JEPAS(PG)-2020

M. Phil in Regenerative Medicine & Translational Sciences (M. Phil RMTS)-2020

Duration: 90 minutes **Full Marks: 100**

Instructions

1. All questions are of objective type having four answer options for each. Only one option is correct. Correct answer will carry full marks 1. In case of incorrect answer or any combination of more than one answer, ¼ mark will be deducted.
2. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
3. Use only **Black/Blue ball point pen** to mark the answer by complete filling up of the respective bubbles.
4. Mark the answers only in the space provided. Do not make any stray mark on the OMR.
5. Write your roll number carefully in the specified locations of the **OMR**. Also fill appropriate bubbles.
6. Write your name (in block letter), name of the examination centre and put your full signature in appropriate boxes in the OMR.
7. The OMR is liable to become invalid if there is any mistake in filling the correct bubbles for roll number or if there is any discrepancy in the name/ signature of the candidate, name of the examination centre. The OMR may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
8. Candidates are not allowed to carry any written or printed material, calculator, docu-pen, log table, wristwatch, any communication device like mobile phones etc. inside the examination hall. Any candidate found with such items will be **reported against** & his/her candidature will be summarily cancelled.
9. Rough work must be done on the question paper itself. Additional blank pages are given in the question paper for rough work.
10. Hand over the OMR to the invigilator before leaving the Examination Hall.

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1) The repair by cell division in the damaged tissue is:

a) Exponential growth.
b) morphallaxis regeneration.
c) epimorphosis regeneration.
d) deaccelerating growth.

2) Most translation occurs by a mRNA cap-dependent mechanism, however, translation can occur by cap-independent initiation. One mechanism by which eukaryotic cells can initiate cap-independent translation is by which of the following approaches?

a) 5' mRNA cap.
b) None of these.
c) Internal ribosome entry site.
d) eIF4F initiation complex.

3) Which of the following is not a phase in translation?

a) Termination.
b) Initiation.
c) Modification.
d) Elongation.

4) Which is not true for humoral mediated immunity?

a) It is an antibody-mediated immunity.
b) It also involves complement activation.
c) Rapid and quick against pathogens that are freely circulating or outside the infected cells and forms and antigen antibody complex thereby bringing in lysis or phagocytosis of the pathogen.
d) T lymphocytes play a major role in humoral mediated immunity.

5) During translation, which site in the ribosome allows for tRNA molecules to enter the complex?

a) A site.
b) F site.
c) P site.
d) R site.

6) Mesenchymal stem cells are examples of:

a) Pluripotent stem cells.
b) Multipotent stem cells.
c) Totipotent stem cells.
d) Induced pluripotent stem cells (iPS cells).

7) Which one of the following genes was NOT part of transcription factors used to generate induced pluripotent stem (iPS) cells from mouse skin fibroblasts?

a) Oct4.
b) Sox2.
c) c-jun.
d) Kfl4.

8) If prospective neural ectoderm of late gastrulae transplanted to prospective skin ectoderm region of other gastrula it give rise to_____, as cells become?

a) Neural plate, committed.
b) Epidermis, committed.
c) Neural plate, Determined.
d) Epidermis, Determined.

9) What are snRNPs (small nuclear ribonucleic particles)?

a) RNA molecules that convey genetic information from DNA to the ribosome.
b) RNA component of the ribosome, essential for protein synthesis.
c) RNA protein complexes that combine with pre-mRNA and other proteins to form a spliceosome.
d) RNA molecules that serve as the link between the nucleotide sequence of nucleic acids and the amino acid sequence of proteins.

10) Differentiated cells express the genes and proteins characteristic of their final identity in the adult, and that identity can be altered only under special circumstances. How does the concept of differentiation, as described here, differ from the concept of determination?

a) Determined cells have begun to differentiate, but are not fully differentiated.
b) Determined cells are embryonic cells that will give rise to all the cell types of the adult organism, but have not yet begun to express the genes and proteins characteristic of their final fates.
c) Determined cells will continue to follow their fate if graGed into a different place in a host embryo, even though they do not yet express the genes and proteins characteristic of their final fate.
d) Determined cells are embryonic cells that will form certain cell types and structures if development is allowed to proceed normally, but will alter their development in response to their location if transplanted to a different place in a host embryo.

