



NAME

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Pre-Medical Model Entrance Exam

2074

(Set-IV)

Date: 2075/04/26

Hints and Solutions

NAME

Solutions for Pre-Medical Model Entrance Exam set -IV (2075-04-26)

Physics

- a) $H_{\max} = \frac{u^2 \sin^2 \theta}{2g} = \frac{(100)^2 \times \sin^2 45}{2 \times 10} = 250 \text{ m}$
 $\Delta H = 250 - 240 = 10$ (decreases)
- b) $F = \frac{\Delta p}{\Delta t} = \frac{mv}{1/n} = nmv$
- c) Loss of KE = work done against friction
 $E_k = FS \Rightarrow S = \frac{E_k}{F}$
As both E_k & F are same, so stopping distance S is same.
- b) Centripetal acceleration
 $a_c = \frac{v^2}{r} = \frac{(30)^2}{500} = 1.8 \text{ m/s}^2$
Tangential acceleration $a_t = 2 \text{ m/s}^2$
 $\therefore a = \sqrt{a_c^2 + a_t^2} = \sqrt{(1.8)^2 + (2)^2} = 2.7 \text{ m/s}^2$
- b) $g = \frac{GM}{R^2}$ so $g \propto \frac{1}{R^2}$
- d) $\gamma = 3\alpha, \beta = 2\alpha \therefore \gamma = \frac{3}{2}\beta$
 $\Delta V = \gamma V \Delta T = \frac{3}{2}\beta V \Delta T$
- c) $E = \frac{3}{2}KT, E \propto T, \therefore \frac{E_2}{E_1} = \frac{T_2}{T_1} = \frac{600}{300} = 2$
- b) $\eta = \left[1 - \frac{T_2}{T_1}\right] \times 100\%$
Decrease in temperature of sink is more effective than increase in temperature of source by the same amount.
- c) Object and image moves in opposite direction
 $\therefore V_R = V - (-V) = 2V$
- d) $\mu = \frac{\sin\left(\frac{\delta_m + A}{2}\right)}{\sin\frac{A}{2}} = \frac{\sin\left(\frac{180 - 24 + 4}{2}\right)}{\sin\frac{A}{2}} = \cot\frac{A}{2}$
- c) $F = \frac{1}{4\pi\epsilon_0} \frac{q_1q_2}{r}$ & $F' = \frac{1}{4\pi\epsilon_0} \frac{q_1q_2}{KR^2}$
Given, $F' = 4F \therefore \frac{1}{4}KR^2 = r^2 \therefore R = \frac{2r}{\sqrt{16}} = \frac{r}{2}$
- a) Capacitance increases, more charge will store by battery.
 $C_m = \frac{KE_0A}{2} = K C_{\text{air}}$

Chemistry

13. c) C_2H_2 is not obtained during the reaction.
14. a)
$$C_2H_5 - \overset{2}{CH} - \overset{1}{CH_2}OH \rightarrow 2\text{-ethylbutanol-1}$$

$$|$$

$$C_2H_5$$
15. c) In Beilsteins test, halogens burn with green edge flame on Cu wire.
16. b) It is Electrophilic addition reaction.
17. b) Ozone is dry bleacher. H_2O_2 acts as bleaching agent in presence or absence of moisture.
18. c) $NCl_3 + 3H_2O \rightarrow NH_3 + 3HOCl$
19. d) $Ca(NO_3)_2 \rightarrow CaO + 2NO_2 + 1/2O_2$. Ca imparts brick red colour to flame.
20. b) The rxn is exothermic with a reduction in number of moles, hence it is favoured by low temperature & high pressure.
21. c) 50 ml of 0.5 M $Ca(OH)_2 = 0.025$ mol of $Ca(OH)_2$
 The equation is
 $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$
 1 mol of $Ca(OH)_2$ gives $CaCO_3 = 100$ g
 0.025 mol of $Ca(OH)_2$ gives $CaCO_3 = 100 \times 0.025 = 2.5$ g.
22. b) In NH_3 , nitrogen has lower oxidation number.
23. a) 60g of urea (NH_2CONH_2) has 28g of N
 \therefore 100g of urea (NH_2CONH_2) has $\frac{28}{60} \times 100$ g of N $\approx 46\%$
24. b) TEL (tetra ethyl lead) is anti knocking agent
25. b)

Botany

26. d) Smallest pathological agent is prion which is protein unit without genetic material.
27. b) All hepatitis are caused by retrovirus (virus having ssRNA genetic material) except hepatitis B which is caused by dsDNA..
28. a) Universal organelle is 70S ribosomes which is also found in all eukaryotes and prokaryotes as bacteria.
29. d) Epipetalous stamen with bicarpellary ovary and cypsela fruit is common character of Asteraceae.
30. c) Heterocysts are specialized heterotrophic cell of cyanobacteria (BGA) for biological nitrogen fixation.
31. d) Lichen prefer to grow in acidic soil.
32. c) Red sea is red due to c-phycoerythrin present in *Trichodesmiumerythrium* (a blue green algae).
33. d) Reticulate chloroplast is present in cells of *Odeogonium*.
34. c) Ecology was first best defined by E. Haeckel as the reciprocal relationship between living organisms and their non-living habitat.

35. d) Quaternary lysosome is also called suicidal bag due to involvement of autolysis.
36. a) Dawsonia is the largest bryophyte representing largest gametophytic phase.
37. d) All Pteridophytes lacks ovules but may show leptosporangiate sporogenesis, heterospory habit and protostelic vascular tissues system

Zoology

38. b) Analogous organs like wings of insects and birds, eyes of octopus and mammas or flippers of penguins and dolphins illustrate convergent evolution
39. b) *Pseudocoelom*, a false coelom derived from embryonic blastocoel.
40. a) Micromerozoites \rightarrow Stomach of mosquito \rightarrow Microgametocytes \rightarrow male gametes
 Macromerozoites \rightarrow Stomach of mosquito \rightarrow Macrogametocytes \rightarrow female gametes
41. b) The cerebral hemisphere, circum-pharyngeal connectives and sub-pharyngeal ganglia form a ring around pharynx in 4th segment.
42. d) Gills \rightarrow aquatic arthropod eg:- Prawn
43. d) Chromophil cells found in pharynx of earthworm - serve to secrete saliva (- mucous and proteases)
44. a) **Bile:** In frog, blood first fixes in intestine with bile because first part of intestine is called duodenum which collects the opening of hepatopancreatic duct which brings the bile from liver that help in emulsification of fats. Succus entericus is an enzyme which acts as emulsify food.
45. d) Excurrent canal found in sponge.
46. d) *Taenia saginata*- intermediate host- cow, *Taenia solium*-intermediate host-pig, diphyllobothrium- fish & tapeworms, echinococcus- primary dog and intermediate host human.
47. a) Imprinting: rapid form of learning. Kinesis - random movement
48. b) Salamandar is a tail bearing amphibia belong to urodela of class amphibia.
49. d) Mammal cranial nerve 12 pairs.
50. c) **Hygroscopic skin:** for absorbing moisture.
 Greatly enlarged eye lids for clear vision in desert place.
 Eg: *Phrynosoma* (Horn-toad)

Result will be published on Sunday

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Best of Luck