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B.Sc. Ag/Vet./Fisheries/Forestry

For AFU Model

2075

Set-XI

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Hints and Solutions

Physics

- b) Work and energy
- c) $V_A = \sqrt{u^2 + 2gh}$ $V_B = \sqrt{u^2 + 2gh}$
- d) $W = m(g + a)$
- a) $T = 2\pi \sqrt{\frac{m}{k}}$ $T \propto \sqrt{m}$
- a) If 'm' be the mass of wax & 'r' is the radius of the mass of wax.
 $I_1\omega_1 = I_2\omega_2$
 $\omega_2 = \frac{I_1\omega_1}{I_1 + mr^2}$ So, $\omega_2 < \omega_1$ (i.e. angular velocity decreases)
- c) More in the tube of smaller diameter
 $h = \frac{2T \cos\theta}{r\rho g} \propto \frac{1}{r} \propto \frac{1}{d}$
- a) $g = \frac{GM}{R^2}$ [for earth] (i); where, $g = 9.8 \text{ m/s}^2$
 $g' = \frac{G.(3M)}{(3R)^2}$ [for a planet] = $\frac{GM}{3R^2} = \frac{g}{3}$ [from (i)] = 3.3 m/s^2
- b)
- c) $T = \text{constant}$ $\Delta U = 0$
 $\Delta Q = \Delta U + \Delta W$ $\Delta Q = \Delta W$
- a) According to Newton's law of cooling, the rate of heat loss is:
 - directly proportional to surface area of the body.
 - directly proportional to the difference in temperature with surrounding i.e. $\frac{dQ}{dt} \propto A.(\theta - \theta_0)$
- d) -30°C to 357°C
- c) Initial frequency (f_1) = 216 Hz
Final frequency (f_2) = ?
Beat frequency (f_b) = 8 Hz
As we know, $f_1 = f_b \pm f_2$
 $216 = 8 + f_2$ [\therefore the beat frequency \downarrow es] $\therefore f_2 = 208 \text{ Hz}$

Chemistry

- c) Haematite is Fe_2O_3 , a magnetic ore.
- c) Ca^{2+} and Mg^{2+} forms insoluble salts with soap.
- d) Solvay process is based on electrolysis of brine (NaCl) solution.
- d) $\text{BaO}_2 \xrightarrow{\Delta} \text{BaO} + \frac{1}{2} \text{O}_2$
- d)
- a) $2\text{NH}_3 + 3\text{Cl}_2 \longrightarrow 2\text{NCl}_3 + 3\text{HCl}$
- a) CH_3 is sp^3 -hybridized. Homolytic bond fission give rise to free radical formation.
- b) Follow IUPAC rules.
- c) Beilstein test is also given by some other compounds such as urea, thio urea, etc.
- a) $\text{CH}_2 - \underset{\text{Br}}{\text{CH}} - \underset{\text{Br}}{\text{CH}_2} - \text{CH}_3 \xrightarrow[-2\text{HBr}]{\text{KOH alc.}} \text{CH} \equiv \text{C} - \text{CH}_2\text{CH}_3$
- d) Unsaturated molecules decolourise Baeyer's reagent.