11) All of the follwing are types of alternative RNA splicing except_____:

a) exon reversal.
b) skipped exon.
c) alternative 3' splicing.
d) dual splice site.

12) Embryonic stem cells are_____whereas adult stem cells are:

a) Unipotent; totipotent.
b) Pluripotent; multipotent .
c) Multipotent; totipotent .
d) Pluripotent; unipotent.

13) Morphogenesis is concerned with:

a) Shape of tissue organ and entire organisms.
b) Cell growth.
c) Cell differentiation.
d) All of the above.

14) What is globin gene switching?

a) Globin gene switching refers to the switching on of the globin genes during erythrocyte differentiation.
b) Globin gene switching refers to the switching from a-globin to b-globin, so that a?b2 hemoglobin can be made.
c) Globin gene switching refers to the molecular basis for the genetic disease, sickle cell anemia.
d) Globin gene switching refers to the transition, during fetal development, from the production of hemoglobin containing e-globin, to g-globin, to b-globin.

15) The immunoglobulin genes are expressed in B-cells, and the b-globin gene is expressed in red blood cells. What manipulations might be carried out to get the b-globin gene to be expressed in B-cells?

a) The coding region of an immunoglobulin gene could be combined with the cis-regulatory region of the b-globin genes, and this artificial gene would then express b-globin in B-cells.
b) The cis-regulatory region of the b-globin gene could be inserted into B-cells, which would then express their own version of the b-globin gene.
c) The cis-regulatory region of an immunoglobulin gene could be combined with the coding region of the b-globin genes, and this artificial gene would then express b-globin in B-cells.
d) The transcription factors GATA-1 and GATA-2 (which activate the b-globin gene in erythrocytes) could be introduced into B-cells, which would then express their own copy of the b-globin gene.

16) Embryonic stem cells are derived from?

a) Undifferentiated inner cellmass of embryo.
b) Differentiated inner cell mass of embryo.
c) Undifferentiated trophoblast cells.
d) Differentiated trophoblast cells.

17) Sex of crocodile eggs is dependent on:

a) Light.
b) Temperature.
c) Humidity.
d) None of the above.

18) "The addition of a CH_3CO group to the N-terminus of a protein is the most common form of protein modification. This chemical modification is called ____."

a) Acetylation.
b) Ubiquitination.
c) Methylation.
d) Adenylation.

19) What are exons?

a) Site where repressor proteins bind.
b) Set of genes that are adjacent to one another in the genome and are coordinately controlled.
c) Genetic information coding for an amino acid sequence that will form a functional protein.
d) Intervening non-coding segments of DNA.

20) OCT4, SOX2,Klf4, Myc are:

a) Viruses.
b) protiens.
c) gene correctors.
d) vitamins.

21) Which of the following statements, if any, is false?

a) Gene therapy involves the direct genetic modification of the cells of a person (or animal model) to achieve a therapeutic goal.
b) Current gene therapy is directed at modifying somatic cells.
c) The only successful gene therapies are those in which cells are removed from a patient, genetically modified, and then returned to the patient.
d) Gene therapy successes have largely involved treatment of recessively inherited disorders.

22) Which protein structure involves the binding of multiple polypeptides?

a) Primary structure.
b) Secondary structure.
c) Tertiary structure.
d) Quaternary structure.

23) Which of the following is not a type of modification that can occur after translation?

a) 5' capping.
b) Trimming.
c) Proteasomal degradation.
d) Phosphorylation.

24) - In (In Vitro Fertilization) the egg can be fertilizes by:

a) another egg.
b) sperm.
c) electric shock.
d) unneucletaed cell.

25) When does alternative splicing occur?

a) Following mRNA translocation to the cytosol .
b) Following translation.
c) Following mRNA polyadenylation .
d) Following pre-mRNA transcription in the nucleus.

26) Which of the following codons is the mRNA start codon that initiates translation?

a) UAG.
b) UAA.
c) AUG.
d) UGA.

27) Which of the following are pluripotent stem cells?

a) Cells has the potential to differentiate into any adult cell type forming an entire organism.
b) Cells that has limited potential to form only multiple adult cell types.
c) Cells that don't have the ability for self renewal.
d) Cells has the Potential to form all differentiated cell types except placenta.

