KATHMANDU UNIVERSITY
End Semester Examination
March/ April, 2017

MAR 2 7 2017

Level : B. Tech.
Year : IV
Time : 2 hrs. 30 mins.

Course : BIOT 410
Semester: I
F.M. : 55

SECTION "C"

(Long answer questions)
[3 Q. × 7 = 21 marks]

Attempt *ANY THREE* questions:

1. What are the common types of DNA damage? Describe the repair mechanism for any two types of DNA damage. [2+5]

2. What are the different mechanisms employed by DNA and RNA viruses for latently infecting cells? Elaborate.

3. What conditions of the Koch's postulates has to be met to define an organism as a pathogen? Describe briefly how antimetabolites, alkylating and platinating agents are used in cancer chemotherapy. [2+5]

4. Describe with the help of figure the Wnt signaling pathway and PI3K-Akt signaling pathway. [3.5+3.5]

SECTION "D"

(Short answer questions)

5. Write short notes on (*ANY FOUR*): [4 Q. × 3.5 = 14]
   a) Density-dependent inhibition of growth.
   b) Tumor-host interactions.
   c) Ionizing radiation and cancer.
   d) Repair of double strand DNA break.
   e) Li-Fraumeni syndrome.

6. Write down *TWO* differences between (*ANY FOUR*): [4 Q. × 2 = 8]
   a) DNA replication checkpoint and Spindle checkpoint.
   b) Schistosomiasis and Cholangiocarcinoma.
   c) Immunotherapy and Molecular targeting.
   d) Chromosomal translocation and DNA rearrangements.
   e) Angiogenesis and Vasculogenesis.

7. Give reasons why/ how? (*ANY FOUR*): [4 Q. × 3 =12]
   a) Inserting 2-naphthylamine directly into bladder does not cause bladder cancer.
   b) Blood type "O" is more prone to *H. pylori* infection.
   c) Skin cancer risk is related to sunlight exposure and intensity.
   d) Alcohol acts synergistically with tobacco to increase cancer risk.
   e) Women working in watch dial manufacturing factory developed bone cancer.

Marks Scored:

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Registration No.:

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SECTION "A"
[20 Q × 0.75 = 15 marks]

Mark "X" in the most appropriate box.

1. _____ is the weakest carcinogen.
   [ ] Aflatoxin [ ] Saccharin
   [ ] Metronidazole [ ] Carbon tetrachloride

2. Mitochondrial proteins that activate the caspase cascade.
   [ ] Bcl2 [ ] p53 [ ] Cytochrome C [ ] Camptothecin

3. Origin of TRK oncogene is an example of
   [ ] Point mutation [ ] Gene amplification
   [ ] Chromosomal translocations [ ] DNA rearrangements

4. The protein that in conjunction with BRCA2 forms the repair complex and coats the exposed single-stranded DNA regions.
   [ ] Rad48 [ ] Rad49 [ ] Rad50 [ ] Rad51

5. The drug used in hormone therapy of estrogen receptors in breast
   [ ] Methotrexate [ ] Tamoxifen [ ] Etoposide [ ] BCNU

6. Which of the following is inhibitor of angiogenesis?
   [ ] Interleukin-8 [ ] Angiogenin [ ] Platelet factor 4 [ ] EGF

7. The chemical sunscreen that elicit allergic reactions
   [ ] Cinnamates [ ] Salicylates
   [ ] Para-aminobenzoic acid [ ] Octocrylene

8. Anticancer drugs derived from plants that act as antimicrotubule agent.
   [ ] Etoposide [ ] Topotecan [ ] Taxol [ ] Irinotecan

9. The surgery technique that is mainly used for the destruction of cancer cells of skin and mouth.
   [ ] Laser surgery [ ] Electrosurgery [ ] Cryosurgery [ ] Mastectomy

10. Blastoma is a cancer involving
    [ ] Bones [ ] Connective tissue
    [ ] Epithelial tissue [ ] Embryonic tissue

11. Which one of the following cancers does not form solid neoplasm?
[ ] Lipoma [ ] Leukemia [ ] Lymphoma [ ] Sarcoma

12. The cancer that has poor responsiveness to radiation treatment.
[ ] Melanoma [ ] Hodgkin's disease[ ] Neuroblastoma [ ] Retinoblastoma

13. CMF chemotherapy (cyclophosphamide, methotrexate, and fluorouracil) is used for the treatment of _____ cancer
[ ] Testicular [ ] Ovarian [ ] Breast [ ] Prostate

14. The base analog of Thymine is
[ ] Fluorouracil [ ] Cytarabine [ ] Mercaptopurine [ ] Thioguanine

15. The hereditary cancer that shows dominant pattern of inheritance.
[ ] Breast cancer [ ] Bloom syndrome
[ ] Fanconi anemia [ ] Xeroderma pigmentosum

16. The protein that functions as Cdk inhibitor and inhibits the Cdk-cyclin pathway.
[ ] Puma [ ] p21 [ ] E7 [ ] Akt

17. Which of the following is believed to be a key cause of immortalization of cancer cells in many tumours?
[ ] Complete loss of telomeres [ ] Inactivation of the telomerase enzyme
[ ] Reactivation of the telomerase enzyme [ ] Shortening of telomeres

18. The protein that converts matrix metalloproteinases precursors into matrix metalloproteinase.
[ ] Plasmin [ ] Lectin [ ] Connexin [ ] Concanavalin

19. The protein that activates the formation of anaphase-promoting complex
[ ] Mad [ ] Bub [ ] Cdc20 [ ] Cohesin

20. The frequency with which a given dominant or homozygous recessive allele yields the expected trait within a population is known as
[ ] Epigenetic change [ ] Penetrance
[ ] Anoikis [ ] Recombination

SECTION "B"

[10 Q. × 0.5 = 5 marks]

Fill in the blanks:

21. _____exhibits a dominant pattern of inheritance for familial breast cancer and a recessive pattern of inheritance for Fanconi anemia.

22. Resveratrol is a phytochemical found in _____.

23. The gene of Rous sarcoma virus responsible for making the coat protein is _____.

24. Cell's main protein destruction machine is called _____.

25. DNA polymerase that catalyze DNA synthesis across a region containing a pyrimidine dimer is called _____.

26. The condition in which the tendency for whole chromosome to be lost or gained thereby leading to a cells that possess an abnormal number of chromosomes is called _____.

27. Cancer of β lymphocytes is called_____.

28. The first synthetic dye discovered by Perkin is _____.

29. The treatment method in which radiation source is inserted directly within or close to the tumor is called _____.

30. _____ is a cancer arising from cells of placental membranes that are sometimes left behind after childbirth.