24. b)
- Botany**
25. d) Chlorophyll has phorphyrin head containing central core element as magnesium (Mg) which give green colour to chlorophyll. Central core element of Fe in haemoglobin gives red colour.
26. b) Cyanobacteria, bacteria and fungi all are unicellular organisms. They are previously placed under kingdom Plantae. Some bacteria and all yeast are fermentors which can be used to produce alcohol. While bacteria has no nucleus and true nucleus is present in yeasts.
27. c) Cell wall is present in plant cell, bacteria and fungi as outermost layer. The cell wall is made from chitin in fungi, cellulose in plants and peptidoglycon in bacteria.
28. a) Algae is non embryophyte while bryophytes, pteridophytes, gymnosperms and angiosperms are embryophytes.
29. c) *Pteridium* is advance group of ferns but it has homosporous habit (bearing only single types of identical spores) and produce monoecious prothallus.
30. a) Conifers like pines can survive even at -10°C ; it can maintain optimum temperature inside plant body by the presence of needle shaped acicular leaves.
31. b) Tomato and brinjal are berry, while cucumber and pumpkin are typical example of pepo fruits. The edible part of potato is modified underground stem called tuber.
32. a) Bicarpellary ovary is present in Brassicaceae, Asteraceae and Solanaceae; while persistent calyx is present in Solanaceae and Asteraceae. More persistent hairy calyx is present in Asteraceae (potato or marigold family).
33. a) Major part of vascular tissues in monocot stem is occupied by sclerenchyma. It also helps to form bundle sheath cells in stem.
34. d) Among 36 (or 38) ATP, only 2 molecules are produced in cytoplasm (outside mitochondria) through Glycolysis (rest 34 is produced from mitochondria). The glycolysis may produce additional 4 (or 6) ATP from NADH_2 through ETS. For ETS, cytochromes are found in oxysomes of mitochondria.
35. d) The cell wall components are produced during cytokinesis. In plant cells, phragmoplast formation leads to the formation of cell plate. During this process, vesicles of Golgi bodies are involved and additionally supported by endoplasmic reticulum also.
36. c) There are only 20 amino acids for the formation of all types of proteins.

Zoology

37. a)
38. a)
39. c) Marine water
- Echinoderms are exclusively found in marine water.
 - Ambulacral groove is absent in ophiuroidea.
40. a) Platyhelminthes
- Pseudosegmentation is found in platyhelminthes
 - Pseudocoelom is found in Nematelminthes.

41. b) Liver
42. a) Cleavage is the early cell divisions of the zygote upto the completion of blastula stage. Pattern of cleavage is frog's egg is holoblastic and unequal.
43. a) Heart beat is controlled by vagus nerve (X^{th} cranial nerve) Vagus is the longest cranial nerve.
44. d) Mammalian RBC is devoid of nucleus and cytoplasmic organelles like mitochondria, golgi bodies, centrosomes, ribosomes etc. which helps to accommodate maximum amount of haemoglobin.
45. a) Corpus luteum and corpus albicans are present in ovary. Corpus callosum is present in brain and connects two cerebral hemisphere.
46. c) Cervical vertebrae are located in neck region. Presence of 7 cervical vertebra is the mammalian character. Thoracic vertebra are located in abdominal region.
47. c) Neck is called growth zone, segmented body is called strobila.
48. c) Starfish \rightarrow Echinodermata, cuttle fish \rightarrow mollusca, cray fish-arthropoda.

49.a	50.d	51.b	52.d	53.c	54.b	55.b
56.a	57.c	58.c	59.a	60.d	61.a	62.a

63. b) Total no. of terms = $(n+1)(n+2)/2 = (10+1)(10+2)/2 = 11*6 = 66$
64. a) Non-empty subset = $2^n - 1 = 2^4 - 1 = 16 - 1 = 15$
65. a) $Z = (2,1) W = (3,4), Z.W. = (ac-bd, ad+bc) = (2*3-1*4, 2*4+1*3) = (6-4, 8+3) = (2, 11)$
66. b) $x + iy = 1 + i\sqrt{3}$
Let, $(x, y) = (1, \sqrt{3})$ lies in the 1st quadrant
Therefore, principle value = $\tan^{-1}(y/x) = \tan^{-1}(\sqrt{3}/1) = \pi/3$
67. c)
68. d) If $f(x)=0$ has roots α and β , then $f(\sqrt{x}) = 0$ has roots α^2 and β^2 respectively.
69. d) Since, it is irrational equation is $\sqrt{29}$ is an irrational number and irrational equation always have irrational roots.
70. a) $\log_a 243 = 5$
 $a^5 = 243, a = \sqrt[5]{243} = 3$
71. d) $b/\sin B = 2R$
 $2/\sin 30^\circ = 2R$
 $R = 2$, Therefore, Area of circum-circle = $\pi R^2 = 4\pi$
72. a) Exterior angle = $360^\circ/n = 360^\circ/6 = 120^\circ$
Interior angle = $180^\circ - 120^\circ = 60^\circ$

G.K

73.b	74.c	75.a	76.a	77.a	78.d	79.d	80.d
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Result will be published on Sunday

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==== Best of Luck ====