28) To which of the following structures in a typical molecule of tRNA is an amino acid attached?

a) D loop.
b) CCA tail.
c) Variable loop.
d) Anticodon loop.

29) Which of the following are methods for termination of transcription in prokaryotes?

I. Release factor binding
II. Rho-mediated termination
III. Hairpin loop (stem loop) formation

a) I, II, and III.
b) I only.
c) II and III.
d) III only.

30) What important lesson for the mechanisms of development can we derive from the ability to clone frogs by nuclear transfer?

a) that the selective gene expression seen in differentiated cells does not result from an irreversible loss of genes, or their potential for expression.
b) that a piece of a frog can be "planted" to obtain a new, cloned individual, just like in plants.
c) that the pattern of gene expression in a differentiated cell can only be reversed if the nucleus is removed from the cell.
d) that the mechanisms of development are irreversible in all organisms except frogs.

31) Which of the following act as the blueprint or template for the process of protein synthesis that takes place on ribosomes?

a) rRNA.
b) DNA.
c) tRNA.
d) mRNA.

32) Which of the following proteins are likely to contain leucine zipper domains?

a) Transmembrane proteins.
b) Transcription factors.
c) Lipases.
d) Proteases.

33) Tick the correct sequence of cell-fate determination:

a) Undifferentiated → determined → committed → differentiated.
b) Specification → determined → undifferentiation → differentiated.
c) Committed → undifferentiated → determined → differentiation.
d) Undifferentiated → Specification → Determined → differentiation.

34) How many ribosomal binding sites are there and what are their functions?

a) There are two sites. A site binds free tRNA before ribosomal exit, P site binds peptidyl-tRNA.
b) There are two sites. A site binds free tRNA before ribosomal exit, P site binds aminoacyl-tRNA.
c) There are three sites. A site binds free tRNA before ribosomal exit, P site binds aminoacyl-tRNA, E site binds peptidyl-tRNA.
d) There are three sites. A site binds aminoacyl-tRNA, P site binds peptidyl-tRNA, E site binds free tRNA before ribosomal exit.

35) What are Yamanaka factors?

a) OCT3/4, SOX2, KLF4, c-Myc.
b) Growth factors.
c) Cytokines.
d) OCT3/4, SOX2, Nanog.

36) Site in the ribosome from which the tRNA donates amino acids to the growing polypeptide chain is:

a) P site.
b) O site.
c) T site.
d) A site.

37) Weismann's theory of nuclear determinants supports?

a) Autonomous specification.
b) Conditional specification.
c) Syncytical specification.
d) Determination theory.

38) How is splicing regulated at the level of cis-acting RNA sequence elements?

a) Insulators bind splicing silencers and decrease nearby splice junction activity. Splicing activators bind splicing enhancers and increase likelihood of proximal sites as splice junction.
b) Heterochromatin prevents alternative splicing whereas euchromatin promotes alternative splicing.
c) Splicing repressors bind splicing silencers and increase nearby splice junction activity. Splicing activators bind splicing enhancers and decrease likelihood of proximal sites as splice junction.
d) Splicing repressors bind splicing silencers and decrease nearby splice junction activity. Splicing activators bind splicing promoters and increase likelihood of proximal sites as splice junction.

39) Important limitation of using cloned ESCs (SCNTESCs) clinically:

a) Immune rejection.
b) Produce limited number of cell types.
c) Destruction of human embryos.
d) Difficult to grow and culture in the laboratory.

40) Which of the following is not dependent on the C-terminal domain (CTD) of RNA polymerase II?

a) mRNA splicing.
b) Transcription termination.
c) 5' capping.
d) None of the other answers.

41) Which of the following best describes the key function of helicases during transcription?

a) Catalyzing the interaction between transcription factors and the DNA strand.
b) Cleaving methyl groups from an unwound DNA strand.
c) Relief of tension in the DNA strands to prevent breakage.
d) Separation of two strands of DNA; "unwinding" gives polymerases access to the strand.

42) Which of the following is not a type of RNA?

a) cRNA.
b) tRNA.
c) mRNA.
d) rRNA.

43) French flag analogy defines the concept of:

a) Effect of paternal mRNA .
b) Effect of maternal mRNA.
c) Effect of morphogens depending on concentration gradient.
d) Effect of morphogens depending on temperature gradient.

