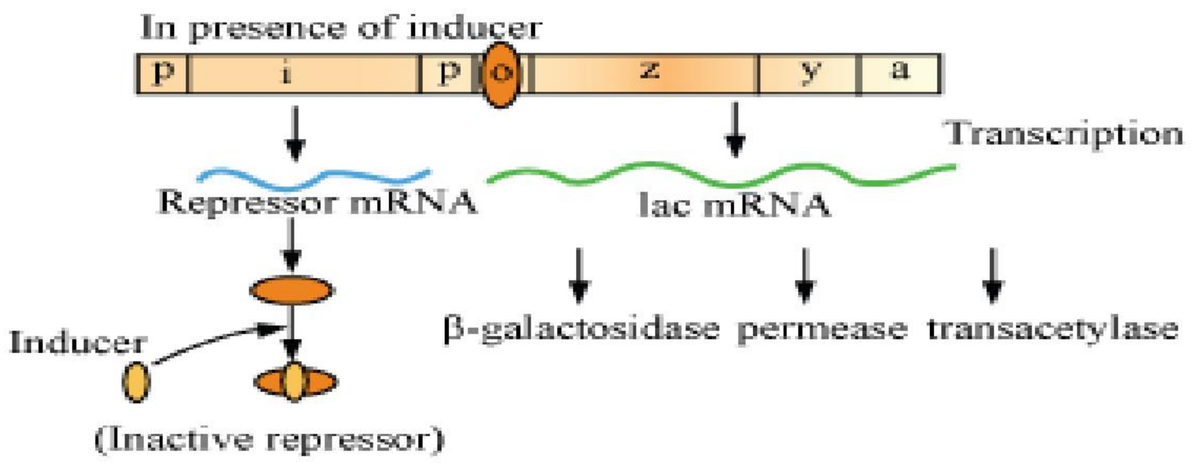
Q.26 Sketch a schematic diagram of lac operon in switched on position. How is the operon switched off? Explain.

OR

A tall pea plant bearing violet flowers is given with its unknown genotypes. Explain by working out the crosses how would you find the correct genotypes with respect to the two traits mentioned only by "selfing" the given plants.

**These answers are meant to be used by evaluators*

Ans.



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Switched on position

(a) labelling– Structural gene, Repressor mRNA , lac mRNA, Repressor, inducer ,3 enzymes ½ x 6 = 3

(b) when all lactose molecules are digested-repressor is free and binds to the operator , no transcription-switched off 1 + 1 = 2

OR

Tall plant= TT/ Tt

Violet flowers= WW/ Ww

Genotype of given plant could be either of the assumed four: TTWW, TTWw, TtWW, TtWw

Case 1

Selfing of TTWW

	TW
TW	TTWW

All tall and violet, then genotype of parent is TTWW 1

Case 2

Selfing of TTWw

	TW	Tw
TW	TTWW	TTWw
Tw	TTWw	TTww

Phenotypic ratio 3:1(3 tall violet:1 tall white) then Parent is TTWw

1

Case 3

Selfing of TtWW

	TW	tW
TW	TTWW	TtWW
tW	TtWW	ttWW

Phenotypic ratio 3:1 ,(3 tall violet :1 dwarf violet) then Parent is TtWW 1

Case 4

Selfing of TtWw

	TW	Tw	tW	tw
TW	TTWW	TTWw	TtWW	TtWw
Tw	TTWw	TTww	TtWw	Ttww
tW	TtWW	TtWw	ttww	ttWw
Tw	TtWw	Ttww	ttWw	ttww

If phenotypic ratio 9:3:3:1, then parent is TtWw 2

**These answers are meant to be used by evaluators*