44) Which of the following processes is not a type of RNA processing carried out by eukaryotes?

a) Splicing and removal of introns.
b) Nucleotide excision repair.
c) Capping of the 5' end.
d) Polyadenylation of the 3' end.

45) Regeneration of a limb or tail is an example of:

a) Epimorphosis.
b) Autotomy.
c) Compensatory hypertrophy.
d) Morphallaxis.

46) The 5' cap on eukaryotic mRNA molecules is recognized by which of the following proteins?

a) RNA polymerase.
b) 40s ribosomal subunit.
c) PABP.
d) eIF4e.

47) What is the role of stem cells with regard to the function of adult tissues and organs?

a) Stem cells are undifferentiated cells that divide asymmetrically, giving rise to one daughter that remains a stem cell and one daughter that will differentiate to replace damaged and worn out cells in the adult tissue or organ.
b) Stem cells are embryonic cells that persist in the adult, and can give rise to all of the cell types in the body.
c) Stem cells are determined cells that reside in fully differentiated tissues and can, when needed, differentiate to supply new cells for growth of the tissue.
d) Stem cells are differentiated cells that have yet to express the genes and proteins characteristic of their differentiated state, and do so when needed for repair of tissues and organs.

48) Which polymerase is involved in transcribing ribosomal RNA (except 5S rRNA)?

a) RNA polymerase III.
b) RNA polymerase I.
c) DNA polymerase IV.
d) RNA polymerase II.

49) Before RNA polymerase can initiate transcription, this protein must bind to it, creating the RNA polymerase holoenzyme and allowing for the initiation of transcription:

a) Topoisomerase.
b) Beta factor.
c) Helicase.
d) Sigma factor.

50) In induction, an inducing tissue directs the target tissue to develop along a particular fate path:

a) True.
b) False.
c) Can't say (depends).
d) Random.

51) Mesenchymal can differentiate into:

a) glial cells.
b) adipocyte.
c) blood cells.
d) neurons.

52) What is the major concern of using retroviral vectors to deliver or activate pluripotent genes?

a) Not very efficient and needs repeated transfections.
b) Plasmid diluted as iPS cells divide.
c) Vector and transgenes remain in the genome and can be reactivated in differentiated cells.
d) The vector integrates but is excised by the transposase.

53) Which of the following cells would be considered differentiated?

a) Blastomere.
b) Spemann organizer.
c) Myotome of the somite.
d) Muscle cell.

54) Which of the following best describes distant regulatory sequences that influence gene expression?

a) Exons.
b) Transcriptional start sites.
c) Enhancers.
d) Promoters.

55) Concerning the efficacy of small molecule drugs, which, if any, of the following statements is true?

a) At the level of clinical trials drugs can vary widely in how effective they are.
b) Once a drug has received regulatory approval, we can be sure that it will be effective in all patients, although some people will receive more benefit from it than others.
c) Drugs used to treat psychiatric disorders are particularly effective.
d) Stains and beta blockers that were meant to reduce the risk of heart disease are good examples of drugs that are largely ineffective.

56) Small GTPases are important molecular switches and signaling pathways. What proteins are responsible for promoting the activation of these small GTPases?

a) Phosphatases.
b) Nicotinamide adenine dinucleotide.
c) Guanine nucleotide exchange factors.
d) Guanine triphosphate.

57) In what way are mrf4, myoD, and the other muscle-inducing genes similar to the homeotic genes of Drosophila?

a) mrf4, myoD, and the others encode homeobox-containing proteins.
b) mrf4, myoD, and the others encode "master-switch" transcription factors, which initiate a cascade of gene expression that leads to the differentiation of cells.
c) mrf4, myoD, and the others act as homeotic genes in Drosophila.
d) mrf4, myoD, and the others are expressed exclusively in muscle, as are the homeotic genes of Drosophila.

58) Imagine that in an attempt to get the â-globin gene to be expressed in B-cells (see question 4 above), the transcription factors (GATA-1 and GATA-2) known to control the â-globin gene in erythrocytes were introduced into B-cells, yet the â-globin gene was not expressed. What is a likely explanation for this result?

a) The erythrocyte transcription factors are degraded rapidly in the B-cell, and so cannot act on the â-globin gene.
b) The â-globin gene in the B-cells is packaged into heterochromatin, and the erythrocyte transcription factors are insufficient to remodel that chromatin into an active state.
c) Erythrocyte transcription factors cannot interact with their target DNA sequences in B-cells, even though those sequences are present and accessible.
d) Even though the necessary erythrocyte-specific transcription factors are now present in the B-cells, the general transcription factors required for â-globin gene expression would not be present.

59) In prokaryotes what site on the mRNA does the ribosome bind to initiate translation?

a) The Shine-Dalgarno sequence.
b) The 3' untranslated region.
c) The operator.
d) The poly adenine tail.

60) Why is the post-transcriptional poly-A tail an important addition to a mRNA molecule?

a) The tail adds stability to the transcript, controlling the time of degradation.
b) The poly-A tail facilitates the binding of ribosomes.
c) The 3' tail signals the end of transcription by the RNA polymerase.
d) The poly-A tail is a part of the protein translated from the mRNA.

61) Which of the following subunits of RNA polymerase is solely required for initiation of transcription?

a) ω (omega).
b) β (beta).
c) σ (sigma).
d) α (alpha).

62) If differentiation excess the self renewal that will cause:

a) cancer.
b) degeneration.
c) normal amount of stem cells.
d) none of above.

63) Which amino acid is the "start" amino acid in a peptide chain?

a) Methionine.
b) Arginine.
c) Lysine.
d) Threonine.

64) Which of the following is a source of adult stem cells?

a) Morula.
b) Placenta.
c) Bone Marrow.
d) Nuclear Transfer.

65) During transcription of a eukaryotic cell, what determines the template strand?

a) The base sequence of the promoter.
b) The base sequence of the enhancer.
c) The location of the AUG start codon.
d) The base sequence of the operator.

66) In 4 cells stage of fog embryo, one blastomere separates and allows to develop it will _____?

a) Not develop as separated from other blastomeres.
b) It will develop as each blastomere is capable of regulate its development.
c) Half embryo will form, as other nuclear determinants are present in other blastomeres.
d) Develop in mosaic pattern.

67) Hematopoietic stem cells can be isolated and grown in culture; if one wished to control their differentiation into either neutrophils or macrophages, what colony stimulating factors could be used?

a) First, GM-CSF and IL-3 would be added to trigger formation of the granulocyte/macrophage lineage; then, the addition of either G-CSF or M-CSF would select between further differentiation as neutrophils or macrophages, respectively.
b) Since stem-cell factor (SCF) would maintain the cells as stem cells, the elimination of SCF would trigger differentiation into granulocyte/macrophage precursors; no further manipulation would be necessary.
c) The stem cells could be simultaneously stimulated with G-CSF, M-CSF, GM-CSF, and IL-3; half would become neutrophils and the other half would become macrophages; no further control is possible.
d) Since hematopoietic stem cells can become only erythrocytes, neutrophils, or macrophages, and no other cell types, the elimination of erythropoietin (EPO) would be sufficient to trigger formation of neutrophils and macrophages.

68) Transcription factors that are the first to bind DNA in heterochromatin regions, often promote euchromatin formation, and recruit other transcriptional machinery to promote transcription are best known as which of the following?

a) Co-factors.
b) Pioneer factors.
c) Histone demethyltransferases.
d) RNA holoenzyme.

69) On which of the following molecules could you find an anticodon?

a) mRNA.
b) rRNA.
c) miRNA.
d) tRNA.

70) Adult stem cells are :

a) totipotent .
b) Multipotent .
c) unipotent .
d) tripotent .

71) Which of the level of protein structure is incorrectly matched to its description?

a) Quaternary structure is the three-dimensional structure of a multi-subunit protein.
b) Tertiary structure is the two-dimensional structure of a protein.
c) Primary structure is the linear amino acid sequence of a protein.
d) Secondary structure is determined by hydrogen bonding of the amino acid backbone.

72) Nuclear determinants are also called as:

a) Inducers.
b) Organizers.
c) Morphogens.
d) Maternal genes .

73) Which of the following statements, if any, is false?

a) Monoclonal antibodies are made by identical immune cells and so will recognize and bind just one specific epitope on a target molecule.
b) Monoclonal antibodies of rodent origin are far from ideal therapeutic agents because of their short half-life in human serum and the potential for immune responses by the recipient.
c) Humanized antibodies are hybrid antibodies that have constant regions of human origin but variable regions of rodent origin.
d) An intrabody is an artificial constructs with just a single chain that is linked to variable domains and, unlike regular antibodies with four polypeptide chains, has the potential to work inside cells.

74) Which of the following is not a category of RNA?

a) Major RNAs.
b) Piwi-interacting RNAs.
c) MicroRNAs.
d) Short interfering RNAs.

75) What is the role of the promoter region in the regulation of gene expression?

a) Bind negative regulators to inhibit gene expression.
b) Recruit RNA polymerase and transcription factors to DNA.
c) Alter gene expression by binding transcription factors.
d) Allow for alternative splicing and recombination of genetic components.

76) Which binding is inhibited by pactamycin?

a) Aminoacyl-tRNA to the A-site of 30S subunit.
b) Initiator-tRNA to 30S/40S initiation complexes.
c) Peptidyl t-RNA to the 50S subunit.
d) Formation of peptide bond in P site.

77) What happens if you introduce the gene myoD into fibroblast cells growing in culture?

a) The fibroblasts will express muscle-specific proteins, fuse, and form functional muscle in culture.
b) Nothing will happen because fibroblasts are derived from a different cell population in the embryo than are the muscle precursors that respond to myoD.
c) The fibroblasts will undergo apoptosis, due to the abnormal effects of myoD on their normal differentiation.
d) myoD will activate expression of myogenin, but the muscle-specific genes will not be able to activate.

78) The following organs can be regenerated in echinodermata:

a) digestive system.
b) arms and disc.
c) pedicellariae.
d) eyes.

79) In eukaryotes, which RNA polymerase makes rRNA?

a) RNA polymerase I.
b) RNA polymerase III.
c) RNA polymerase IV.
d) RNA polymerase II.

80) Concerning stem cells, which of the following statements is incorrect?

a) Stem cells occur frequently in our bodies.
b) A stem cell can divide asymmetrically to give a daughter stem cell plus a daughter transit amplifying cell that can undergo a series of differentiation steps to give rise to a differentiated cell.
c) If for any reason, stem cells are depleted, a stem cell can divide symmetrically to regenerate the stem cell population.
d) In an adult person, stem cells are normally multipotent or unipotent.

81) Which of the following cells would be considered as differentiated cells:

a) Blastomere.
b) Spemann organizer .
c) Stem cell.
d) Muscle cells.

82) Epimorphosis is regeneration through:

a) repatterning of existing cells as seen in hydra.
b) reinitiation of division in existing cells, followed by patterning, as occurs in amphibians such as newts.
c) repatterning of existing cells as seen in amphibians.
d) reinitiation of embryonic growth from remaining cells as seen in Hydra.

83) The end point of a cell's migration in embryo development is determined by concentration of chemicals called?

a) Regulators.
b) Organizers .
c) Inducers.
d) Morphogens.

84) Adipose-derived stem cells have been shown to have greater proliferation capacity as compared to:

a) Umbilical cord stem cells.
b) Amniotic tissue-derived stem cells.
c) Bone-marrow-derived stem cells.
d) Muscle-derived mesenchymal stem cells.

85) **Hysterotomy and hysterectomy are two very common surgical terms used during pregnancy. Which is the correct option that defines hysterotomy and hysterectomy.**

a) Hysterectomy is a surgical procedure where there is a total or partial removal of the uterus with or without the female urogenital organs and Hysterotomy is the process where a surgical incision is made in the uterus during any operative procedure followed by other process of birth control like ligation.
b) Hysterotomy is a surgical procedure where there is a complete or partial removal of the uterus with or without the female urogenital organs and Hysterectomy is the process where a surgical incision is made in the uterus during any operative procedure followed by other process of birth control like ligation.
c) Hysterectomy is a surgical procedure where there is a total removal of the uterus with or without the female urogenital organs and Hysterotomy is the process where a surgical incision is made in the uterus during any operative procedure followed by other process of birth control like ligation.
d) Hysterectomy is a surgical procedure where there is a partial removal of the uterus with or without the female urogenital organs and Hysterotomy is the process where a surgical incision is made in the uterus during any operative procedure followed by other process of birth control like ligation.

86) In cell fate determination stage of specification is _____ whereas determination state is _____:

a) Irreversible, Reversible.
b) Reversible, Irreversible.
c) Reversible, can't say (depends).
d) Can't say (depends), Reversible.

87) **Animal handling and animal research is strictly monitored by an organization apart from local ethics body. The name of the organization is:**

a) CPCSEA
b) NAC-SCRT
c) IC-SCRT
d) CREC

88) Which of the following is *not* an example of post-translational modification?

a) Ubiquitination.
b) Polyadenylation.
c) Alkylation.
d) Myristoylation.

89) Recently, it was reported that adult, differentiated cells can be made to behave as pluripotent stem cells by the introduction of a few genes, one of which was Oct4. What was the rationale for this experiment?

a) Oct4 is a master switch gene that turns on the stem cell program.
b) Oct4 expression is one of the requisites for the maintenance of pluripotent embryonic stem cells in culture.
c) the Oct4 gene produces a cell-cell signaling protein that is used by stem cells to stimulate cell division.
d) Oct4 is only expressed in embryonic stem cells, and so its expression automatically reverses any differentiation that may have gone on in a cell.

90) Negative regulation of protein synthesis is accomplished by:

a) allosteric inhibition.
b) the binding of RNA polymerase to the promoter.
c) the binding of a repressor to the DNA.
d) the binding of a repressor to the RNA polymerase.

91) Which of the following ensures that viral gene translation occurs even when host translation is inhibited?

a) 5' guanine cap.
b) Internal Ribosomal Entry Sites (IRES).
c) 3' poly-A tail.
d) 5' untranslated region (UTR).

92) Chloramphenicol prevents protein translation by which of the following mechanisms?

a) It blocks the peptidyl transferase reaction on ribosomes.
b) It blocks the translocation reaction on ribosomes.
c) It blocks the binding of aminoacyl tRNA to the A site of the ribosome.
d) It blocks initiation of RNA chains by binding to RNA polymerase.

93) Restorative regeneration is:

a) healing of wounds.
b) formation of a new entity from a piece of body of parent.
c) a regular process in which the dead and worn out cells of some organs are continuously replaced by new cells.
d) all of these.

94) What element(s) do all eukaryotic promoter regions share?

a) Transcription factors.
b) Enhancers that accept binding agents.
c) A basal promoter (TATA box).
d) All of these.

95) In which of the following organelles does the initial linkage of a sugar for post-translation modification N-linked glycosylation most commonly occur?

a) Endoplasmic reticulum.
b) Nucleus.
c) Mitochondria.
d) Golgi apparatus.

96) Where are the stem cells that renew the epithelium of the gut found?

a) in the bone marrow.
b) in the inner cell mass.
c) in the villi, underlying the dead outer layer of keratinocytes.
d) near the bottom of the crypt.

97) In autonomous specification; the blastomere contains:

a) Pattern information.
b) Positional information.
c) Signal for concentration gradient.
d) Competence to induce from neighboring cells.

98) When was the genetic code completed?

a) 1958.
b) 1952.
c) 1966.
d) 1968.

99) What is the developmental pathway by which the hematopoietic stem cell gives rise to a macrophage?

a) the hematopoietic stem cell divides, giving rise to a daughter cell that remains a stem cell and a daughter cell that differentiates directly into a macrophage.
b) the hematopoietic stem cell can give rise to either a lymphoid progenitor or a myeloid progenitor; the myeloid progenitor differentiates directly into a macrophage.
c) The hematopoietic stem cell can follow two paths, one called lymphoid and the other called myeloid, either of which can ultimately give rise to macrophages and other cell types such as osteoclasts and T cells.
d) the hematopoietic stem cell must first generate a cell of the myeloid lineage (as opposed to the lymphoid lineage), then a granulocyte/macrophage progenitor, then a monocyte, and finally a macrophage.

100) What event is indicative of transcription initiation?

a) RNA polymerase is removed from the DNA.
b) Telomerase lengthens the telomeres of the DNA.
c) The RNA strand begins to be synthesized.
d) RNA polymerase binds to the promoter.